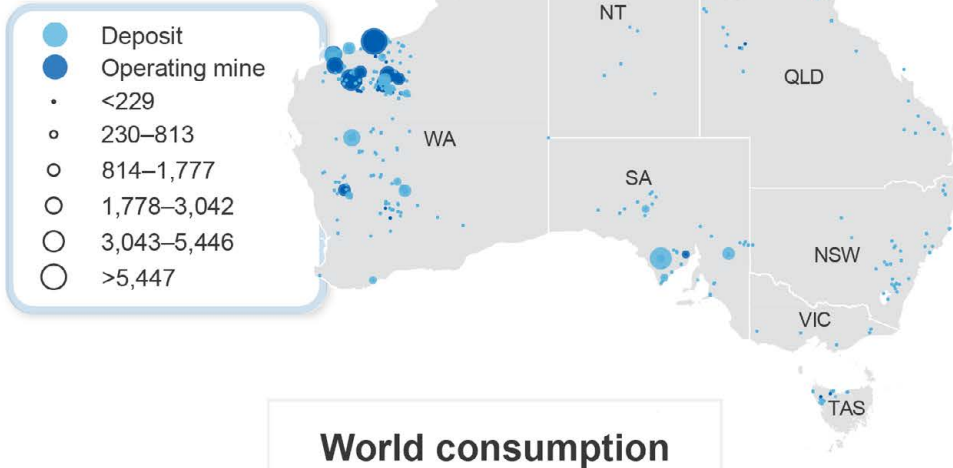
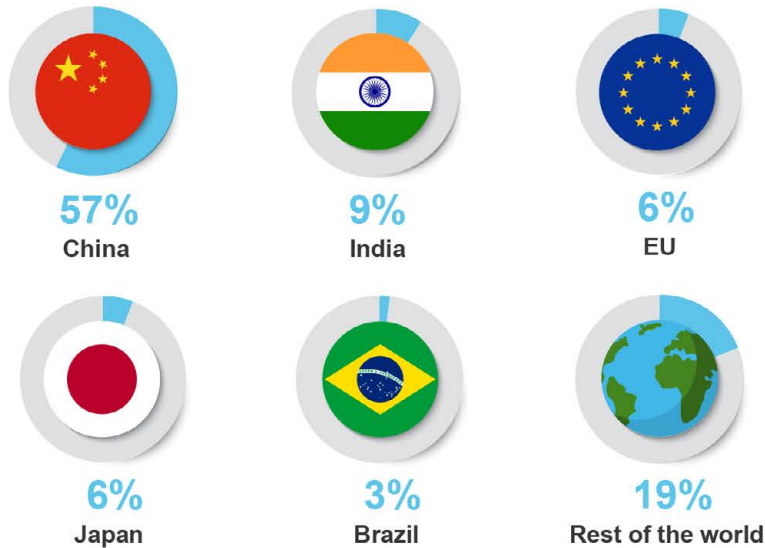


Iron Ore

Major Australian iron ore deposits (Mt)



World consumption



Iron ore



Iron is the most abundant element on earth, forming much of the **planet's core**



Iron ore deposits were originally **formed by algae**

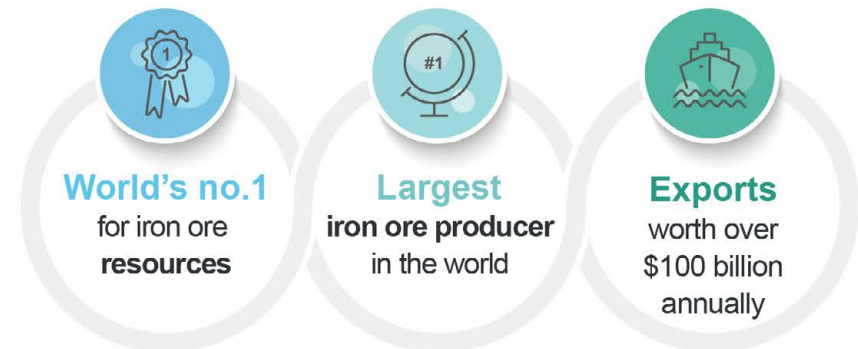


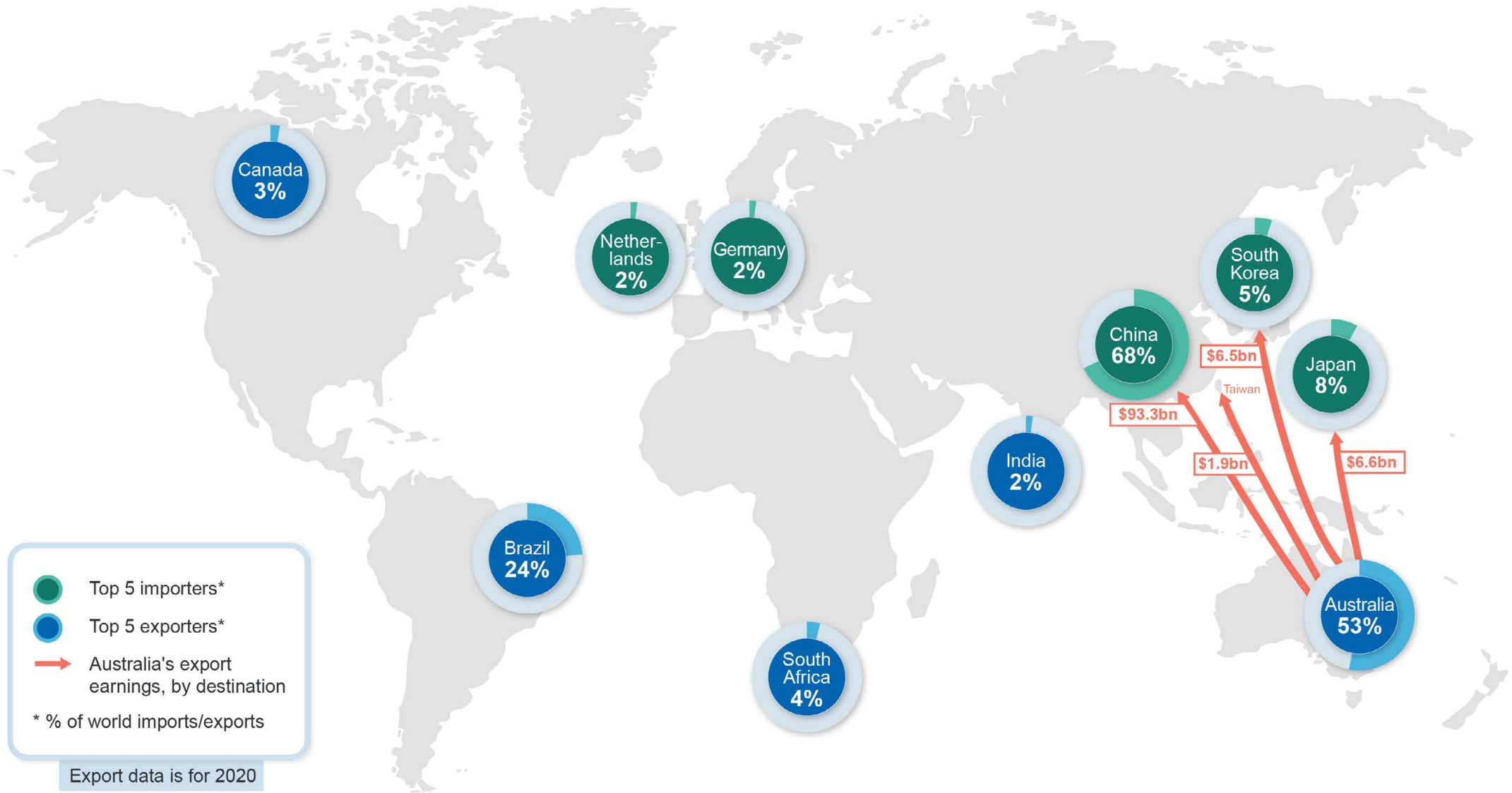
Humans have been working with iron for at least **5,000 years**



Iron was central to the **industrial revolution**

Australia's iron ore





4.1 Summary

- The iron ore price surged in December and January, and is now at its highest level since 2011. Prices have been driven by high demand in China and (fears of) disrupted supply in Brazil and elsewhere. The iron ore price is forecast to remain well above US\$100 a tonne until late 2021, before easing gradually over subsequent years, ultimately reaching US\$72 (in real terms) by the end of 2026.
- Australia's export volumes are expected to grow from around 900 million tonnes in 2020–21 to 1.1 billion tonnes by 2025–26, as several mines open or expand in Western Australia (see [Australia section](#)).
- Stronger prices are expected to push Australia's iron ore export values up to a peak of \$136 billion in 2020–21 (in real terms). Iron ore exports are forecast to earn more than \$700 billion over the outlook period, remaining above \$100 billion annually for each of the next five years.

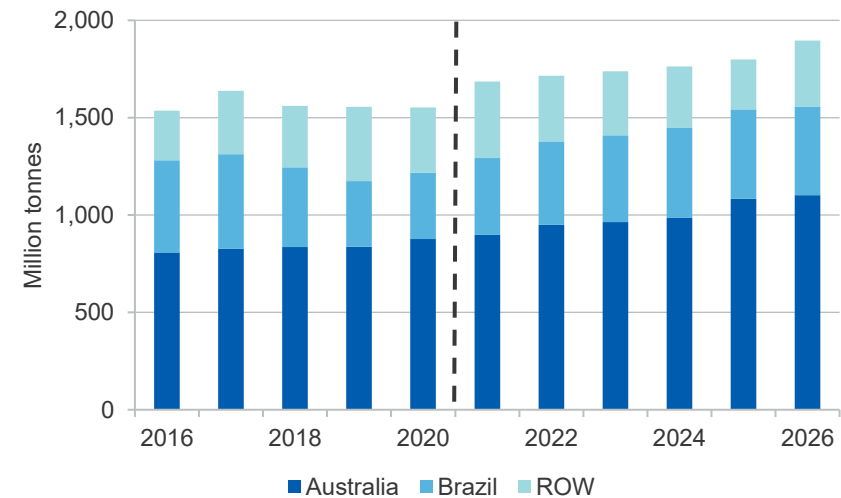
4.2 World trade

Australia's dominance of iron ore markets will face challenges

Global trade remains dominated by Australia, which exported more than half of seaborne iron ore in 2020. However, iron ore output from South America and Africa is expected to increase over the outlook period, (Figure 4.1).

China is investigating a number of possible iron ore mines in Africa, including large deposits in Gabon and Madagascar. However, the most notable prospect in Africa is the proposed Simandou iron ore mine, located in the Nzérékoré region of Guinea. This region is relatively remote and far from any port facilities, but the deposit is large and high-quality, and Rio Tinto has announced that roadworks at the site are now underway. The company is currently reviewing the cost and feasibility of investments required for the mine. These investments are likely to include port connections and more than 600 kilometres of railway to transport ore, and the review is expected to conclude by the end of the 2020-21 financial year.

Figure 4.1: Outlook for global iron ore exports



Source: World Steel Association (2021); Department of Industry, Science, Energy and Resources (2021)

While the project is expected to proceed, the infrastructure and capital requirements are significant. Full output is not expected before 2027 or 2028, though some initial output may occur towards the end of the outlook period. The Simandou deposit is subject to complex ownership arrangements, with the southern blocks controlled by a joint venture between Rio Tinto, Chinalco and the Guinean Government, while much of the northern area is controlled by a separate Chinese joint venture. The northern area is currently closer to development, with a \$14 billion infrastructure contract now signed by the consortium. Should both areas produce at full output, the mine could produce close to 200 million tonnes of iron ore per year, or around 15-20% of output currently produced in the Pilbara region of Western Australia.

Brazilian iron ore output is expected to recover over the next 12-18 months. Prices for Brazilian ore have risen by more than 50% in December 2020 relative to December 2019, creating favourable investment conditions. Export volumes have recently shown signs of

significant recovery, following a series of difficulties and delays; exports increased from 25 million tonnes in December 2019 to 33 million tonnes by December 2020. In conjunction with higher prices, this led to a doubling of export revenue to Brazil over the year to December 2020.

Vale has released detailed plans to add over 100 million tonnes of new iron ore output to the market by end 2023. This includes its US\$1.5 billion Serra Sul 120 project, which progressed well in 2020 and is due to be commissioned as 2024 begins. This upgrade will open access to extra mining areas, incorporate extra processing lines and provide a duplicate long-distance conveyor. However, progress may be checked by the complexity of the projects and by a series of missed deadlines in the company's recovery plans. Conditions in Brazil remain difficult, due to the COVID-19 pandemic and after-effects from the Brumadinho dam collapse.

Vale remains subject to a range of court actions, added regulations and other requirements, as well as disruptions to port and rail facilities in the south of Brazil. On balance, it is expected that Brazilian output will largely recover pre-dam collapse levels by early 2022, with steady growth over the following years, as new projects gradually commence production.

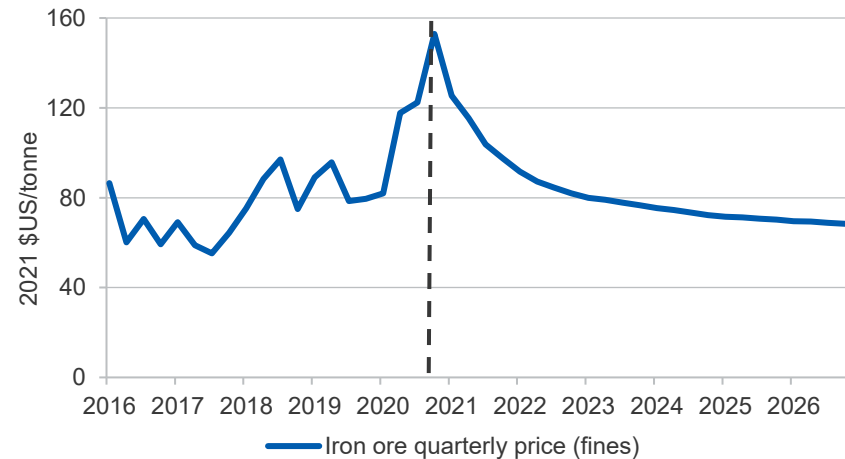
Global iron ore markets are expected to remain tight, with slow growth in both supply and demand over the next five years. Market structure is not expected to alter significantly, with Australia's market share expected to hold up. A recovery in Brazilian supply is likely in the short-term, but a number of high-cost mines in Brazil and China are also expected to face closure or depletion over the next 10 years.

4.3 Prices

Iron ore prices are holding at the highest level for almost a decade

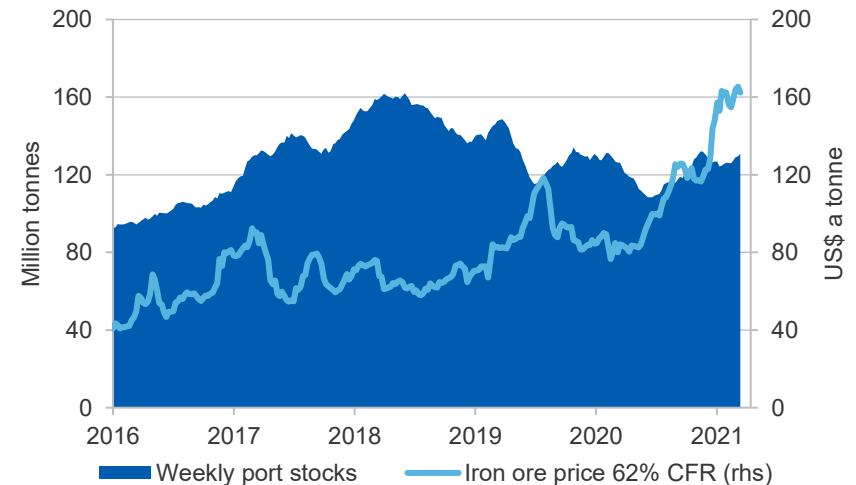
Iron ore prices surged in December, lifting from around \$US115 a tonne at the start to the month to close out 2020 at over \$US140 a tonne — the highest level since 2011. Prices have subsequently lifted higher still, averaging over \$US150 a tonne during January 2021 and reaching US\$170 a tonne during parts of February (Figure 4.2).

Figure 4.2: Iron ore price outlook, quarterly



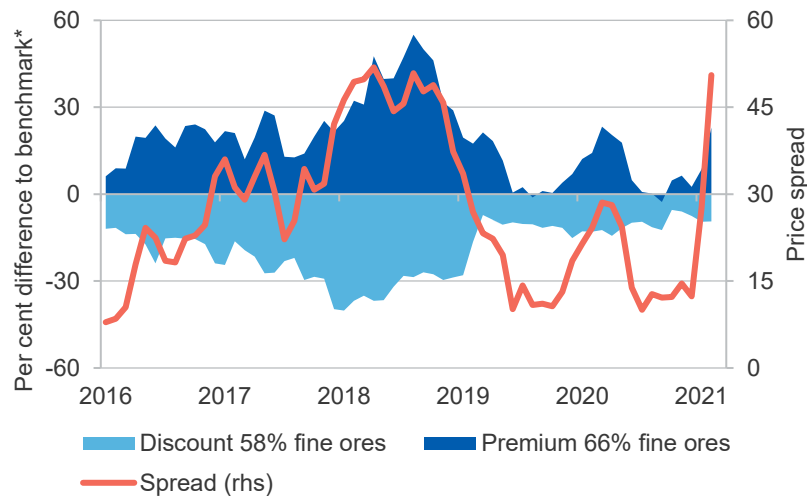
Notes: China import Iron ore fines 62% Fe spot (CFR Tianjin port)
Source: Bloomberg (2021) Department of Industry, Science, Energy and Resources (2021)

Figure 4.3: China's iron ore port stocks and spot price



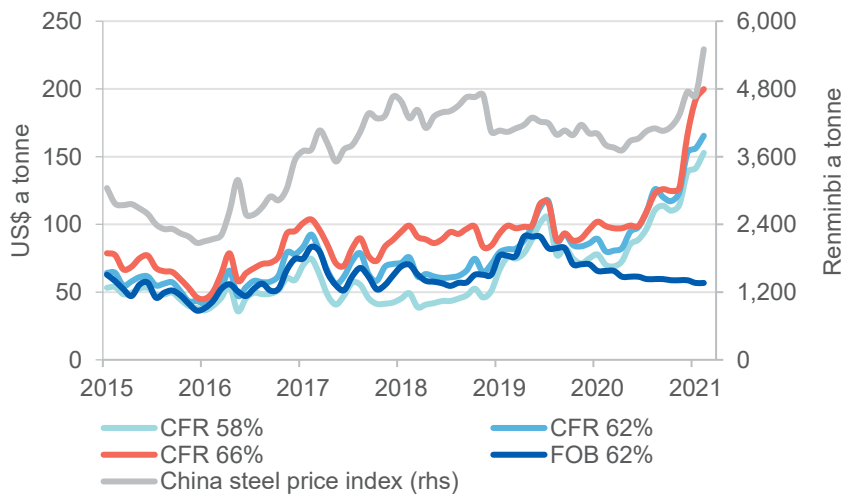
Notes: China import Iron ore fines 62% Fe spot (CFR Tianjin port)
Source: Bloomberg (2021) Antaika iron ore port stocks; Metal Bulletin

Figure 4.4: Iron ore price spread between grades



Notes: *Benchmark used is 62% iron fines CFR
Source: Bloomberg (2021) China import prices

Figure 4.5: Iron ore price by grade and China steel price index



Source: Bloomberg (2021); Department of Industry, Science, Energy and Resources (2021)

Prices (and premium prices in particular) have thus remained at near-10 year highs for two months without significant retreat. Prices have been pushed up by consistently high steel production in China, which has been driven by COVID-19 related stimulus measures (Figures 4.3 and 4.4). These strong demand influences have magnified the impact of lower supply estimates from Vale, which has reduced its production guidance significantly over the past 12 months.

Iron ore production remains highly concentrated, with a small number of firms accounting for a high share of overall output. High entry costs present a significant curb on new competition. The dominant firms have scaled down investment in recent years, in an attempt to reduce debt and adjust to (at the time) relatively low prices and strong supply conditions. On the demand side, competition is far more intense despite the relative domination of the market by China. Chinese steel mills compete with each other, and are rivalrous in their efforts to secure available supply and gain access to potential new supply sources.

Iron ore prices are expected to stay high into 2021

The primary drivers of high iron ore prices are expected to hold throughout 2021. Although Vale has announced plans to expand its capacity significantly, much of the resulting output is not expected to reach seaborne markets for at least two to three years. BHP and Rio Tinto are bringing new mines to production in the Pilbara region of Western Australia, but much of the resulting output will substitute for depleting mines in the same area (see *Australia* section). Consequently, overall output growth is not expected to occur at a pace which reduces prices significantly.

A range of factors could put downward pressure on prices over the coming months. Some price falls are expected, as Vale's Brazilian operations steadily return to output levels prior to the January 2019 Brumadinho dam collapse. Overall, Brazilian output expected to recover to normal levels by the end of 2021. More rapid progress on this front could lower prices more swiftly. Chinese steel mills, which are facing severe pressure on margins, may also seek to postpone some output in order to manage price

pressures over the coming months (Figures 4.5 and 4.6). Chinese Government stimulus measures could also be phased down in the second half of 2021, reducing the imperative for rapid purchases of iron ore to meet production schedules and allowing some build-up of iron ore at ports.

However, risks also exist in the other direction. The two largest supply sources — Western Australia and Brazil — are both subject to regular disruption to production and transport from extreme weather events. These include heavy rains which sometimes disrupt operations in Brazil, and cyclonic activity which periodically affects Australian shipments from Port Hedland, Dampier and Cape Lambert. The likelihood of further events presents a perpetual risk of price spikes over the coming years.

Figure 4.6: Iron ore price vs China steel production growth



Notes: China import Iron ore fines 62% Fe spot (CFR Tianjin port)
 Source: Bloomberg (2021) China import prices; World Steel Association (2021)

4.4 Australia

Iron ore export earnings are set to reach a new record in 2020–21

The recent price surge for iron ore has added markedly to the value of Australia’s iron ore exports. Export earnings hit new a record of \$104 billion in 2019–20 (in real terms). However, Australia’s position as the most reliable and dominant supplier has placed it in a position to capture a huge share of the added gains from the latest surge in prices. Export earnings are now forecast to reach above \$136 billion in 2020–21 (real terms).

A shift back towards more typical prices is expected to reduce earnings somewhat over subsequent years, although iron ore is still expected to earn over \$100 billion every year over the outlook period, with a cumulative total of above \$700 billion earned by 2025–26.

Australia’s iron ore export volumes are expected to grow

Export volumes are expected to rise over the outlook period, partly offsetting the likely correction in prices. Mines expected to come online include Mesa B, C & H at Rio Tinto’s Pannawonica site in mid-2021, though the new output from this site will be offset by the closure of Mesas J and A in the same area.

BHP is expected to bring its South Flank project to full production (of around 80 million tonnes per year) in 2021, though this will largely act as a replacement for the Yandi mine, which is closing.

The Roper Bar mine in the Northern Territory has recently restarted production, in response to strong prices. Nathan River, which owns the site, has announced that the project is expected to ramp up to 1.5-2 million tonnes of production each year from 2021.

NT Bullion’s new Frances Creek mine is also producing on schedule, following its opening in August 2020. Output is shortly expected to reach 2 million tonnes per year, which will last beyond the outlook period.

Fortescue’s newly developed Eliwana project is successfully ramping up, with output expected to reach almost 30 million tonnes per year from 2021.

Rio Tinto's new Koodaideri mine has an even larger potential, and is ramping up towards an output of around 40 million tonnes per year from 2022. Other sources of new output include Magnetite Mines' Razorback project in South Australia, Strike Resources' Paulsens East project in Western Australia, and Grange Resources' proposed expansion to its mine in Tasmania.

Export volumes are expected to increase from 893 million tonnes in 2020–21 to reach almost 1,100 million tonnes by 2025–26 (Figure 4.7). However, exports will remain sensitive to conditions in China, which remains Australia's primary export market (Figure 4.8). The wave of new openings and output replacements also presents a significant logistical challenge across multiple sites. Any disruptions due to weather or other external factors could present a risk to export volumes (on the downside) or iron ore prices (on the upside).

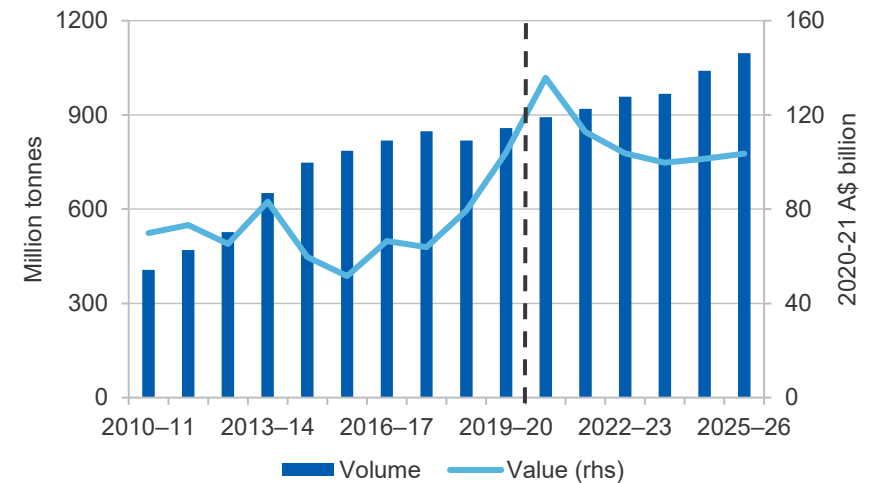
Iron ore exploration expenditure is growing as prices lift

A total of \$111 million was spent on iron ore exploration in the December quarter. This is virtually unchanged from exploration in the September quarter, but 31% higher than in December 2019. Exploration has been elevated in recent quarters as iron ore prices have continued to reach historical highs.

Revisions

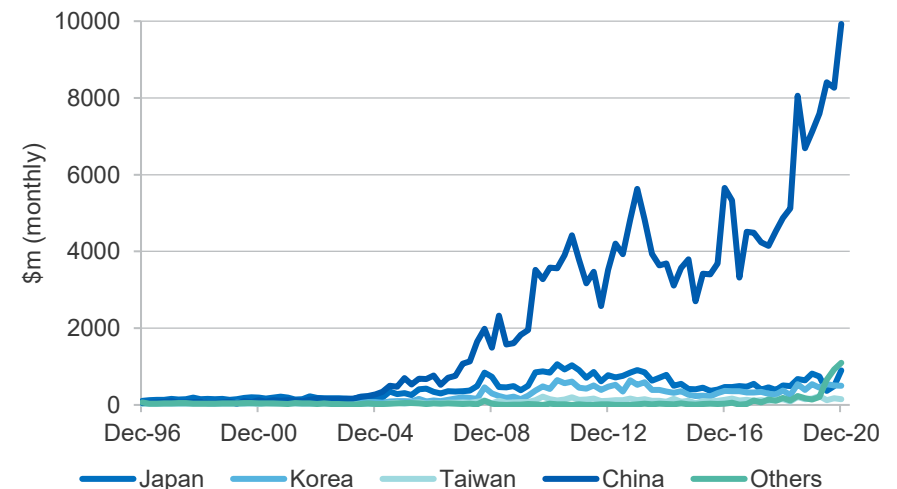
Forecast export earnings for 2020–21 have risen from \$123 billion in the December *Resources and Energy Quarterly* (in nominal terms) to just over \$136 billion in this edition. This reflects stronger-than-expected Chinese demand and persistently high prices, following repeated cuts in Vale's production guidance. Australian export earnings have been revised up by a similar amount for 2021–22.

Figure 4.7: Australia's iron ore export volumes and values



Source: ABS (2021) International Trade, Australia, 5368.0; Department of Industry, Science, Energy and Resources (2021)

Figure 4.8: Australia's iron ore export destinations, monthly



Source: ABS (2021) Department of Industry, Science, Energy and Resources (2021)

Table 4.1: World trade in iron ore

	Million tonnes							
	2020	2021 ^f	2022 ^f	2023 ^z	2024 ^z	2025 ^z	2026 ^z	CAGR ^r
Total world trade	1,552	1,686	1,716	1,739	1,763	1,799	1,844	2.9
Iron ore imports								
China	1,175	1,268	1,292	1,295	1,295	1,296	1,309	1.8
European Union 28	97	112	112	112	112	112	112	2.4
Japan	99	113	116	119	122	125	128	4.3
South Korea	58	76	78	80	82	84	86	6.9
India	5	5	5	20	40	70	70	53.6
Iron ore exports								
Australia	868	897	950	963	987	1,084	1,103	4.1
Brazil	341	396	428	446	461	459	455	4.9
Ukraine	30	22	26	25	24	20	26	-2.2
India	34	40	30	30	28	23	31	-14.3

Notes: **e** estimate; **f** forecast; **r** Average annual growth between 2020 and 2026 or 2019–20 and 2025–26; **z** projection.

Source: World Steel Association (2021); International Trade Centre (2021); Department of Industry, Science, Energy and Resources (2021)

Table 4.2: Iron ore outlook

World	Unit	2020	2021 ^f	2022 ^f	2023 ^z	2024 ^z	2025 ^z	2026 ^z	CAGR ^r
Prices ^{bc}									
– nominal	US\$/t	116.7	110.4	88.1	81.9	78.9	77.5	77.1	-6.7
– real ^d	US\$/t	119.0	110.4	86.3	78.4	73.9	70.9	69.0	-8.7
Australia	Unit	2019–20	2020–21 ^f	2021–22 ^f	2022–23 ^z	2023–24 ^z	2024–25 ^z	2025–26 ^z	
Production									
– Steel ^{hs}	Mt	5.53	5.55	5.59	5.59	5.59	5.59	5.59	0.2
– Iron ore	Mt	911.8	923.7	942.5	980.7	992.1	1 067.6	1 124.0	3.5
Exports									
Steel	Mt	0.88	0.89	0.96	0.96	0.96	0.96	0.96	1.5
– nominal value	A\$m	1 011	816	871	835	726	726	726	-5.4
– real value ^{hi}	A\$m	1 022	816	857	804	682	665	648.9	-7.3
Iron ore	Mt	858.1	892.5	919.0	957.6	966.9	1 040.4	1 096.8	4.2
– nominal value	A\$m	102,861	136,311	114,669	107,618	106,163	110,645	115,820	2.0
– real value ⁱ	A\$m	103,950	136,311	112,790	103,676	99,775	101,407	103,517	-0.1

Notes: **b** fob Australian basis; **c** Spot price, 62% iron content basis; **d** In 2021 US dollars; **e** estimate; **f** forecast; **h** Crude steel equivalent; Crude steel is defined as the first solid state of production after melting. In ABS Australian Harmonized Export Commodity Classification, crude steel equivalent includes most items from 7206 to 7307, excluding ferrous waste and scrap and ferroalloys; **i** In 2020–21 Australian dollars; **r** Average annual growth between 2020 and 2026 or 2019–20 and 2025–26; **z** projection.

Source: ABS (2021) International Trade in Goods and Services, Australia, 5368.0; Bloomberg (2021) Metal Bulletin; World Steel Association (2021); AME Group (2021); Company Reports; Department of Industry, Science, Energy and Resources (2021)