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IRON ORE MARKET REVIEW 2018

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ABSTRACT

Iron ore prices remained at relatively high levels during 2018. Premia paid for high quality ores increased and are substantial. Global iron ore production is estimated to grow by around 2% in 2018. Sharp cuts in production of un-beneficiated ore have taken place in China during 2018. Demand for iron ore in general and for high grade products in particular has however increased. Future developments in China, both in the steel and iron ore industries, will be crucial to the global iron ore markets in 2019. This review is written in March 2019 and incorporates as much as possible figures and trends for the full year 2018, in some cases this is however not yet possible.

Steel markets

While steel market conditions have continued to improve in most regions, strong headwinds remain. According to the OECD in its Steel Market Developments Q4 2018 [1] it is uncertain whether the momentum will continue. Trade actions and the presence of distortive governmental support and subsidies are still of great concern. On a macro level the International Monetary Fund has revised its forecasts for global economic growth slightly downwards for the years 2019 and 2020 [2].

World crude steel production grew to 1,790 Mt in 2018 (1,689 Mt in 2017), a new global all-time high [3]. This is an increase of 4.5% over 2017, and the third consecutive year of growth.

Chinese crude steel production increased by 57 Mt in 2018, an increase of 6.6%, compared to an increase by 3.0% in 2017. At 928 Mt China continues to be, by far, the largest producer, output by the second largest producer India was 106 Mt of crude steel in 2018. In 2018 51.9% of total world crude steel was produced in China 2.7 percentage points higher than the year before [4].

Global steelmaking capacity increased from 1,056 Mt, to 2,290 Mt between 2000 and 2018. After two years of decline, global capacity rose by 2.0% in 2018 compared to 2017. In spite of these recent capacity increases the gap between capacity and production is likely to narrow because of the strong growth in steel production. The overcapacity is estimated to 540 Mt in 2018 a decrease since 2017. This equals a utilization rate of 76% in 2018 up from 75% in 2017 but still lower than 80% in 2000. In 2015 the utilization rate was at its lowest during recent years and fell to 70%. 2015 is also the year with the highest recorded capacity 2,334 Mt. Since then more steel capacity has been shut down than what has been installed while at the same time production of crude steel has increased. However, at present there are additional new steel capacities under planning which could possibly affect the utilization rate negatively [5].

In the first quarter of 2018 trade by the seven largest steel producing countries declined. Chinese exports fell by 27% compared to the same period 2017, Indian exports by 35%, Japanese, Korean and EU exports also declined but by smaller figures. Russia increased its steel exports by 1.2% in the same period. There are as yet no steel trade figures for full year 2018 available, but a decline compared to 2017 seems likely.

Global exports of finished and semi-finished steel products reached 463 Mt in 2017, down 2.2% from 474 Mt in 2016 [6]. China is the main exporter with 75 Mt in 2017 or 16.2% of total exports down 30.8% from 108 Mt in 2016. EU exported a total of 148 Mt of which 117 was sold to other EU countries. Other major exporting countries are: Japan 37.5 Mt, South Korea 31.4 Mt and Russia 31.1 Mt.

Global steel demand recovery since 2016 has supported a rebound in steel prices from their lows in 2015 and early 2016. The world steel price index which had trended downwards since 2011, rose sharply in 2016 and continued to increase during 2017. In the first half of 2018 prices for flat products rose by 13% and rebar by 9%. Price developments differed considerably in the various market however, in the US prices in the same period rose much quicker by 44% and 24% respectively. Towards the end of 2018 steel prices on average trended slowly downwards. Prices for the key steelmaking raw materials (iron ore, hard cooking coal and scrap) declined between early 2011 and late 2015 beginning of 2016, contributing to lower steel production costs. Prices for the three main raw materials have since started to recover. The margin between raw materials costs and steel prices increased between 2013 and the second half of 2016 when, because of the sharp increase in the price of hard cooking coal, the margins dropped sharply. Since then margins have recovered

Fig. 1. Iron ore production 2018 (Mt)
Source: RMG Consulting, 2019

due to a stabilization in raw materials prices and stronger steel prices.

Iron ore production

For 2018 Australian production is estimated at 894 Mt, an increase of 1.2% compared to 2017 (see **Fig. 1**). Brazilian production is estimated at 439 Mt in 2018, a marginal increase only compared to 2017. Based on these and other available production figures reported by iron ore mining companies we estimate production in 2018 to reach around 2,225 Mt, a growth below 2%. In 2017 global output of iron ore increased by 2.7% to 2,187 Mt. The increase is mainly due to higher output in Australia particularly the ramp up of the Roy Hill mine. In 2017, Australia grew by 3.2%, to 883 Mt, and Brazil grew by % to 436 Mt. Asian production, which reached a peak in 2007 at 647 Mt, has come down considerably since, mainly due to shrinking output in China and India. There is considerable uncertainty around Chinese iron ore production [7]. The national Chinese production figures for unbeneficiated ores increased by 1.9% to 1,322 Mt in 2017. In 2018 Chinese production of unbeneficiated iron ore, as officially reported, has fallen sharply and reached 763 Mt, a decrease of 42.3% [8]. RMG Consulting has made estimates of Chinese production of beneficiated ore (in order to make figures comparable to the global standard Fe content of 62%) for 2018 our figure is 215 Mt compared to only 115 Mt in 2017. In India, the downward trend has turned, with an increase in production since 2014. In 2017 production grew to 202 Mt, a 9.4% increase.

In Europe, including also Kazakhstan and Russia, production declined by 1.5% in 2017, down to 232 Mt. African production fell by 5.4% to 85.7 Mt in 2017, and output by the two major producing countries, South Africa and Mauritania, declined, the former by 6.3% and the latter by 12%.

During the last decade, with the exceptional increase in production from Australia and the falling production in China, the share of iron ore being produced by developing countries has declined from top levels at 76% in 2007 to just below 50% (estimated) in 2018 [9].

In 2018, the combined output by 14 major companies, which so far have reported production volumes, reached 1,490 Mt. This represents a growth of 0.7% year-on-year. Vale shows the largest increase with a growth of 18 Mt compared to 2017. **Table 1.**

Iron ore trade

Trade figures for all 2018 are not available for all countries at this time of the year. Some are however already published. During 2018, Australia's exports continued to increase, reaching 836 Mt, an increase of 1.4% [11]. The second largest exporter, Brazil, has a market share of 24%. Brazilian exports were 352 Mt for the first 11 months of 2018 [12]. Together with data from a few more countries we have constructed **Table 2**. Based on these data we estimate a minor decline in trade of iron ore in 2018 compared to 2017.

South Africa exported 58 Mt of iron ore in 2018, a decrease with 14% compared to 2017, which makes it the third largest exporting country. Canada, number 4, and the Ukraine 5, exported 43 Mt and 35 Mt, respectively, in 2018. Sweden, the seventh largest exporter, shipped some 22 Mt in 2018. For 2018 the five largest exporters have increased their exports by a total of 0.5%. India's exports decreased in 2018 reaching 11 Mt even further from the peak in 2009 at 117 Mt. There was a rebound in

Table 1. **Iron ore production 2018 by major companies (Mt)**

Rank	Company name	Country	Production 2018	Production 2017	2018 % of world total
1	Vale	Brazil	384.6	366.5	16.8%
2	Rio Tinto	U.K.	290.8	282.5	12.9%
3	BHP	Australia	274.0	268.3	12.3%
4	FMG	Australia	168.6	168.8	7.7%
5	Hancock*	Australia	72.1*	58.0	2.7%
6	Arcelor Mittal	U.K.	58.3	57.4	2.6%
7	Anglo American	U.K.	46.5	62.0	2.8%
8	State of India	India	42.0	41.6	1.9%
9	Metalloinvest	Russia	40.4	40.3	1.8%
10	CSN	Brazil	27.9	29.9	1.4%
11	Metinvest	Russia	27.4	27.5	1.3%
12	LKAB	Sweden	26.9	27.2	1.2%
13	US Steel	USA	23.1	21.1	1.0%
14	Cliffs Nat Res	USA	20.3	28.9	1.3%
	Total top 14		1,490	1,480	
	Total world		2225**	2187	67.7%

Notes: * Hancock production 2018 includes Atlas Iron.
** State of India includes NMDC and Odisha Mining Corp., which are fully controlled by the national government and Odisha State respectively.
Sources: Corporate annual and quarterly reports [10]

Table 2. **Export of iron ore 2018 (Mt)**

Country	Export 2017	Export 2018	Change 2018/17 (%)
Australia	828	836	1.0
Brazil	377	384	1.9
South Africa	67	58	–13.9
Canada	43	43	–0.2
Ukraine	37	35	–5.4
Sweden	24	22	–8.2
India	22	11	–50

Sources: RMG Consulting based on national statistics and company reports.

2017 when 22 Mt was shipped as the Indian government, in 2016, cut the country's iron ore export tariffs and eased restrictions, however, in 2018 with rising steel production and a problematic political situation with several mining operations closed down more ore was directed towards domestic steel production.

Global exports increased by 3.3% in 2017 (see **Fig. 2**). World total iron ore exports have more than doubled since 2006 and amounted to 1,568 Mt in 2017 compared to 1,518 Mt in 2016. Australia is by far the largest exporter of iron ore with a market share of 53%.

China alone accounted for 69% of total imports in 2017. In 2018 China imported 1,064 Mt of iron ore, a decrease of 1.0%. During 2017, the country's imports of iron ore increased 5.0% following a growth of 7.7% in 2016. With rising imports and falling domestic production, which has been the trend for the last couple of years, Chinese import dependency has reached even further heights and was 90% in 2017 up from 89% in 2016. However, in 2018 this was reversed and import dependence fell to 80%.

In 2017, the seaborne iron ore trade increased by 2.9% to 1,504 Mt. As in earlier years, the increase was entirely due to higher Chinese imports.

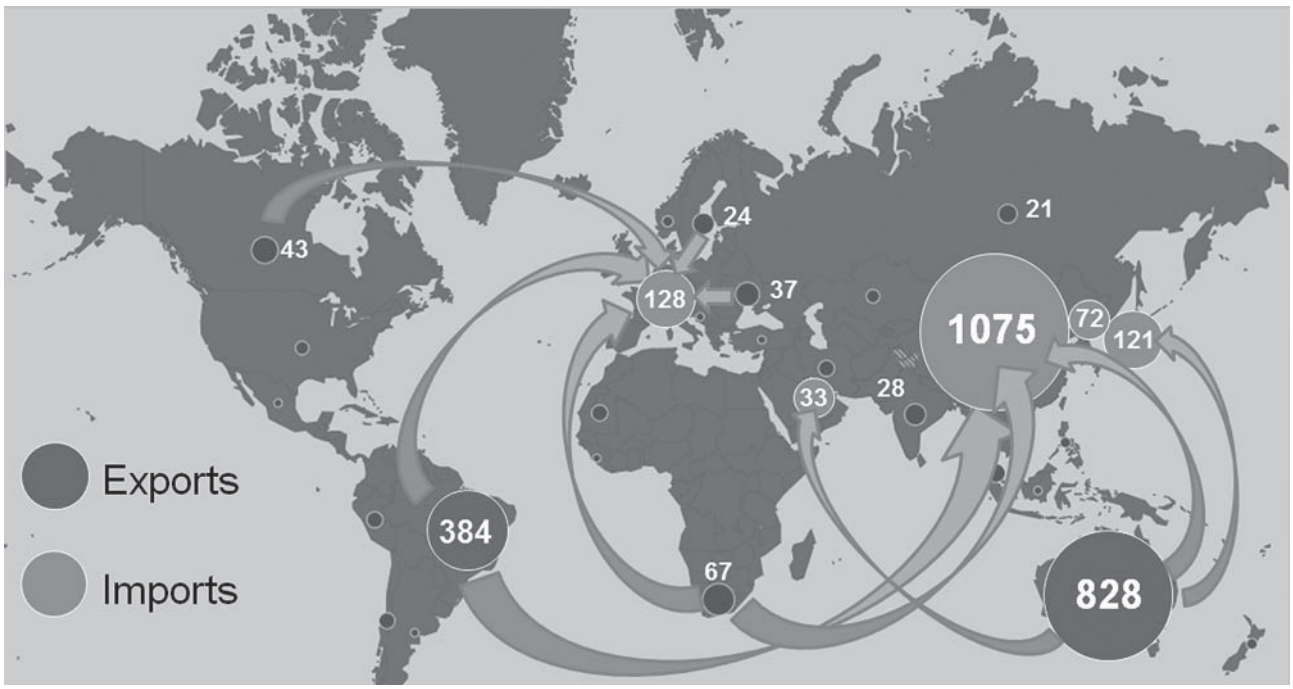

Fig. 2. Iron ore trade 2017 (Mt)

Table 3. **Pellet production by major companies 2016–2018 (Mt)**

Company	2016	2017	2018
VALE	46	50	53
Cliffs	24	26	21
Metalloinvest	25	25	28
US Steel	18	23	23
LKAB	22	21	22
Arcelor Mittal	19	19	19*

Note: Estimate
Source: Company reports

Iron ore pellets

The most important pellet companies together produced 164 Mt in 2017. For 2018 the same companies produced 166 Mt, an increase of 1.2%. **Table 3.**

Global production of pellets in 2017 increased to 420 Mt, up 5.4% compared to 2016. Exports of pellets in 2017 also grew (7.9%) to 133 Mt. Pellet export from Brazil reached 34.3 Mt (up 13.3%) in 2018 while Indian exports declined by 18.5% to 8.4 Mt.

The share of pellets in total iron ore production has declined since the late 1990s when it ranged between 26-27%. Developments in recent years have underlined the sensitivity of pellet demand to world market conditions and prices. The closure of Samarco capacities caused the pellet share of total production to shrink even lower and in 2017 it was as low as 19% the same proportion as 2016.

Iron ore prices

Iron ore prices, 62% Fe CFR China, remained at relatively high levels in 2018 and volatility decreased compared to 2017. 2018 started on a high note just shy of USD 80/t and declined in the middle of the year only to rebound in the third and fourth quarters almost coming back to the levels in the beginning of the year. In November the price dropped again but recovered around USD 72/t at year end. The average price in 2018 was USD 70/t down marginally from 71 in 2017.

So far in 2019 iron ore price, 62% Fe CFR China, has been increasing by 24.5% between 1st of January and 15th of March to USD 86.1/t. The average price in the same period is USD 82.1/t a strong increase over the same period 2018 and the last quarter in 2018. The growth compared to the average price in 2018 is 18%.

The price of iron ore held up well during 2018 on the back of robust demand from China. However, the iron ore pricing system is going through a period of change. When the benchmark pricing model fell apart in 2009/2010 the dominating 62% Fe qualities exported from Australia became the globally recognized pricing basis. Through the boom years steel companies were more interested in feeding their blast furnaces than worrying about qualities. The 62% Fe price worked well as a basis for price setting of various qualities. The global increase of iron ore production consisted mainly of low-quality ores with iron content less than 62%. A lack of high-quality iron ores has been the result. China, attempting to reduce environmental problems and to diminish waste of energy as well as trying to improve productivity, started to demand higher qualities of iron ore. The price spread between low quality iron ores (below 58%) and the 62% standard product on the one hand and high quality (above 65%) and the 62% standard on the other hand, has increased. The discount for 58% iron ore price compared to 62% iron ore remained on average USD 29/t in 2018 (USD 29/t also in 2017) compared to USD 14/t in 2016. The premium paid for 65% Fe is substantial, in some periods during 2017 it has reached 40% on top of the 62% Fe index price. On average over in 2018 the premium paid was USD 21/t, up from USD 16 and 7/t in 2017 and 2016 respectively. Iron ore products with more than 65% Fe-content will be paid with even higher premia, which are not linear but increasing with the ore grade and decreased content of gang material. It will be more important to clarify which quality is referred to, when giving an iron ore price projection in the future.

Project pipeline

Most of the increased production of iron ore in 2018 came from Australia and Brazil where large-scale project ramp-ups took place. In Brazil, Vale continued to gradually increase production at the S11D mine in Carajas. The investment totals 14 billion USD and full capacity, 90 Mt, is expected in 2020 [13]. Production in 2018 at S11D reached 55 Mt. The project accounted for 82% of Vale's USD 972 million investment budget for 2018. Rio Tinto had two major projects in the pipeline: the Koodaideri at the feasibility stage and the 10 Mt/annum Silvergrass mine which was officially opened on the 30th of August 2017. The Koodaideri project aim to sustain the quality and tonnage of the company's Pilbara blend product. BHP continues to develop the South Flank Mines, which will sustain production levels of the company and also raise the average iron grade from 61% to 62%, and the overall proportion of lump from 25% to approximately 35%. The mine, which could possibly start production sometime after 2020, has been plagued by cost increases. The Roy Hill iron ore mine in Australia is close to reaching its full capacity at 55 Mt/a. For the financial year ended June 2018 sales from the mine was about 33 Mt. Fortescue Metals Group (FMG) approved the USD 1.3 billion Eliwana project in May 2018. The project will increase the average grade of FMG products from a 58.5% to around 60% Fe.

The Timir joint venture between Evraz and Alrosa in Russia is completing the first USD 180 million stage with a capacity of 3 Mt/a. The project should, according to plan, reach full capacity in 2018. A second phase could

expand capacity to 6 Mt/a at a cost of another USD 380 million. New Chinese owner of the Tonkolili mine in Sierra Leone, Shandong, has published plans to invest USD 700 million to restart the mothballed operation. So far there are however no definitive news of a project start [14].

A small but interesting new start is the bankrupt Northland Resources' mine in Pajala Sweden. A new company, Kaunis Iron AB, bought the mine, the processing plant and other facilities. The high premium for high grade products has made the mine profitable again. Production was restarted in July 2018. The mine has a capacity of 2 Mt/a [15].

Corporate concentration

Corporate concentration in the iron ore industry has remained at a constant level in 2017 after a period of increase from 2014-2016. It is still too early to make calculations for 2018 but we do not anticipate any major changes in corporate concentration during the past year. The earlier trend of decreasing concentration, due to swift production increases by many small and medium sized producers not utilizing their full capacity, during the 2005-2008 period, was reversed in 2009. At that time, the major producers got their large expansion programs up and running. Since then, industry concentration has increased slowly but steadily. But the increase stopped in 2017, when the ten biggest producers accounted for 62.9% of global production compared to 62.7% in 2016. The 'Big 3' iron ore mining companies (Vale, Rio Tinto and BHP) have steadily increased their control over total world iron ore production from 40.0% in 2016 to 41.9% in 2017 and a preliminary figure of 42.7 in 2018 (see Table 2.)

Vale, the Brazilian giant mining company, remains the world's largest iron ore producer, with 385 Mt of iron ore production in 2018, up from 367 Mt in 2017, a new all-time high. After marginal growth in 2016, partly due to the Samarco dam failure, new production capacity at the S11D project in Carajas has come on stream. All of Vale's mines are located in Brazil and its market share rose from 16.4% in 2016 to 16.8% in 2017 and remained at the same level in 2018. This is down from its peak share of 18.8% in 2007. Rio Tinto has been the second largest producer since 2016, when it overtook BHP and regained its traditional second rank, which it had always held until 2013. Rio produced 291 Mt in 2018 up from 283 Mt in the previous year. It controls a market share of 12.9%, the same share as in 2017. Rio Tinto has most of its mines in the Pilbara region in Australia, and in addition controls the Iron Ore Company of Canada (IOC) with mines in Labrador. BHP managed to keep its market share at 12.3% as production increased by 6 Mt to reach 274 Mt in 2018. Except for the Samarco joint venture in Brazil together with Vale, which has not been producing since 2015, all of BHP's mines are in Western Australia.

Hancock Prospecting, the privately owned emerging iron ore giant, controlled by Gina Rinehart, has grown rapidly in the past two years. The gradual start-up of its Roy Hill Mine during 2017 and 2018 has catapulted Hancock into rank 5 among the world's largest iron ore miners, ahead of both Anglo American and Arcelor Mittal. With the acquisition of Atlas Iron in 2018 Hancock reached rank 5.

Most probably corporate concentration will only change marginally into the next years. How much will depend mostly on the speed of expansion by the 'Big 3' as well as by FMG and the newcomer Hancock Prospecting.

Market outlook

Global economic growth in 2018 is estimated at 3.7% according to the IMF December 2018 World Economic Outlook update. Global growth is expected to be 3.5% in 2018 and 3.6 in 2019, which is lower than previously anticipated. However, IMF issues a warning: the escalating trade tensions could spark a further deterioration further the Brexit is another potential trigger to decline. Meanwhile, the near-term momentum of the US is strengthening, as projected. China's growth projections, 6.6% for 2018 and 6.4% in 2019, reflects the country's reorganization of its economy and the concurrent slow down. The main risk is however the announced and expected tariff increases by the United States and retaliatory measures by trading partners which have increased the likelihood of escalating and sustained trade actions.

During the first two months of 2019 world crude steel production increased by 3.8% compared with the same period for 2018. While it is slightly early to make any predictions based on these figures they are encouraging. China, which alone accounts for roughly half of the crude steel production globally increased the production of crude steel grew by 9.2% in the first two months of 2019 compared to the same period 2018. The country's production of unbeneficiated iron ore continued to fall, down 4.0% for the period January to February 2019 compared with the same period one year earlier.

The World Steel Association's Short Range Outlook October 2018 for world steel use, anticipates an increase in world steel demand by 3.9% in 2018, followed by an increase of 1.4% in 2019, compared to a growth of 2.4% in 2017 [16]. China's steel demand is estimated to reach 781 Mt in 2018 (47% of total world demand) and is expected to be flat in 2019. In comparison to the World Steel Association's earlier forecast in April 2018 [17], global growth in 2017 was 0.4 percentage points lower than predicted but the 2018 figures have been revised upwards with 0.2 percentage points.

The current decisive factor for steel market prospects is the direction of economic change in China. It is not the slowdown in Chinese growth per se that would lead the slower steel demand growth over the longer term, but rather the reduced share of investment in Chinese GDP.

With lower steel growth, the scrap ratio of the steel burden will also increase as more and more steel becomes available for recycling. This will limit the demand growth for virgin units of iron ore. Thus, pig iron production combined with the production of direct reduced iron (DRI) can arguably give a more accurate picture of the demand for iron ore in China than crude steel does. In 2017 pig iron production increased by 1.2% or 13.5 Mt and DRI production increased by 3.0% or 2.3 Mt [18]. That would generate an additional demand of roughly 26.3 Mt iron ore globally. In China, pig iron production rose 1.8% or 12.6 Mt, converted to iron ore 21 Mt. However, global iron ore production increased by 58 Mt in 2017. Clearly more iron ore is produced than what is demanded but paradoxically iron ore prices stayed high during the year. This can, as discussed above, at least partly be explained by the increasing price premia for high quality iron ores and an increasing spread between the various qualities.

With the completion and ramp-up of Vale's S11D and the independent Roy Hill mine, iron ore capacity will probably increase more than demand also in the next couple of years. The production forecast by the 'Big 4' (Vale, Rio Tinto, BHP and FMG) for 2019 is an increase of around 50 Mt, in 2021, the production volume could be raised to 1,250 Mt.

The spot price for 62% Fe fines delivered in China will probably remain relatively high for the rest of 2019. However, it is not likely that the strong increase in the first quarter of 2019 will last through the year, but a price increase compared to 2018 is already forecasted by some of the leading analysts [19]. Further, the spread of prices between the low, medium and high-quality iron ores can be expected to remain wide. There seems to be a glut of low-quality ores and a deficit of high-quality iron ore products, especially pellets. If this situation continues a reduction of production by certain low-quality miners might take place. Chinese production of un-beneficiated ore in 2018 has dropped considerably in comparison to 2017. Other producers of high-quality ores might instead increase their production. The restart of Kaunis Iron and its 69% Fe and low impurities product in Sweden is but one example.

January 25th 2019 one of Vale's tailings dams collapsed with hundreds of people dead or missing as a consequence. The tragic accident has pushed up the iron ore price and the latest figures from Vale points towards a production cut in 2019 between 50-75 Mt. Further the company and probably many other companies will have to invest in refurbishing and monitoring their tailings dams to ensure the public that these accidents will not happen again. In the short term this will mean that prices are pushed higher as there is much less material on the market but also, if Vale sees its costs increasing this could push up the price as Vale is a to big producer for buyers to find the material somewhere else.

This article is a summary of the forthcoming regular annual iron ore market review by RMG Consulting.

REFERENCES

1. OECD Steel Market Developments Q4 2018, January 11th 2019.
2. International Monetary Fund, World Economic Outlook UPDATE, January 2019.
3. World Steel Association press release, February 2019 Crude steel production, March 26th 2019, https://www.worldsteel.org/media-centre/press-releases/2019/february-2019-crude-steel-production.html.
4. National Bureau of Statistics China, 2019, http://data.stats.gov.cn/english/easyquery.htm?cn=A01.
5. World Steel Association, 2019, op. cit.
6. World Steel Association, Steel Statistical Yearbook 2018.
7. Löf, A., Ericsson, M. and Löf, O., Iron Ore Markets Improve in Most Regions, *Engineering & Mining Journal*, October 2018, p. 55.
8. National Bureau of Statistics China, op. cit.
9. Bundesministerium für Nachhaltigkeit und Tourismus, Reichl, C., Schatz, G., Zsak, G. World Mining Data 2018 Vol. 33, Vienna 2018,
10. 16 company reports, annual and quarterly for all companies in list various dates 2018 and 2019.
11. Australian Government, Department of Industry, Innovation and Science, Office of the Chief Economist, Resources and Energy Quarterly, March 2019.
12. Sinferbase, Relatório Decembro 2018, http://sinferbase.com.br/wp-content/uploads/2019/03/RELAT%C3%93RIO_DEZEMBRO_2018.pdf?x23777
13. Vale Day December 6 2018, http://www.vale.com/EN/investors/information-market/presentations-webcast/PresentationsWebcastsDocs/Vale%20Day%202018_i.pdf
14. Updated version of Löf, A., Ericsson, M., and Löf, O. Iron ore markets 2018, *Nordic Steel & Mining Review* (Bergsmannen) Vol. 202, No. 7, 2018, 4-10.
15. Kaunis Iron AB, https://www.kaunisiron.se/.
16. World Steel Association, Shart Range Outlook, October 2018.
17. World Steel Association, Short Range Outlook, April 2018.
18. MIDREX 2017 World Direct Reduction Statistics, https://www.midrex.com/assets/user/news/MidrexStatsBook2017.5_.24_.18_.pdf
19. See for example Morgan Stanley Research, Metal&ROCK, Global Foundation, The Price Deck — 2Q 2019, March 25th 2019.