



Applied Value Quarterly Steel Report

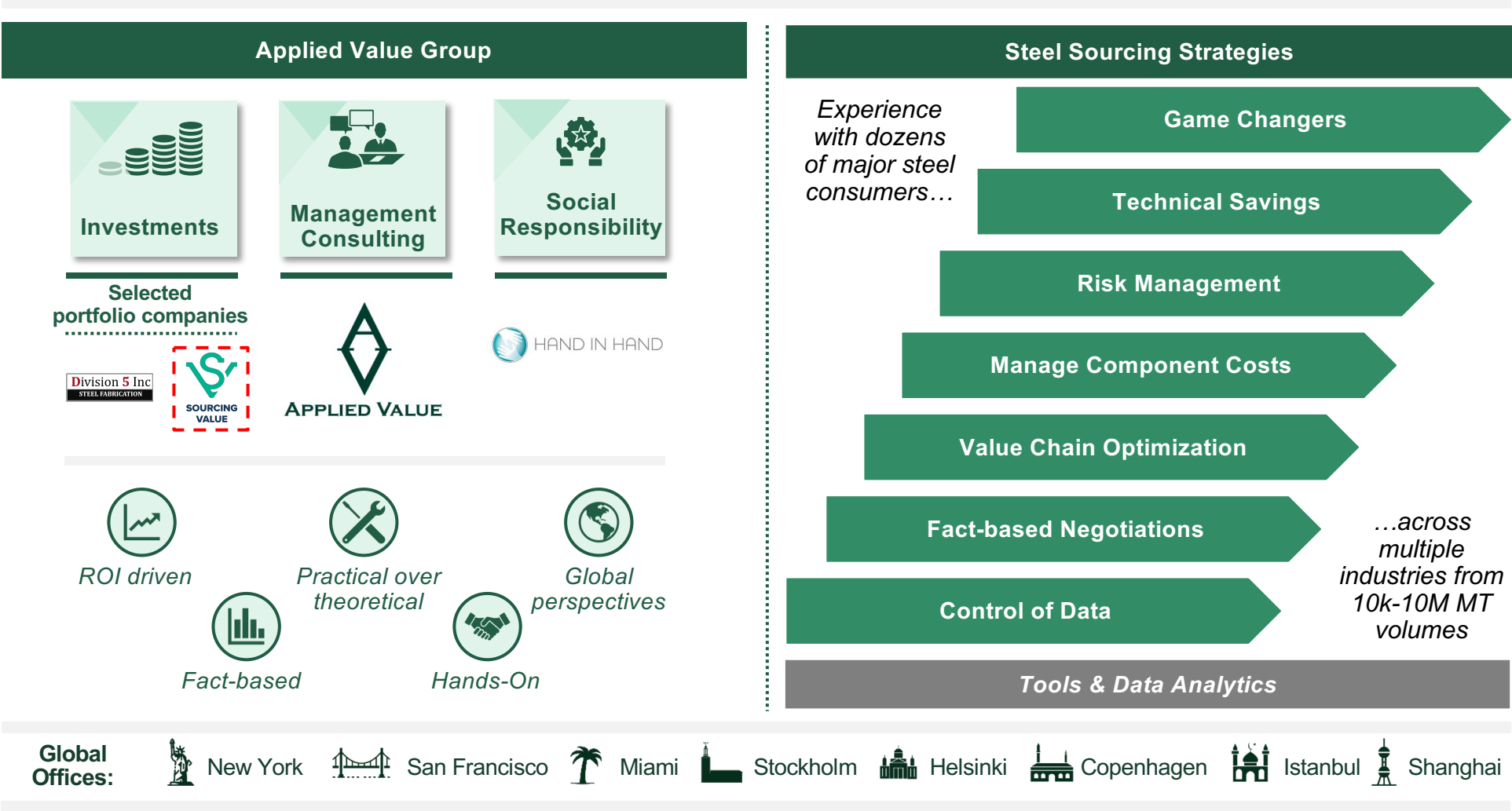
Q2 2022 Report

April 2022

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Applied Value is a management consulting & investment firm with deep expertise in supporting clients throughout the steel industry.



Sourcing Value is a comprehensive digital analytics platform for steel sourcing, designed by Applied Value to save buyers time & money.

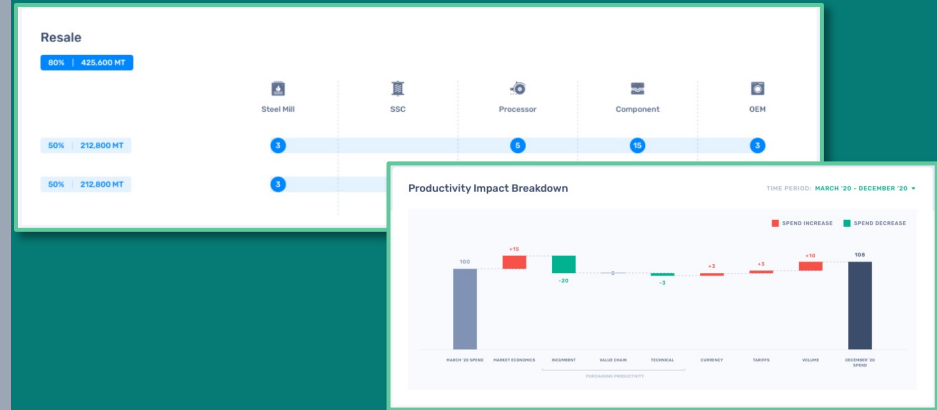


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- ✓ Data Management
- ✓ Directed Buy & Resale Management
- ✓ Benchmarking
- ✓ Value Chain Optimization
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- ✓ RFQ Portal & Quote Analytics
- ✓ Fact-Based Negotiations
- ✓ Market Intelligence
- ✓ Day to Day Spend Management

Reach out to Alex.Curiel@appliedvalue.com to schedule a demo

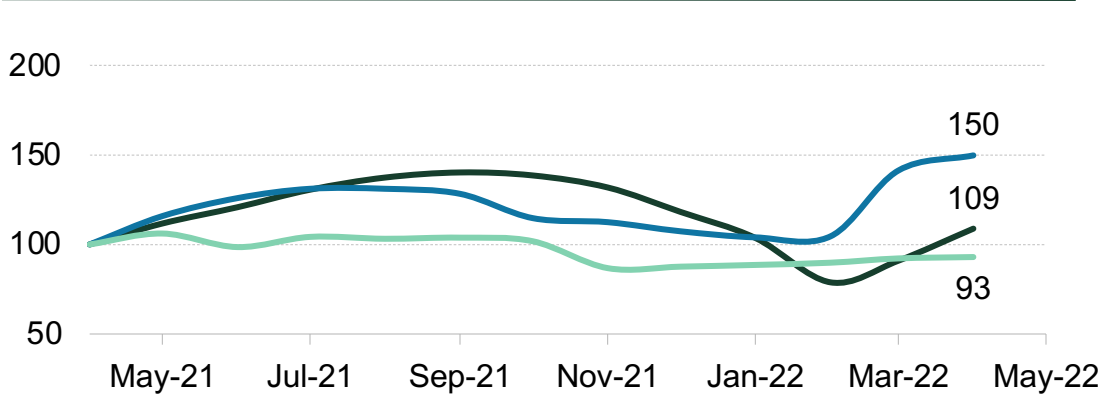


HRC prices in EU surged 44% Q-o-Q in the fallout of the Russia-Ukraine conflict, dramatically increasing the price gap with China to \$650/MT.

Indexed Hot-rolled Coil Costs

Apr '21 – Apr '22

100 = April 2021



Last 12 Months

HRC- EU
50%

With sanctions on Russia materials, EU HRC price have increased 50% Y-o-Y and landed at historical high

HRC – US
9%

US HRC has rebounded and gone up 9% Y-o-Y due to pig iron shortage and rising scrap prices

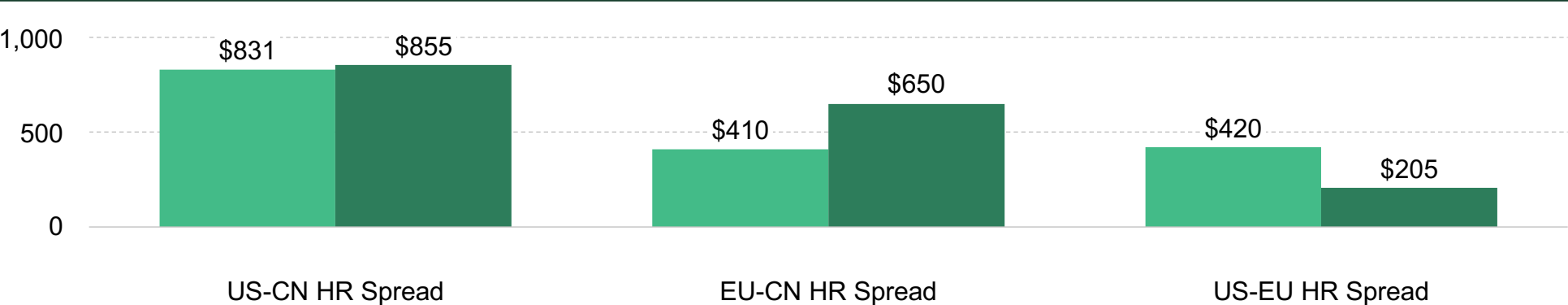
HRC - CN
-7%

After a plunge in Nov'21, CN HRC has mostly stabilized, bringing total LTM change to -7%

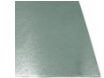
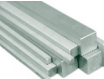
US, EU, CN prices spread

USD / MT, Last 6 months = Nov 2021 to Apr 2022

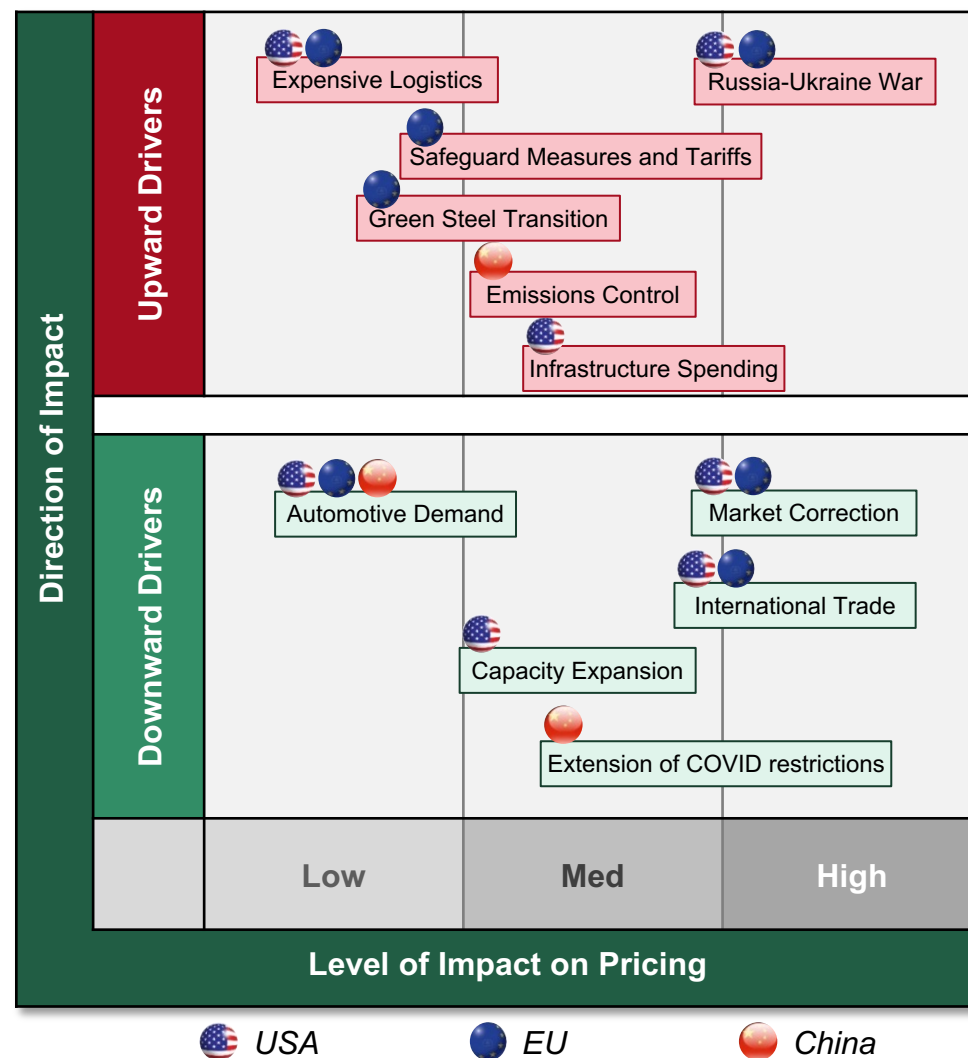
Last 6 months Apr-22



Global Steel Price & Trend Summary.

Commodity		Latest Approx. Price*	Last 3 Months	Trend (3 Months Forward)	
	Flat	US	~\$1,668/MT	5%	
		EU	~€1,325/MT	44%	
		CN	~\$813/MT	5%	
	SS	US	~\$4,784/MT	9%	
		EU	~\$5,870/MT	19%	
		CN	~\$3,154/MT	-14%	
	Plate	US	~\$2,017/MT	1%	
		EU	~\$1,675/MT	51%	
		CN	~\$818/MT	2%	
	Bar	US	~\$1,543/MT	0%	
		EU	~\$1,249/MT	3%	
		CN	~\$781/MT	-15%	

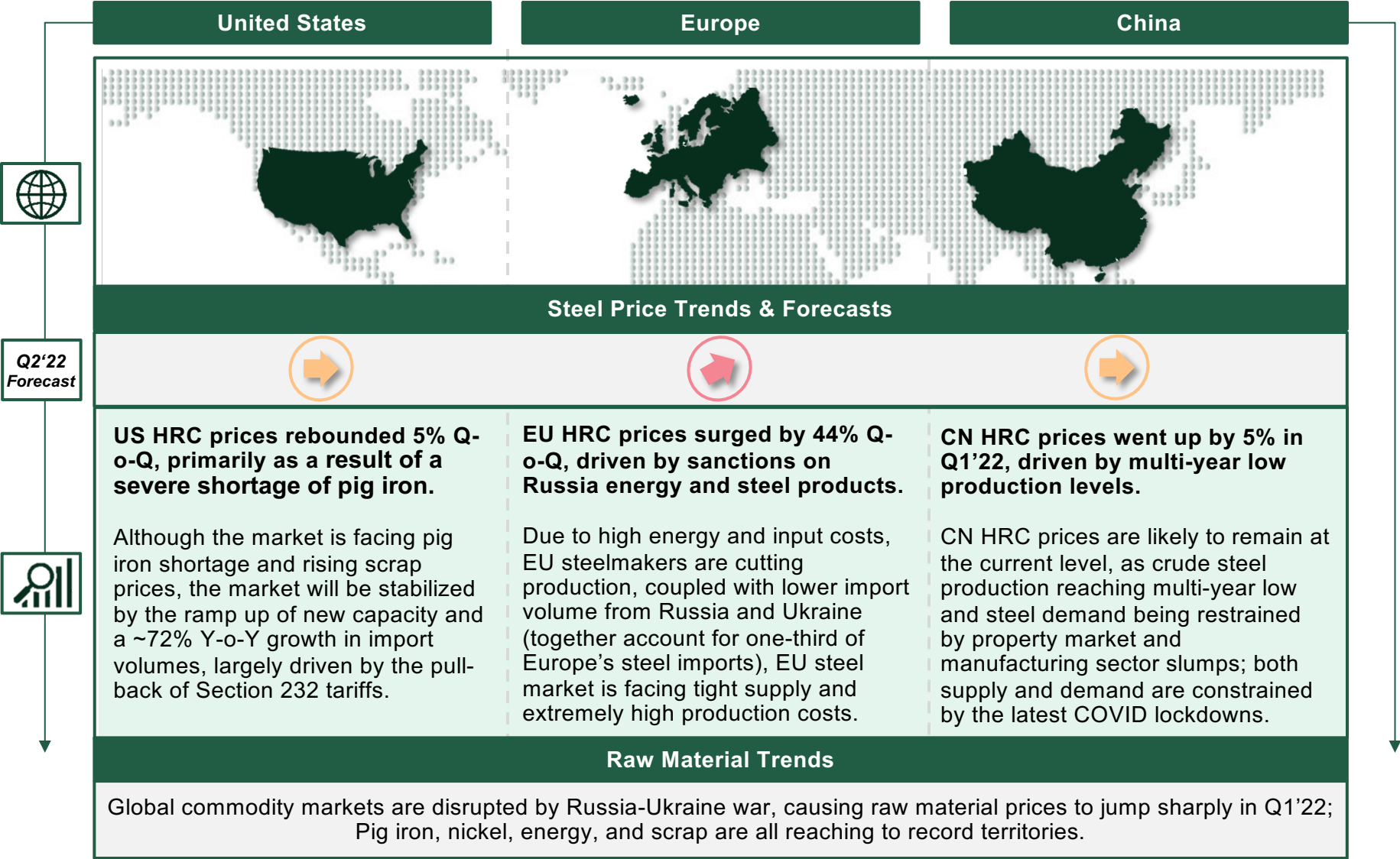
Major Market Drivers



* Flat prices updated to reflect most recent Apr '22 prices due to volatile market conditions; all other prices as of Mar '22.



Although US and EU market were under correction at the beginning of 2022, Ukraine War has caused production costs and steel prices to rebound.



The Russia-Ukraine conflict is likely to trigger energy and metal supply crunch in EU, whereas US might experience pig iron supply shortage.

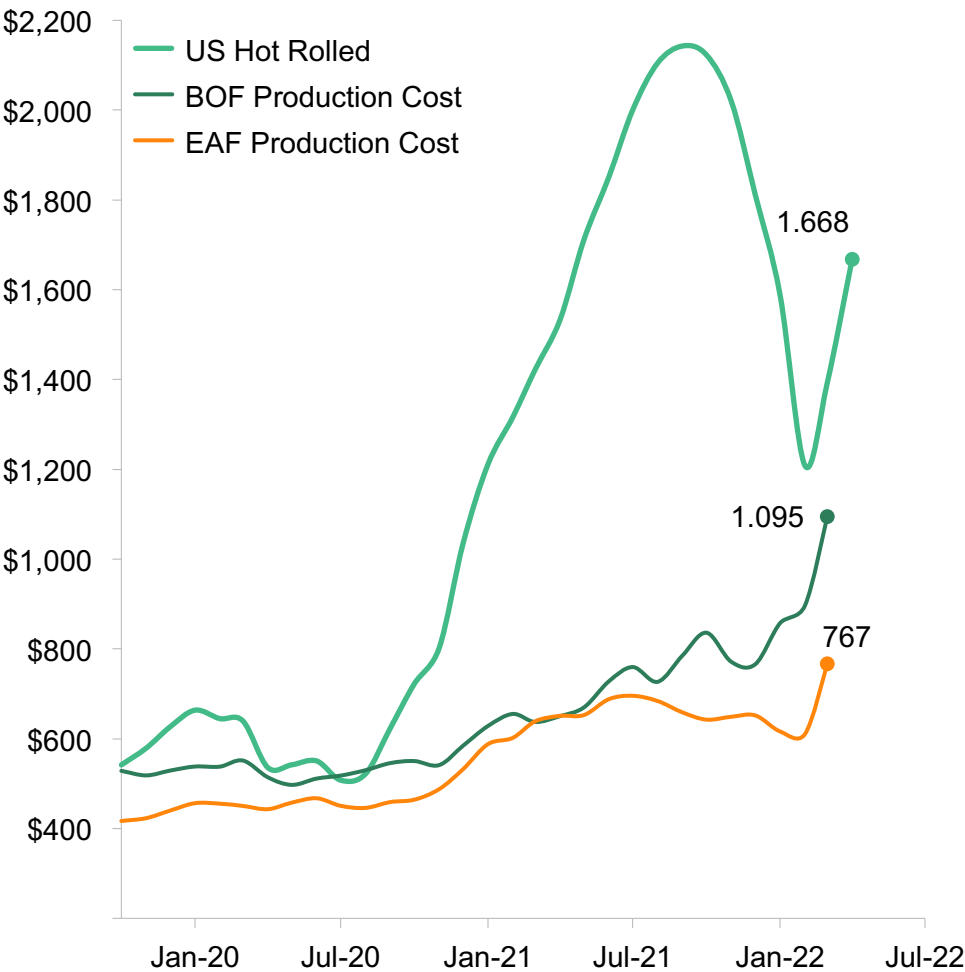
Selected Russia-Ukraine Resources Supply, 2021

	% Global Production	% of Global Export	US Import Volume	% of Total US Supply	EU Import Volume	% of Total EU Supply	Comments
Natural Gas	19%	25%	-	-	152.6 bn m ³	40%	Germany relies on Russia for 55% of its gas supply
Coal	17%	11-17%	0.3 mMT	0%	31 mMT	26%	Russian coal accounts for ~30% of European metallurgical coal imports and over 60% of European thermal coal imports
Crude Oil	10%	12%	245 m barrels	4%	1,182 m barrels	21%	The majority of Russia's crude oil went to EU. However, at a country level, China imported the largest volume of Russia's crude oil and condensate exports in 2021
Nickel	9%	20%	-	-	0.1 mMT	37%	Russia accounted for 44% of Germany's nickel import
Aluminum	6%	11%	0.3 mMT	5%	1.4 mMT	10%	With any reduction in Russian supply, EU is likely placing a call on additional volumes from the Middle East and India
Pig Iron	6%	31%	3.7 mMT	10%	0.8 mMT	1%	Russia and Ukraine supply more than 60% of US import volume
Copper	4%	4%	16.4 kMT	1%	0.2 mMT	13%	Russia reliance on China, Germany and Netherlands in exporting copper
Steel	4%	8%	1.5 mMT	2%	6.9 mMT	5%	>15% of Russia's steel exports to Turkey
Zinc	4%	4%	-	-	-	-	Russia produces ~210kt of refined zinc with virtually all of this consumed domestically

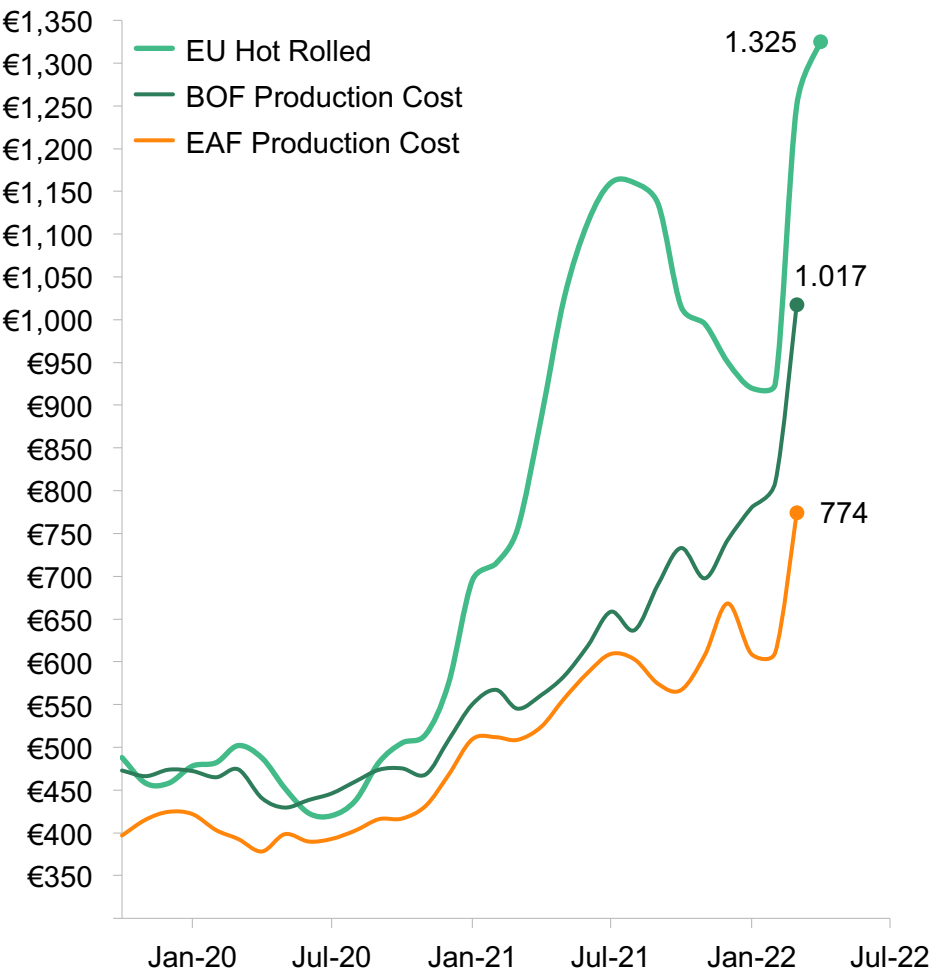


Production costs have played a major role in supporting the recent spike in spot market prices in both US and EU.

US Production Cost vs. Market Pricing
Oct '19 – Mar '21, USD/MT

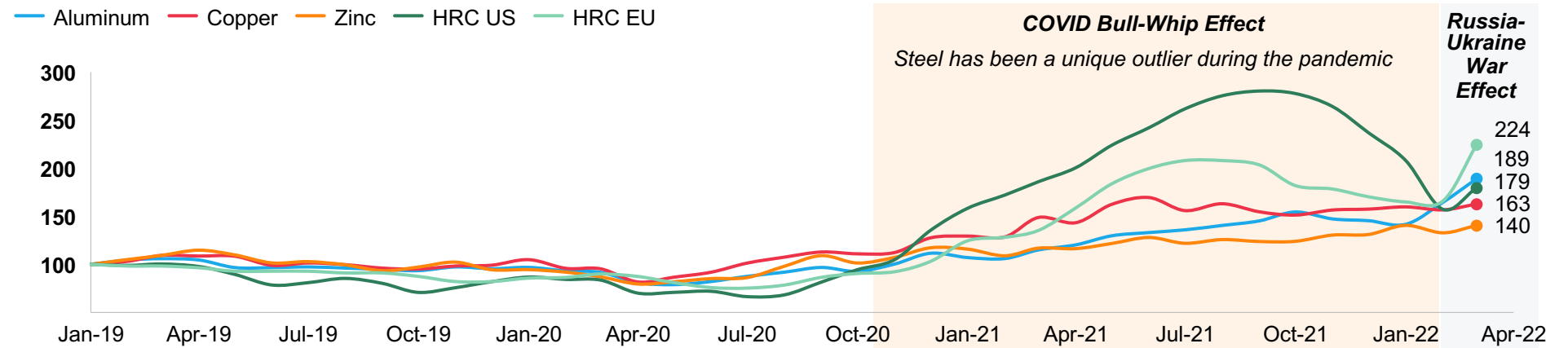


EU Production Cost vs. Market Pricing
Oct '19 – Mar '21, EUR/MT

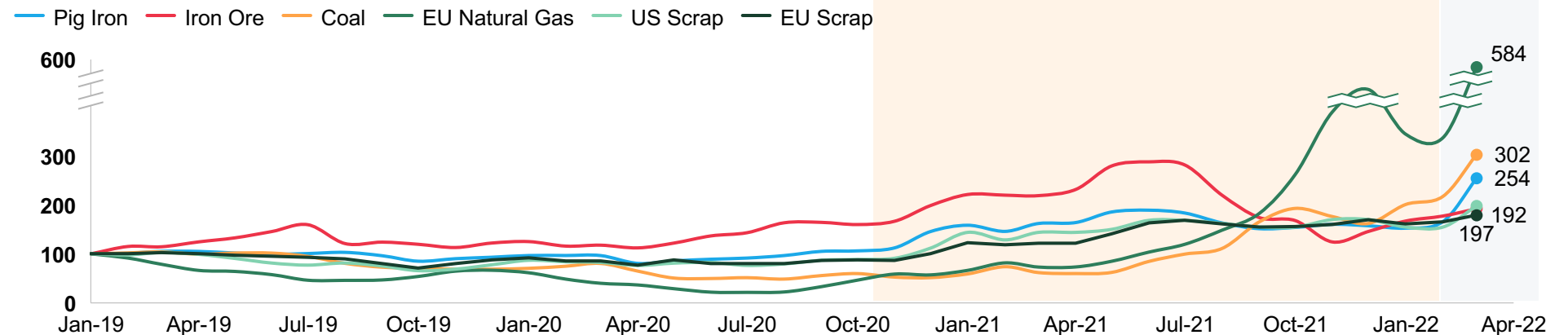


During the past months, majority of commodity prices have seen significant increase due to Russia-Ukraine War.

Non-precious Metal Price Indices



Input Cost Indices



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Q2 2022

Market Conditions by Region

Steel Production Costs

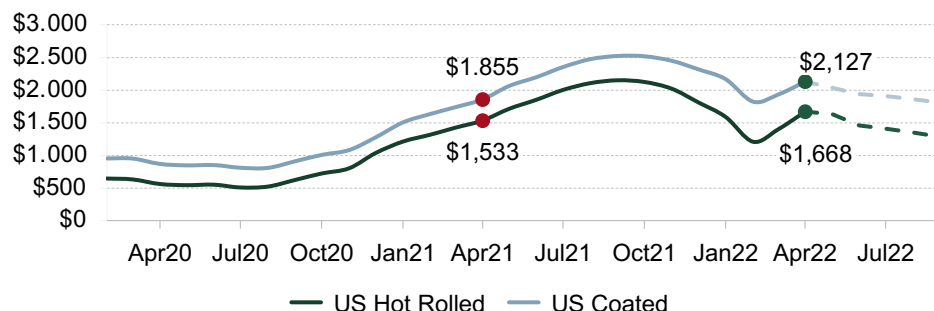
Special Section: Iron Ore Deep Dive

Major Steel Mill Company Performance



US HRC and Coated prices have seen a sharp rebound, recording \$1,668/MT and \$2,127/MT in Apr'22, respectively, driven by tight pig iron supply.

US Flat Prices (USD/MT)



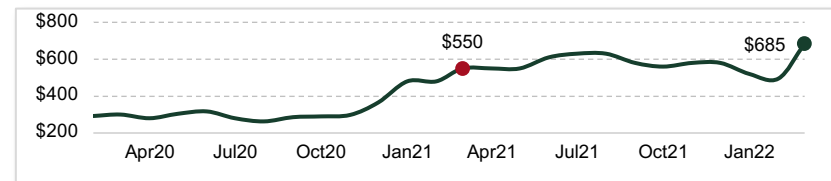
- US HRC rebounded to \$1,668/MT in Apr'22, up 5% Q-o-Q, largely driven by a severe shortage of pig iron due to the ongoing Russia/Ukraine war, and supplies of pig iron from Russia and Ukraine account for ~61% of total US pig iron imports. Supported by growing demand from construction sector, US coated followed similar upward trajectory and recorded \$2,127/MT in Apr'22. As US steel mills turned to source from new pig iron suppliers in Brazil, US steel market will start to settle down.
- The combination of mill utilization above 80%, record high import volumes, and new capacity ramping up has helped ease tight domestic demand. These factors along with the replacement of Sec. 232 on EU, Japan, and UK steel imports with quotas, bringing more than 5MMT of duty-free steel volume per year, are driving expectations for lower prices across the market.
- As scrap provides a viable substitute to Pig Iron during the shortage, scrap prices increased 18% Q-o-Q, reaching a multi-year high of \$685/MT in March.
- US crude steel production decreased 3% Q-o-Q in Q1'22. Domestic steel supply is expected to stabilize as mills are running at ~80% optimum level of capacity utilization rate.
- The US-CN HRC price spread enlarged again to \$855/MT in April, as a result of the recent rebound of US HRC prices.

Source: AV Analysis

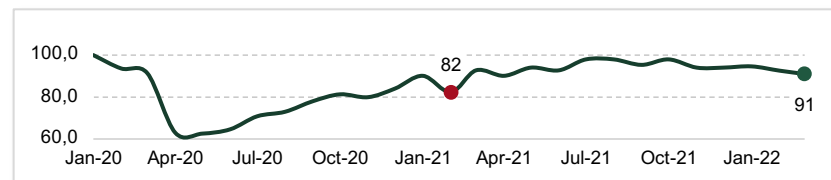
Note: 1. US has removed Sec. 232 on EU, Japan, and UK, and imposed Tariff-rate-quota of 3.3MMT, 1.25MMT, and 0.5MMT respectively

US Scrap Steel Price

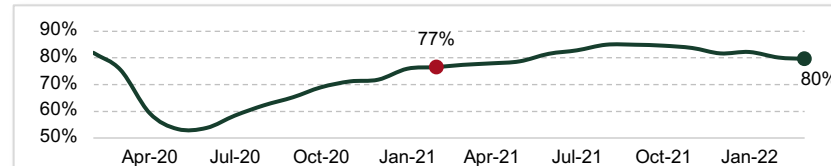
USD/MT



US Indexed Crude Steel Production Volume 100 = Jan 2020

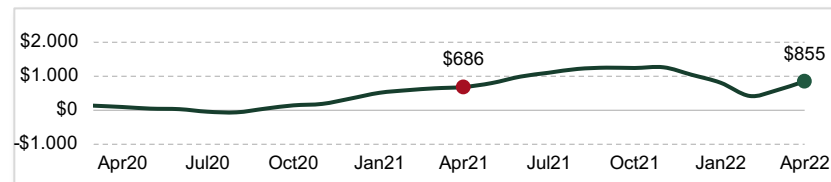


US Mill Capacity Utilization



US vs China Price Spread

USD/MT



● Previous Year's Data

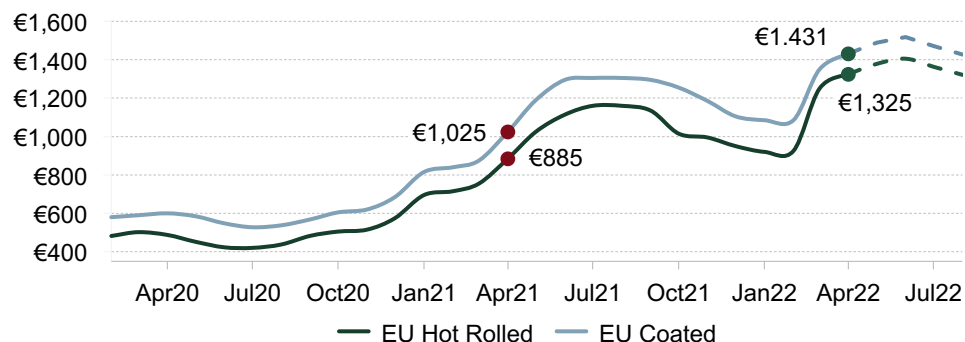
● Latest Data

● Correlation to Market Price



EU HRC prices have rallied to a historical high of €1,325/MT in April '22 amidst the Russia-Ukraine war, inflated input costs and tight supply.

European Flat Prices (EUR/MT)

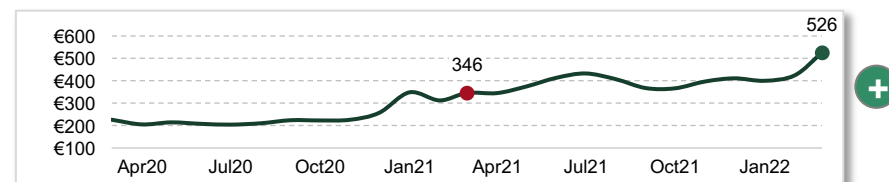


- EU HRC and Coated steel prices have increased sharply to historical highs, soaring by 44% and 32% Q-o-Q to €1,325/MT and €1,431/MT, respectively. In the near term, many strong upward drivers will support these price levels, including sanctions on Russian energy and steel imports, surging production costs and tight steel supply. However, market is expecting downward correction in H2'22, as downstream, steel-consuming industries are also planning to cut outputs due to the extremely high cost of materials and energy.
- As a result of the climate target plans, steelmakers have been reducing their reliance on iron ore and are shifting demand to scrap as a key raw material. Tight supply of high iron-yield scrap continues exacerbated due to the war, scrap prices have spiked 28% Q-o-Q to €526/MT in Mar'22.
- EU steel production has seen 9% decrease Q-o-Q. EU mills are expected to maintain lower capacity utilization amid energy and input price spike.
- EU PMI fell to 57 in Mar'22 from 58.2 in Feb'22, indicating slowdown in manufacturing activity and the weakest expansion in 14 months.
- The EU-China spread has spiked by 147% Q-o-Q, closing at all-time-high of €589/MT in April '22.

Source: AV Analysis

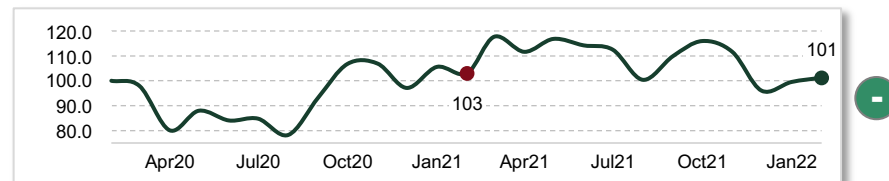
European Scrap Prices

EUR/MT



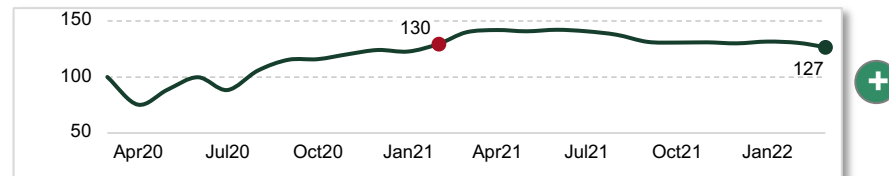
EU Indexed Crude Steel Production

100 = Feb 2020



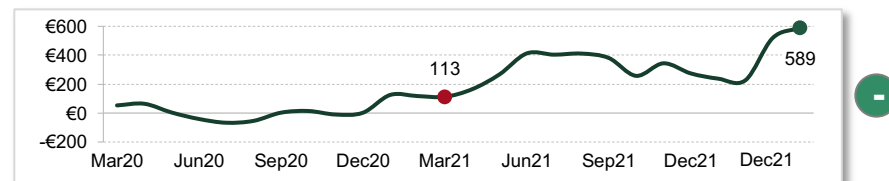
Euro Zone Manufacturing Indexed PMI

100 = Mar 2020



EU vs. China Price Spread

EUR/MT

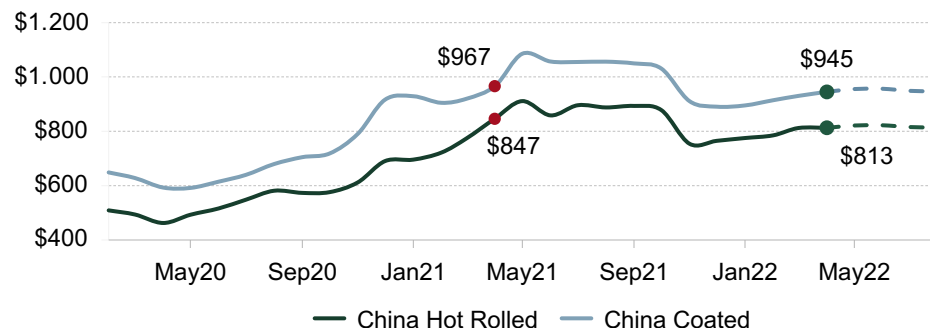


● Previous Year's Data ● Latest Data + - Correlation to Market Price



CN HRC and Coated prices have seen 5% Q-o-Q increase in Apr'22; Both supply and demand are constrained by COVID restriction in the near term.

China Flat Prices (USD/MT)

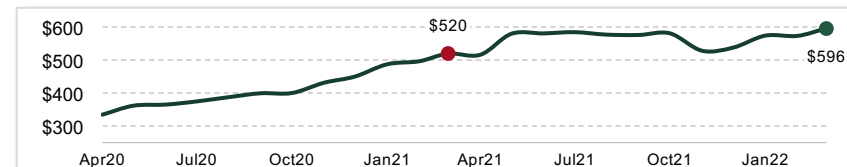


- China HRC and coated have both showed 5% Q-o-Q increase, rising to \$813/MT and \$945/MT in Apr'22, driving by low production level. Prices are expected to fluctuate at the same level, given that both supply and demand are constrained. Property market slumps, along with logistical disruptions that have weighed on the manufacturing sectors have been exacerbated by a COVID-zero strategy and led to weak domestic steel demand.
- Scrap prices have seen upward momentum and grown 10% Q-o-Q, reaching multi-year high of \$596/MT in March'22. Under COVID lockdown, scrap recyclers were forced to suspend shipments, resulting in supply reduction. Whereas mills have been stocking scrap to prepare for resuming production.
- As winter output cuts in northern China intensified in February during the Winter Olympics, China steel production level has dropped to multi-year lows. In Apr'22, Tangshan, a main steel production hub, was affected by COVID outbreak, leading steelmakers to a production pause.
- China's net exports continued to decline and reached 15-month low, as Beijing limited overseas steel exports by cancelling the export tax rebate on CRC and HDG.
- As US and EU HRC prices rose significantly during Q1'22, regional price gaps have been enlarged again, and closed at \$855/MT and \$650/MT in April.

Source: AV Analysis

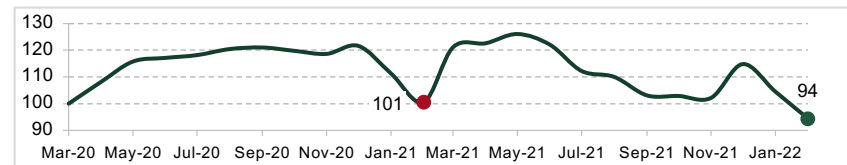
China Scrap Steel Price

USD/MT



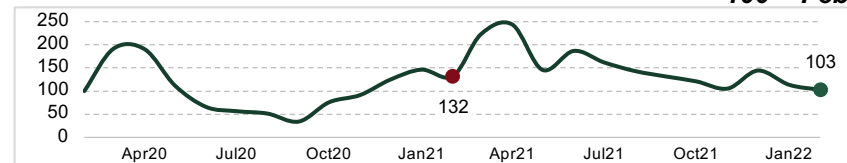
Indexed Production

100 = Mar 2020



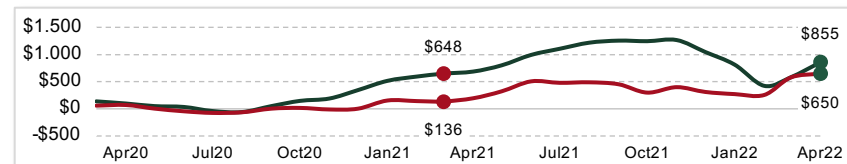
Indexed China Net Exports

100 = Feb 2020



Spread between US & EU

USD/MT



● Previous Year's Data ● Latest Data + - Correlation to Market Price



Steel prices spiked unprecedentedly as a result of Russia-Ukraine conflict in forms of energy crisis, material shortages, and production disruptions.

Upward Market Drivers



Russia – Ukraine War

- › US: 61% of imported pig iron (10% of total domestic supply) that widely used in US steel production originate from the two countries. Despite that United States has fewer energy and economic ties with Russia and Ukraine, cumulative effects of rising commodity prices have boosted steel prices since war initiation.
- › EU: Price rally of steel prices were intensified as Russia and Ukraine who together account for one-third of Europe's steel imports or 10% of domestic steel consumption, turned down economic activities and cutoff exports via sanctions. Furthermore, Russia supplies 25% of EU's crude oil and 45% of EU's gas imports with top destinations to Germany, Turkey, Italy, and France. The energy crisis has escalated fuel and electricity prices in the region with no signs of short-term recovery given the infrastructure damage in Mariupol and strained relationship with Russia. A 30% surge in benchmarked Turkish steel scrap and global iron ore prices compounded the supply issue. Pressured European steelmakers are cutting output or idling steel production which tightened domestic steel supply.
- › Global: The consequences of war also passed onto the rest of the world, but the effect is relative moderate given other countries' neutral stance in this conflict. Yet the global supply chain crisis that the world has been grappling with since the outbreak of the COVID-19 pandemic is further exacerbated with suspended commercial shipping at the port of Odesa.



Inflation Peaking

- › Global: US Inflation hit its highest in four decades - inflation accelerated to 8.5% in March as oil prices soared; Eurozone inflation reached an all-time high of 7.5% in March and isn't expected to abate soon; Food costs also jumped as Russia and Ukraine together export 30% of global wheat which is causing food scarcity in Africa and the Middle East followed by another threat of lacking fertilizers as oil prices surge.



Construction Demand

- › US: Construction employment climbed by 19,000 jobs between February and March, while spending on construction projects rose for the 12th month in February to \$1.70 trillion, a rise of 0.5% for the month and 11.2% on a y-o-y basis. The Biden administration initiated a \$1.5 trillion omnibus spending package, of which \$81 billion funding went to transportation, housing, and urban development.



Transition to Renewable Energy

- › EU: The recent energy crisis from geopolitical tensions will accelerate EU's transition to use renewable energy in steel production in hope of being independent of Russian fossil fuels by 2030. The "green steel" concept is heating up in the region with an aim to reduce carbon footprint and reshape energy supply chain.



Steel prices face downward pressure from diminished downstream demand, pricing rationale, and a renewed search for diversified supply chains.

Downward Market Drivers



Sluggish Demand

- › Global: The automotive industry is faced with another round of semi-conductor component challenges that halted production of certain models in Germany - VW, BMW and Mercedes-Benz were forced to curb production. 2.6 million cars were written off from global production forecast in 2022 as a joint effect of Russia – Ukraine war, uneased chip shortage worldwide, and another round of COVID-19 lockdown in China.
- › CN: Shanghai, China's financial hub entered lockdown by the end of March with nearly all economic activities on hold and pandemic-induced transport restrictions yet to be lifted in its major steelmaking city Tangshan. Construction, once the power engine of steel demand, has been weak entering 2022 and worsened during the lockdowns. The consumption of steel products is to fall in the near term which partially offset by the effect of transportation-related raw material shortage and production stoppage.



Price Rationale

- › US: US HRC prices are slowing the upward momentum after entering April when the market digested the negative impacts on global trade and fear of commodity shortages – CME HRC future prices first increase but later slightly fall in the course of Q2'22. The weaker than expected ferrous scrap trade tempered the pricing expectations of steel.



Diversified Supply Chains

- › US: Ended a long-time dispute over steel and aluminum tariffs with UK – in March, the two parties reached agreement on allowing “sustainable volumes” of UK steel and aluminum products to enter the US market without the application of Section 232 tariffs. On the raw material side, the US is actively seeking alternatives to pig iron which is currently constrained, it can be partially compensated by extra 1 million tons/yr pig iron capacity in Ontario and 1.9 million tons of hot briquetted iron capacity in Toledo as substitute.
- › EU: Ban on steel import from Russia and Belarus triggers a diversification in steel supply where Turkish exporters expected an additional \$1 billion steel products flow to the region and import quotas will be re-distributed among other countries.



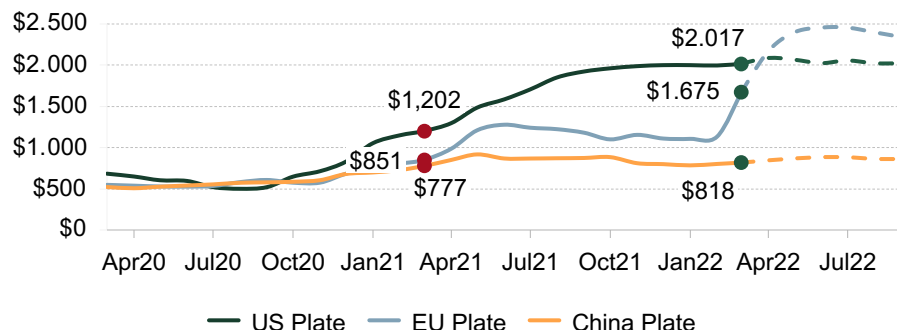
Capacity Expansion

- › US: Multiple US steelmakers are currently moving forward with plans for new EAFs: US Steel is building a new 3 million short ton/yr flat-rolled mill in Arkansas, while EAF steelmaker Nucor is building a 3 million short ton/yr flat-rolled mill in West Virginia. Nucor also plans to invest \$350 million in a new rebar mini mill in North Carolina with target to produce with nearly 100% recycled content.



US and China plate price curve flattened in Q1 while EU plate prices soared by 51% to \$1,675/MT in March as the region is mostly affected by the war.

Plate Prices – US / Europe / China (USD/MT)

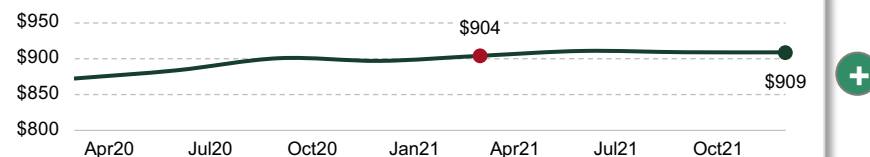


- US plate price eased its upward momentum during Q1 after reaching record highs in Jan'22 and climbed to \$2,017/MT in March. Sharp inflationary costs were factored into plate prices and sustained as US construction spending continued rising for the 12th month in Feb'22.
- EU plate price skyrocketed in March, landing at \$1,675/MT by the end of Q1'22. The 50.9% Q-o-Q increase was due to the recent war in Ukraine which severely disrupted Europe's supply of steel slab, which in turn is affecting plate production and costs. Despite the effort to find alternative sources to slab, the likelihood of resolving the material and energy shortage is low in near future which supported the plate price to increase in Q2.
- China plate price edged up by 2.3% during Q1'22, ending the quarter at \$818/MT. As the country is under another round of COVID-19 lockdown starting April, the demand and supply of plate both contracted.
- OPEC is sticking to earlier laid plans for ramping up production, its production increased to 34.1MBPD in Feb'22 and is expected to continue the trend into Q2. US crude oil output is stable around 19.6MBPD over Q1.
- BDI index recovered losses from Jan'22, rebounding to 2,392 since the initiation of the war.

Source: AV Analysis

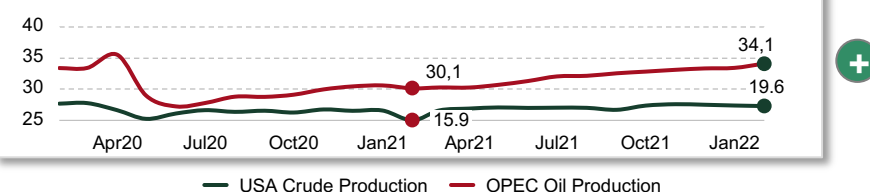
US Defense Spending

BUSD



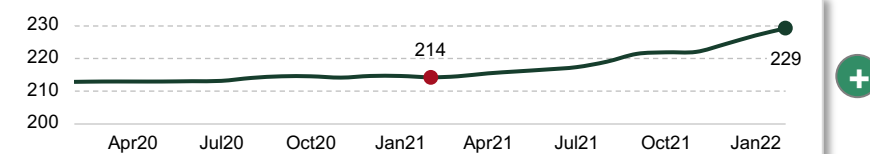
Crude Oil Production

MBPD

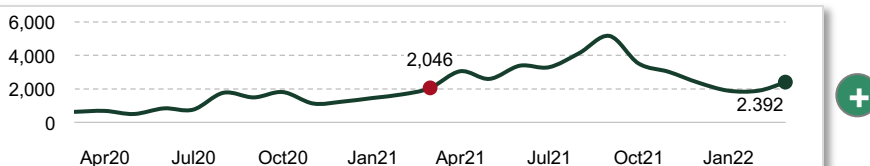


US Ship Building and Repairs

Index: 1985 = 100



Baltic Dry Index

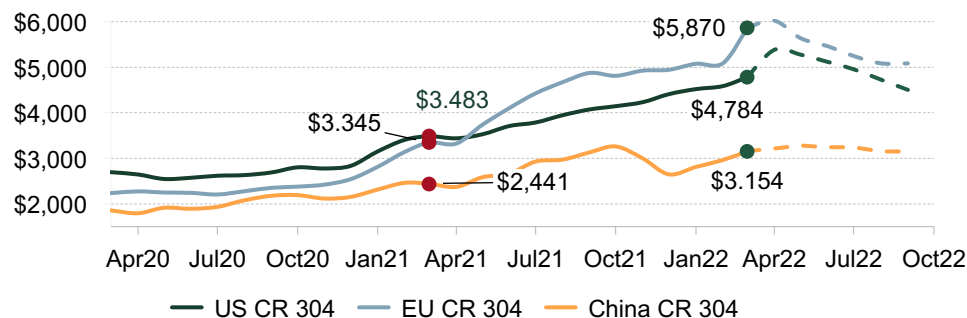


● Previous Year's Data ● Latest Data + - Correlation to Market Price



Stainless prices rose to record highs in the first quarter across all regions amid nickel turmoil with Europe, and settled at \$5,870/MT in March.

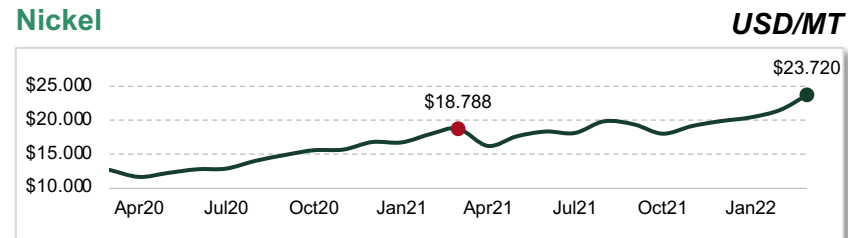
Stainless Steel Prices – US / Europe / China (USD/MT)



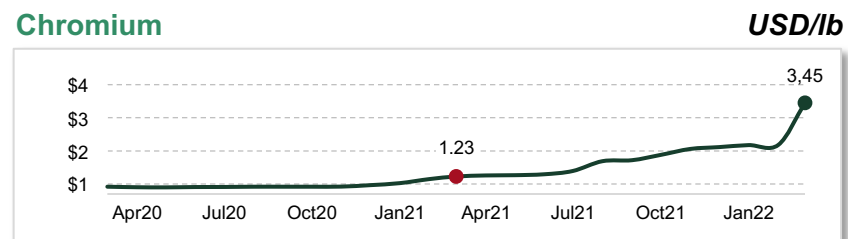
- US stainless steel price increased to \$4,784/MT in March. The effect of recent nickel turmoil has been less significant in the US with an 8.5% Q-o-Q increase. Domestic steelmakers are delaying deliveries amid strong order books and failed attempts to gain Section 232 exemptions. Efforts to find exemptions have intensified the tight supply market.
- Europe stainless price moved along with hot rolled prices to \$5,870/MT, highest among all regions. Spurred by sanctions against Russia, which have caused supply to be massively disrupted. Steelmakers in Spain and Germany curbed production amid soaring energy prices.
- China stainless price rebounded to \$3,154/MT or a 19.1% increase on Q-o-Q basis as it sat at the epicenter of the massive spike in Nickel prices. Now, inventory is piling up, along with lower contracted manufacturing activities in April, contributed to the bearish outlook on stainless steel prices.
- China LME nickel price soared 250% to record highs above \$100,000/MT in two days early March, and soon the black swan event caused huge volatility in the market. China's Tsingshan, one of the world's top producers, bought large amounts of nickel to hedge its short bets on LME and softened nickel prices back to normal levels, prices stood at \$23,720/MT by the end of Q1'22.
- Stainless Steel will continue to face increased competition for Nickel supply from the growing EV market

Source: AV Analysis

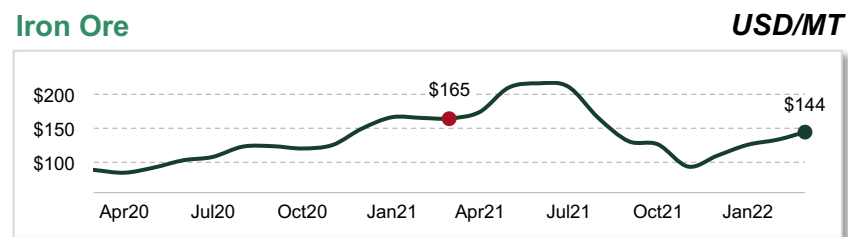
Nickel



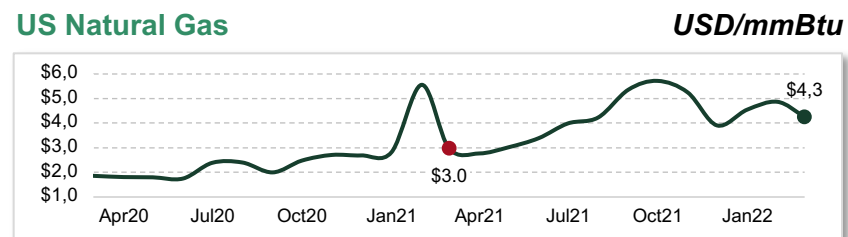
Chromium



Iron Ore



US Natural Gas

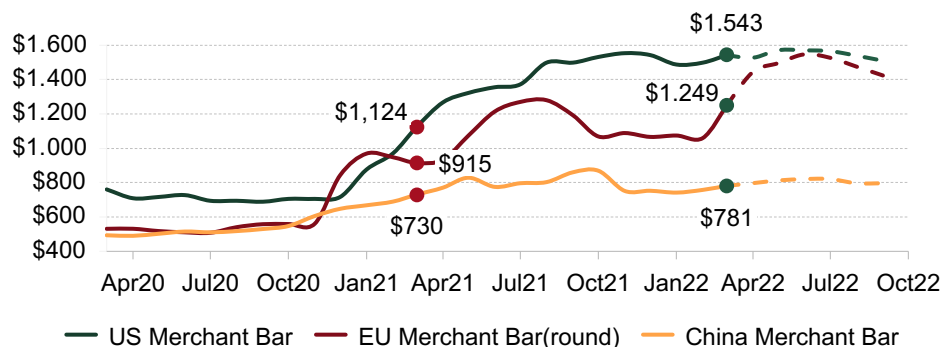


● Previous Year's Data ● Latest Data + - Correlation to Market Price



Global long steel prices stabilized except for Europe where prices pushed higher to \$1,249/MT mainly driven by supply squeeze.

Long Steel Prices (USD/MT)

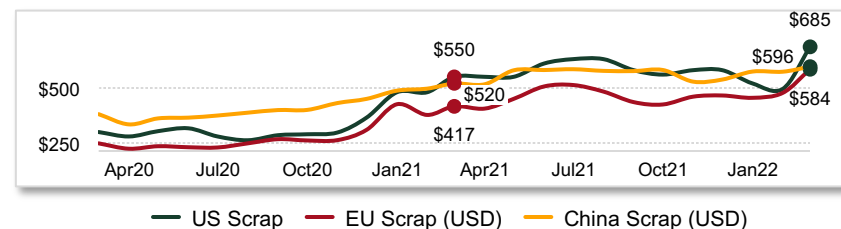


- US Merchant Bar price stabilized at \$1,543/MT in March and is likely to hold at the current level. Although automotive demand has not fully recovered, scrap prices surging into record territory strongly support the bar prices.
- Europe Merchant Bar price saw a much steeper rise of 37.5% in Q1'22 to \$1,249/MT. Supply plays a driving factor in determining merchant bar prices as European mill capacity utilization were reduced and import options are limited. No announcements on quota relaxation have been made by European Commission to ease the market.
- China long steel price demonstrated a flattened curve recently and ended Q1 at \$781/MT, up by 3.8% Q-o-Q. The price gap between China and EU merchant bar has grown with China price currently only half of EU price. Recent lockdowns in China have put construction projects on hold and is expected to have a negative impact on long steel consumption.
- Scrap prices also boomed in three regions with US up 18.1% Q-o-Q. Turkish mills have sought the extra availability of European scrap, helping keep scrap prices under control.
- Ferrochrome prices jumped to \$12,401/MT, up by 47.1% from last quarter. As Russia's share of ferrochrome export is cutoff, Merafe Resources has announced a further price rise of 20% in ferrochrome for Q2'22.

Source: AV Analysis

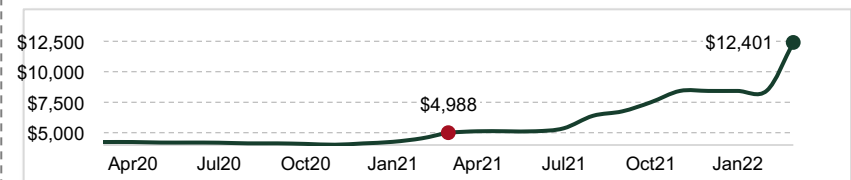
Scrap Steel Price

USD/MT



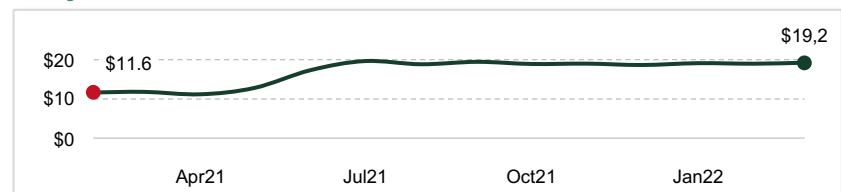
Ferrochrome

USD/MT



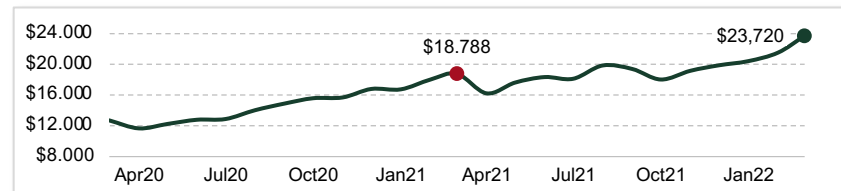
Molybdenum

USD/lb.



Nickel

USD/MT

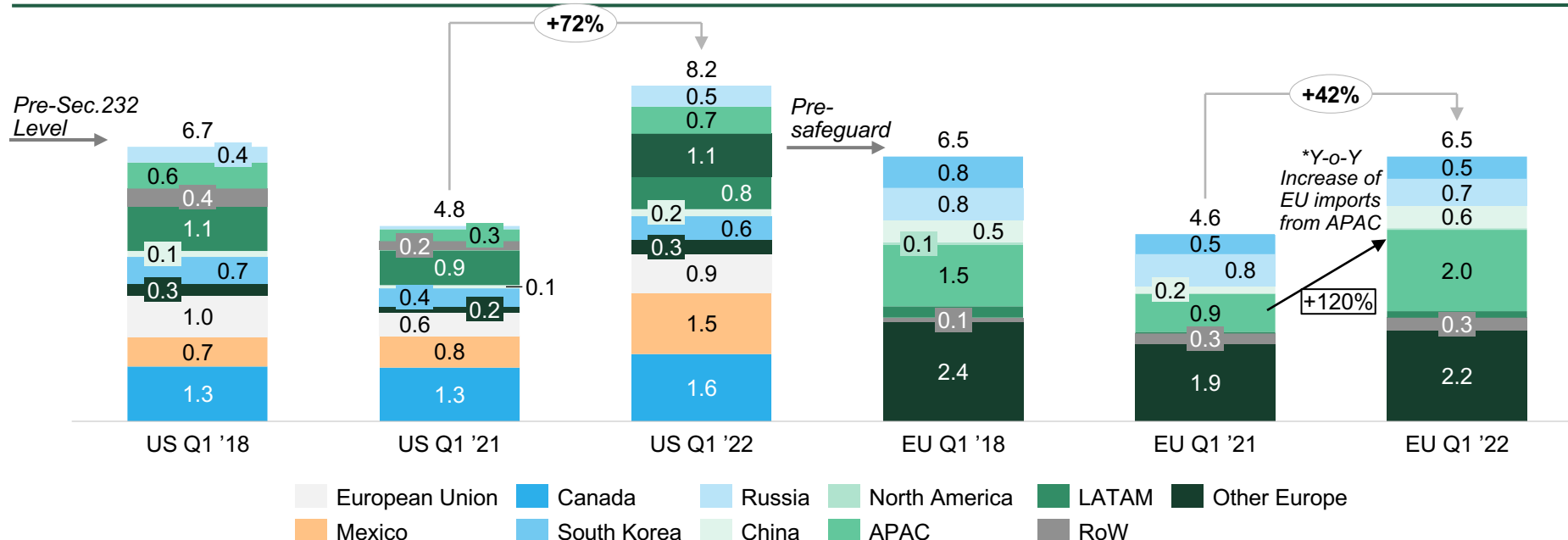


● Previous Year's Data ● Latest Data + - Correlation to Market Price



Trade barriers have become less prominent as regional price gaps continue to influence decision making; imports in US and EU are above 2018 levels.

US and EU Imports – All Steel Products MMT

Q1 2022: Nov 21 – Jan 22¹

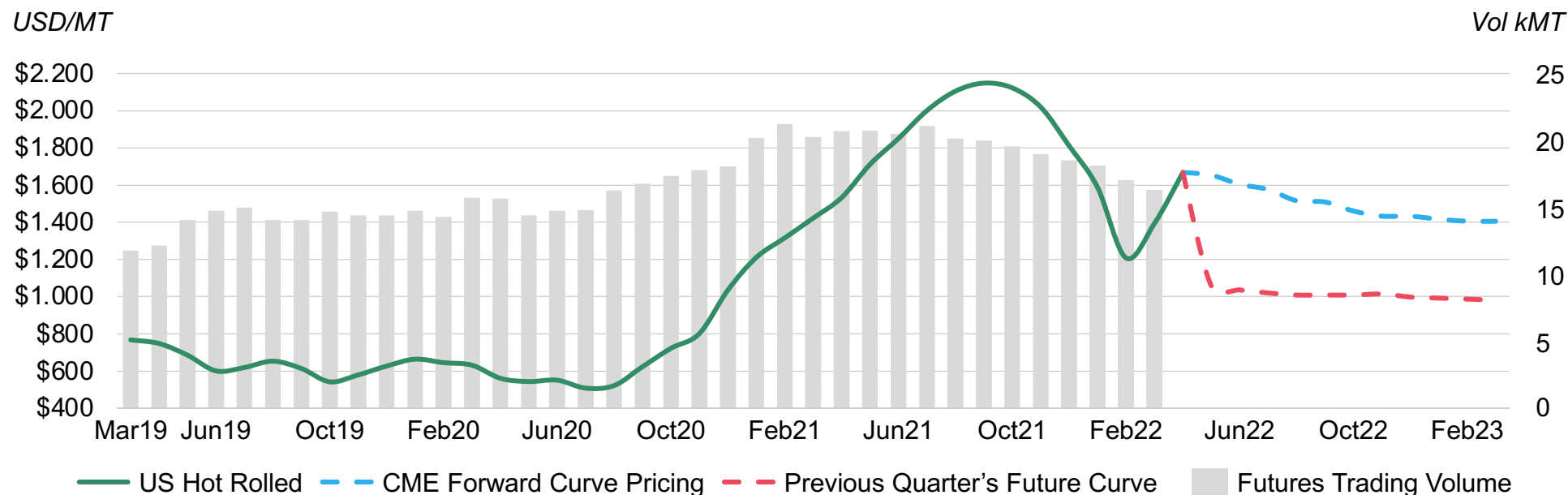
- US import volumes increased by 4.2 MMT (72% Y-o-Y), surpassing pre-232 levels. Exempted by Section 232 (25% tariff), Canada and Mexico continue to be the top 2 import sources, with volume increasing 0.3 and 0.7 MMT, respectively, compared to same quarter last year.
- In January '22, Section 232 tariffs were removed from European Exports and provided a 3.3MMT tariff-rate-quota. This led to a 14% M-o-M increase in EU imports in January. Subsequently, Japan and US received exemptions to 232, with quotas of 1.25MMT and 0.5MMT, effective on 1 April and 1 June '22, respectively.
- EU total import volume has increased 1.9 MMT (42% Y-o-Y), now similar to pre-safeguard levels. Imports from APAC marked the biggest jump of over 100%, mainly driven by increasing import volume of Vietnamese coated steel and Indian flat steel.
- EU's sanction measures on Russian steel products are expected to shift steel import source from its second largest supply country to Turkey and APAC countries.

Note 1: There is a one-quarter lag on the publication of import data



The latest futures curve for US HRC has corrected upwards sharply from last quarter, indicating market sentiment largely around the Pig Iron shortage.

Hot Rolled Historical Prices, Contract Volume, and Futures CME Pricing



- With soaring input prices caused by Russia-Ukraine war, CME futures curve has been lifted this quarter. But as US trade barrier loosening, import volume soaring, domestic steel production level normalized, coupled with lower cumulative demand, futures curve shows a downward trajectory, indicating that the market is anticipating steady market correction. HRC futures for Mar'23 are trading 16% lower than current spot market prices.
- HRC futures are trading at a lower volume than last quarter, with volumes down by 12% Q-o-Q in Mar'22, indicating that market-perceived volatility has declined. Traders are holding back from making deals, and hedging activity is entering a wait-and-see period.

Note: Volumes are traded volumes cleared by CME, i.e. they exclude the "off exchange" OTC (over-the-counter) volumes not cleared by CME Prices

Source: CME, AV Analysis



Applied Value Quarterly Steel Report

Q2 2022

Market Conditions by Region

Steel Production Costs

Special Section: Iron Ore Deep Dive

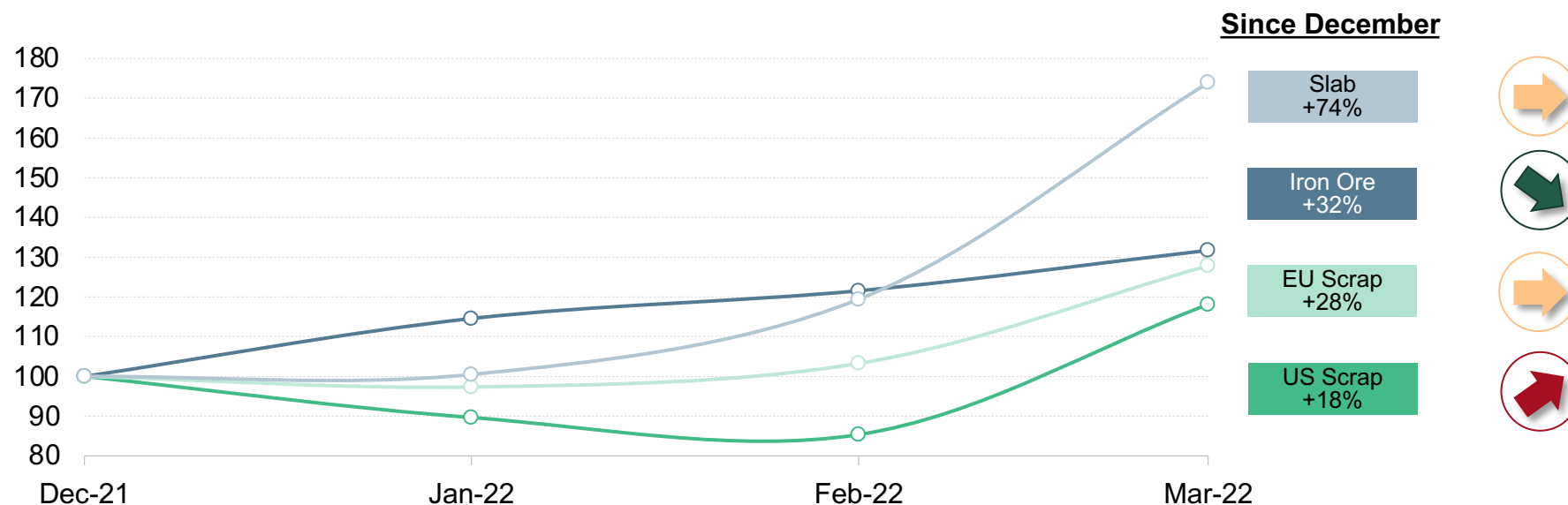
Major Steel Mill Company Performance



Slab and scrap prices rose significantly in Q1'22 due to Russian-Ukraine conflict, slab spiked and increased by 74% Q-o-Q.

Current Market Update

Q2'22 Forecast



US Scrap

- › Sanctions on Russia reduce pig iron availability notably which raise the alternative scrap prices. Turkish mills tend to fill steel supply gap from Russia and Ukraine, thus increasing import volume from US. Bullish sentiment continues over next quarter.

EU Scrap

- › Disruptions on Russia-Ukraine supply sustained tight supply in EU results, increasing scrap prices. However, EU steelmakers may halt operations as energy prices face another surge, especially in Italy. EU scrap expects to be leveled in Q2'22.

Iron Ore

- › Continued COVID-19 spillover and lockdowns in China adds uncertainties to disruptions to the economy. Weakened steel demand, depressed market sentiment and limited trading activities at China's major ports bring downward expectations on iron ore prices in Q2'22.

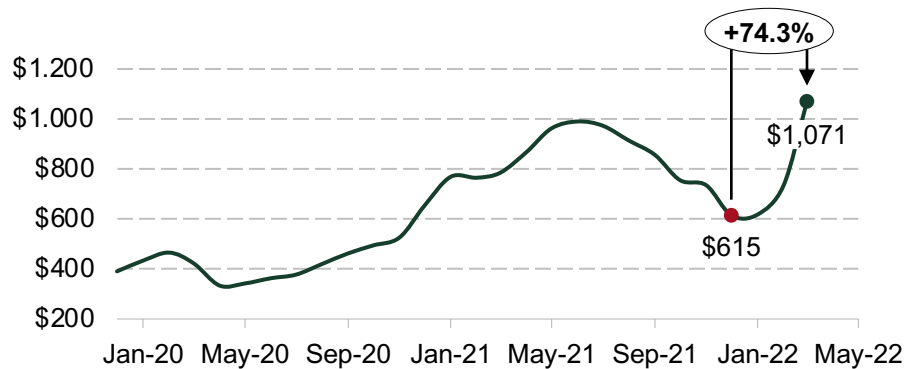
Slab

- › Panic in Europe continues after EU's announcement on sanctions against Russian steel. Elevated slab prices in EU has attracted Brazilian and Asian mills. Slab price tends to maintain at current level in the short-term.

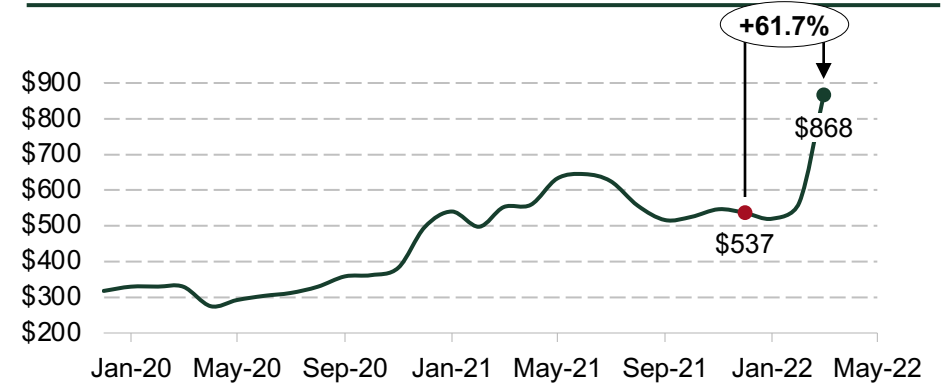


Slab and pig iron prices rose remarkably by 74.3% and 61.7% Q-o-Q, respectively in Q1'22; Ferrous scrap price in Europe and US also increased.

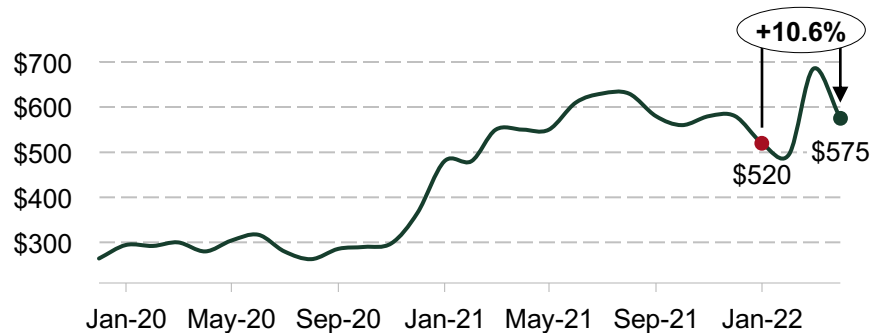
Slab
USD/MT Dec 19 – Mar. 22



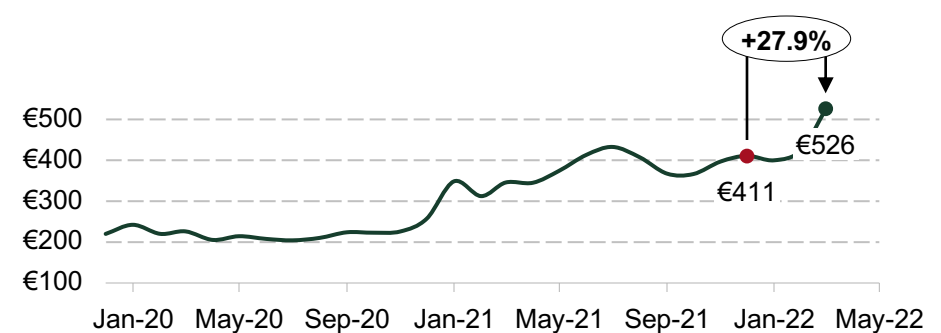
Pig Iron
USD/MT, Dec 19 – Mar. 22



Ferrous Scrap US
USD/GT Dec 19 – Apr. 22



Ferrous Scrap Europe
EUR/MT Dec 19 – Mar. 22



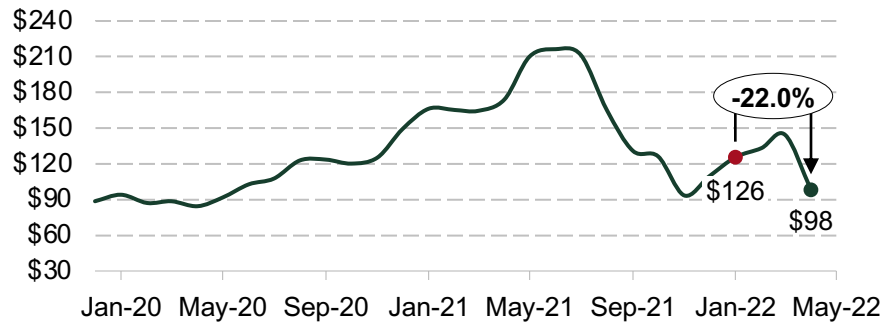
● Previous Quarter's Data
● Latest Data



Iron ore, coking coal and zinc prices were down by 22.0%, 7.3% and 7.2% Q-o-Q respectively, whereas limestone soared by 8.4% Q-o-Q.

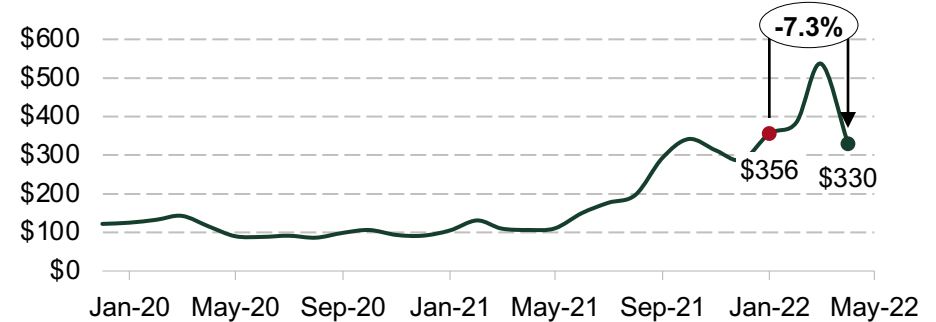
Iron Ore

USD/MT Dec 19 – Apr. 22



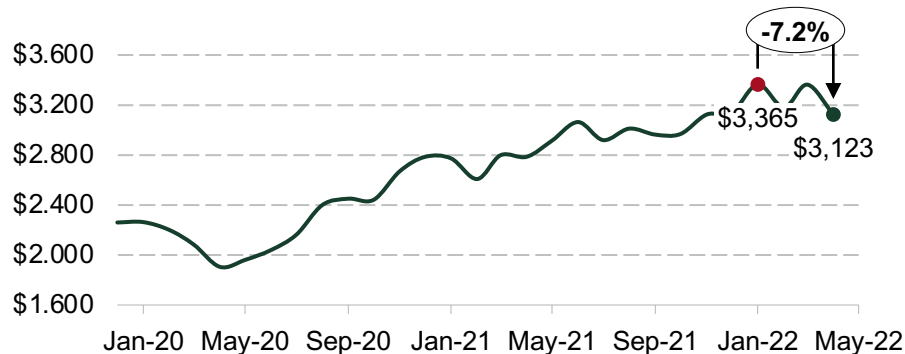
Coking Coal

USD/MT Dec 19 – Apr. 22



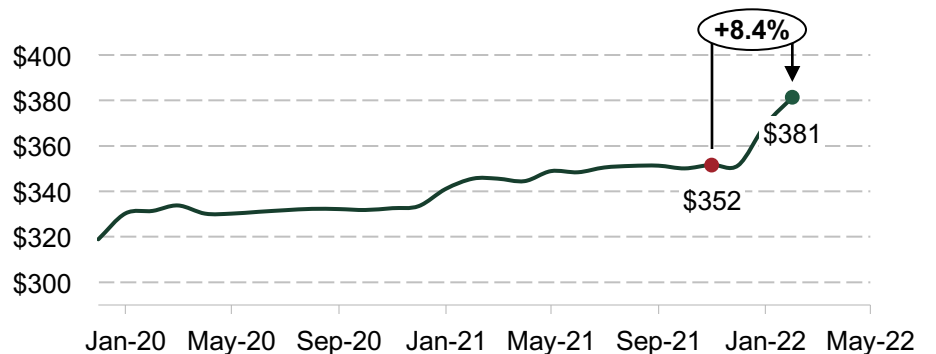
Zinc

USD/MT Dec 19 – Apr. 22



Limestone – Producer Price Index

Dec 19 – Feb. 22



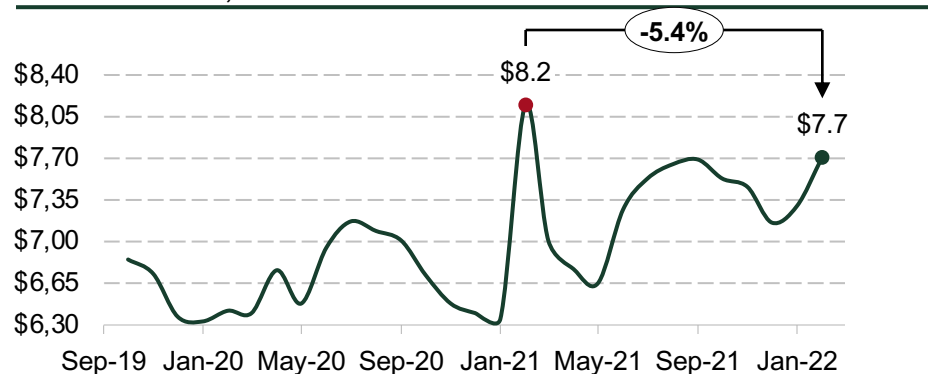
● Previous Quarter's Data
● Latest Data



Germany natural gas price was up by 502.8% on Y-o-Y basis during Q1'22, Europe electricity also risen by 197.4% Y-o-Y.

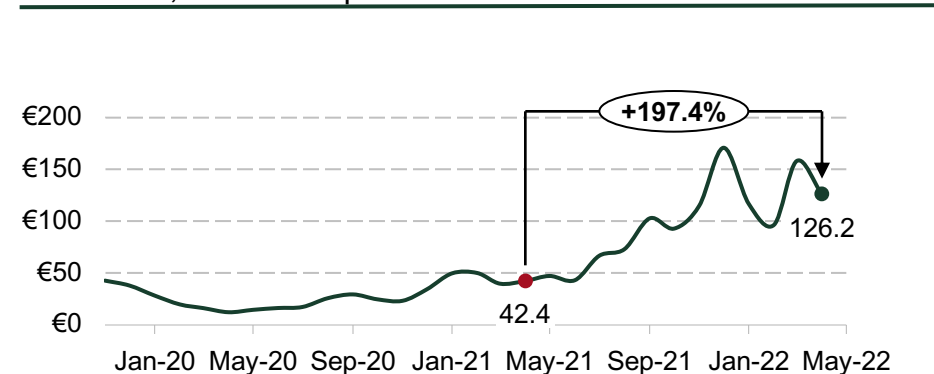
Electricity US

US cents/KWH, Oct 19 – Feb. 22



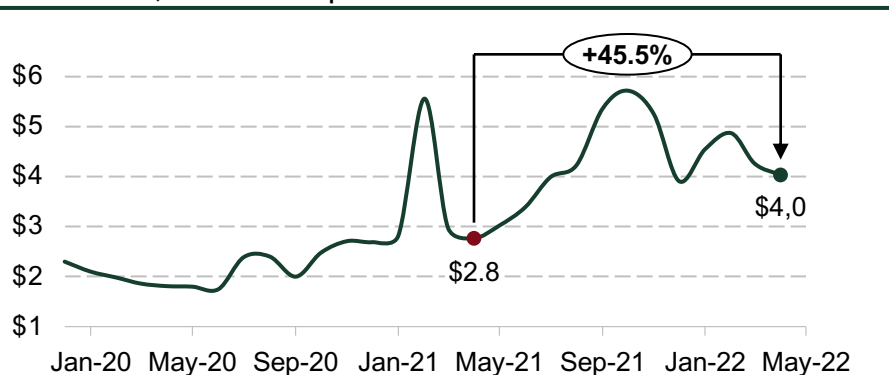
Electricity Europe

EUR/MWH, Nov 19 – Apr. 22



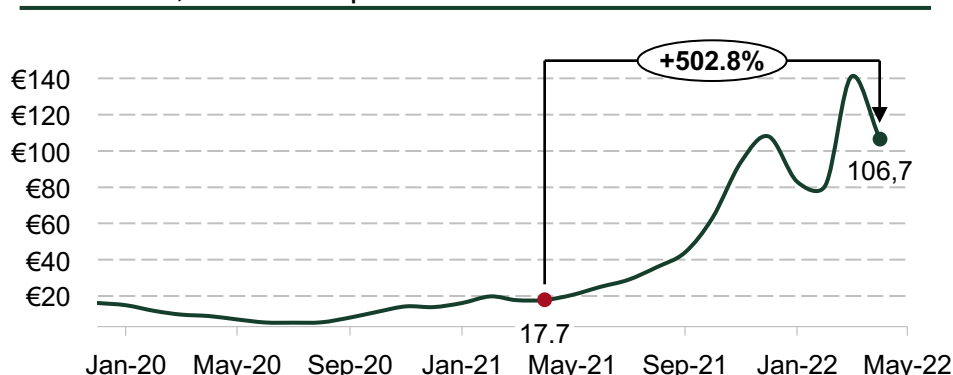
Natural Gas US

USD/mmBtu, Dec 19 – Apr. 22



Natural Gas Germany

EUR/MWH, Dec 19 – Apr. 22



● Previous Year's Data
● Latest Data



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Q2 2022

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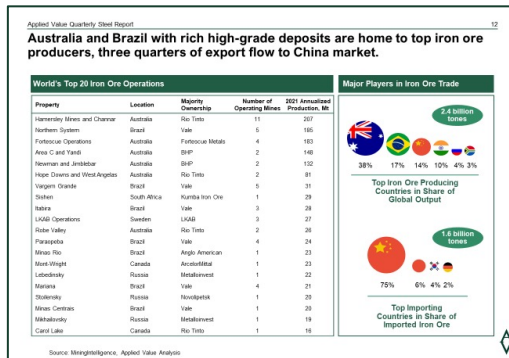


Iron Ore Special Section: Executive Summary.

1

Supply-Demand

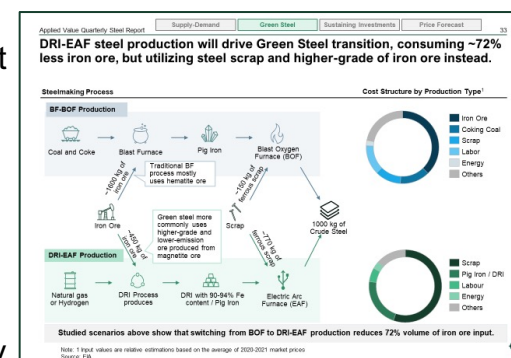
- Australia and Brazil are the top 2 iron ore producers, accounting for 55% of world output
- China consumes 75% of Global Iron Ore volume
- Chinese crude steel production is one of the most important price drivers for Iron Ore



2

Green Steel

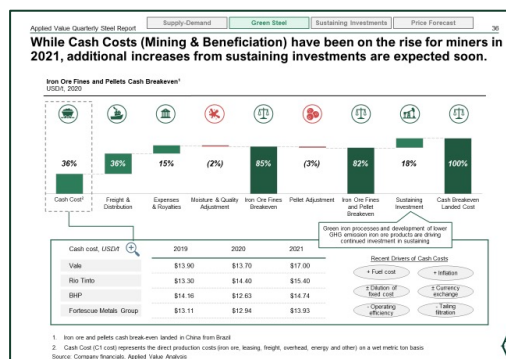
- The transition to Green Steel is causing Global Steel Production to shift rapidly towards EAF production, which consumes ~72% less Iron Ore than BOF
- EAF share of global steel production is expected to rise from 28% in 2020 to 42% by 2030



3

Sustaining Investments

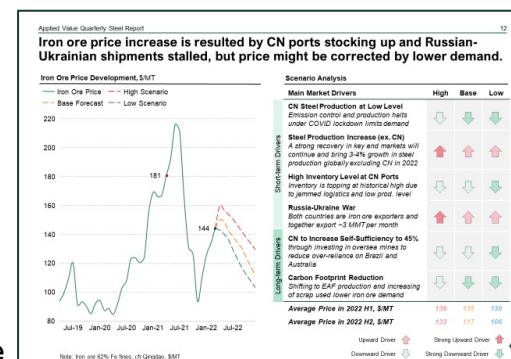
- Mines will be forced to make important investment decisions in the medium term to address the shifting industry landscape
- These investments are likely to carry cost implications for downstream buyers



4

Price Forecast & Drivers

- Recent iron ore price increase reflected tightened supply and demand fundamentals, as Chinese mills stocking up and Russian-Ukrainian shipments stalled
- Market is expected to enter a correction stage

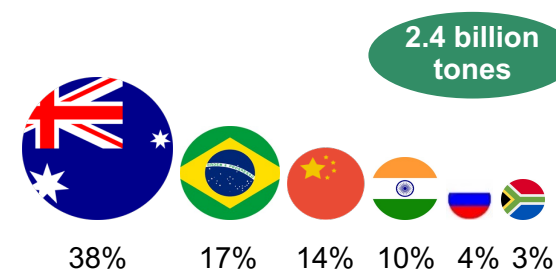


Australia and Brazil with rich high-grade deposits are home to top iron ore producers; three quarters of exports flow to China market.

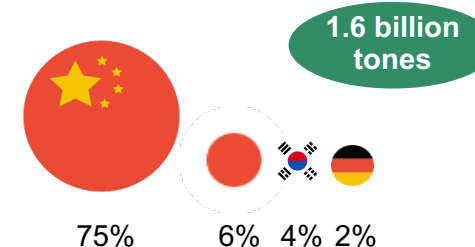
World's Top 20 Iron Ore Operations

Property	Location	Majority Ownership	Number of Operating Mines	2021 Annualized Production, Mt
Hamersley Mines and Channar	Australia	Rio Tinto	11	207
Northern System	Brazil	Vale	5	185
Fortescue Operations	Australia	Fortescue Metals	4	183
Area C and Yandi	Australia	BHP	2	148
Newman and Jimblebar	Australia	BHP	2	132
Hope Downs and West Angelas	Australia	Rio Tinto	2	81
Vargem Grande	Brazil	Vale	5	31
Sishen	South Africa	Kumba Iron Ore	1	29
Itabira	Brazil	Vale	3	28
LKAB Operations	Sweden	LKAB	3	27
Robe Valley	Australia	Rio Tinto	2	26
Paraopeba	Brazil	Vale	4	24
Minas Rio	Brazil	Anglo American	1	23
Mont-Wright	Canada	ArcelorMittal	1	23
Lebedinsky	Russia	Metallinvest	1	22
Mariana	Brazil	Vale	4	21
Stoilensky	Russia	Novolipetsk	1	20
Minas Centrais	Brazil	Vale	1	20
Mikhailovsky	Russia	Metallinvest	1	19
Carol Lake	Canada	Rio Tinto	1	16

Major Players in Iron Ore Trade



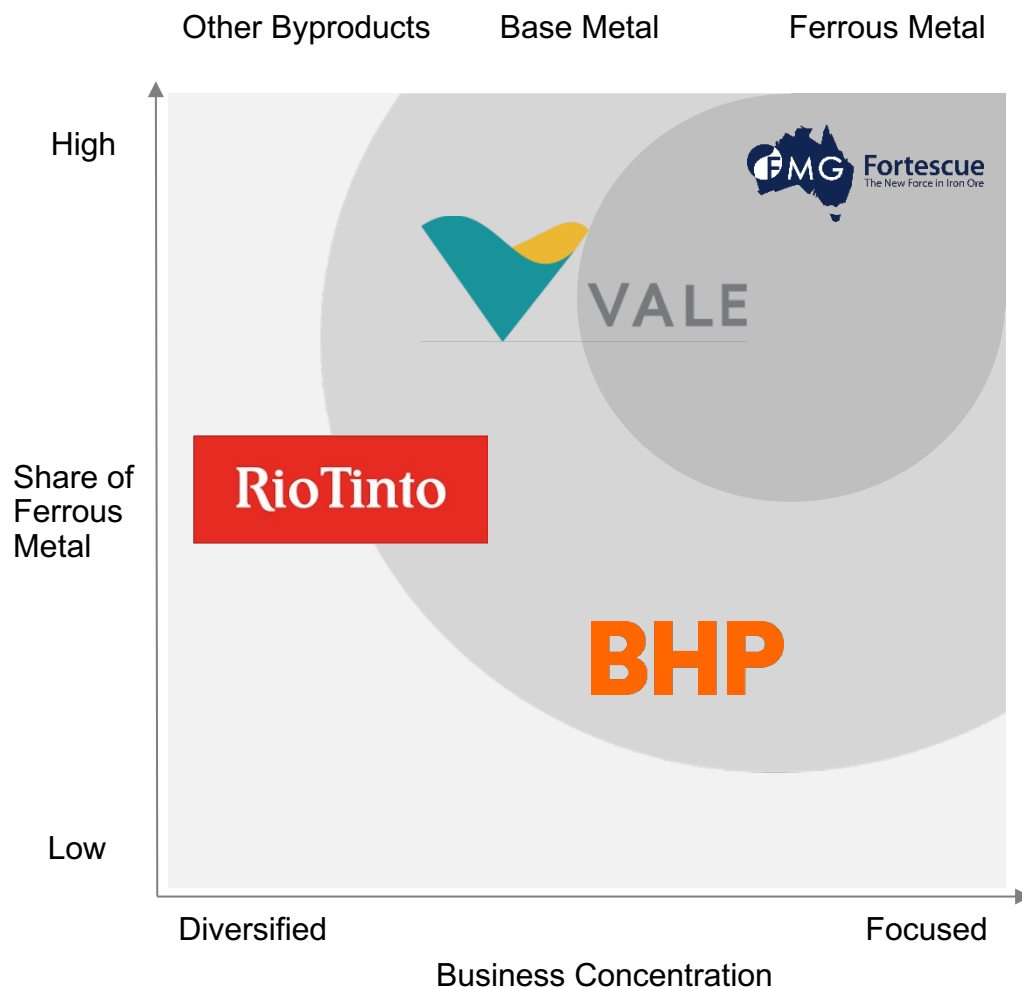
Top Iron Ore Producing Countries in Share of Global Output



Top Importing Countries in Share of Imported Iron Ore



Four major miners dominate the iron ore supply market accounting for ~43% of world's total output and provide end-to-end solutions.



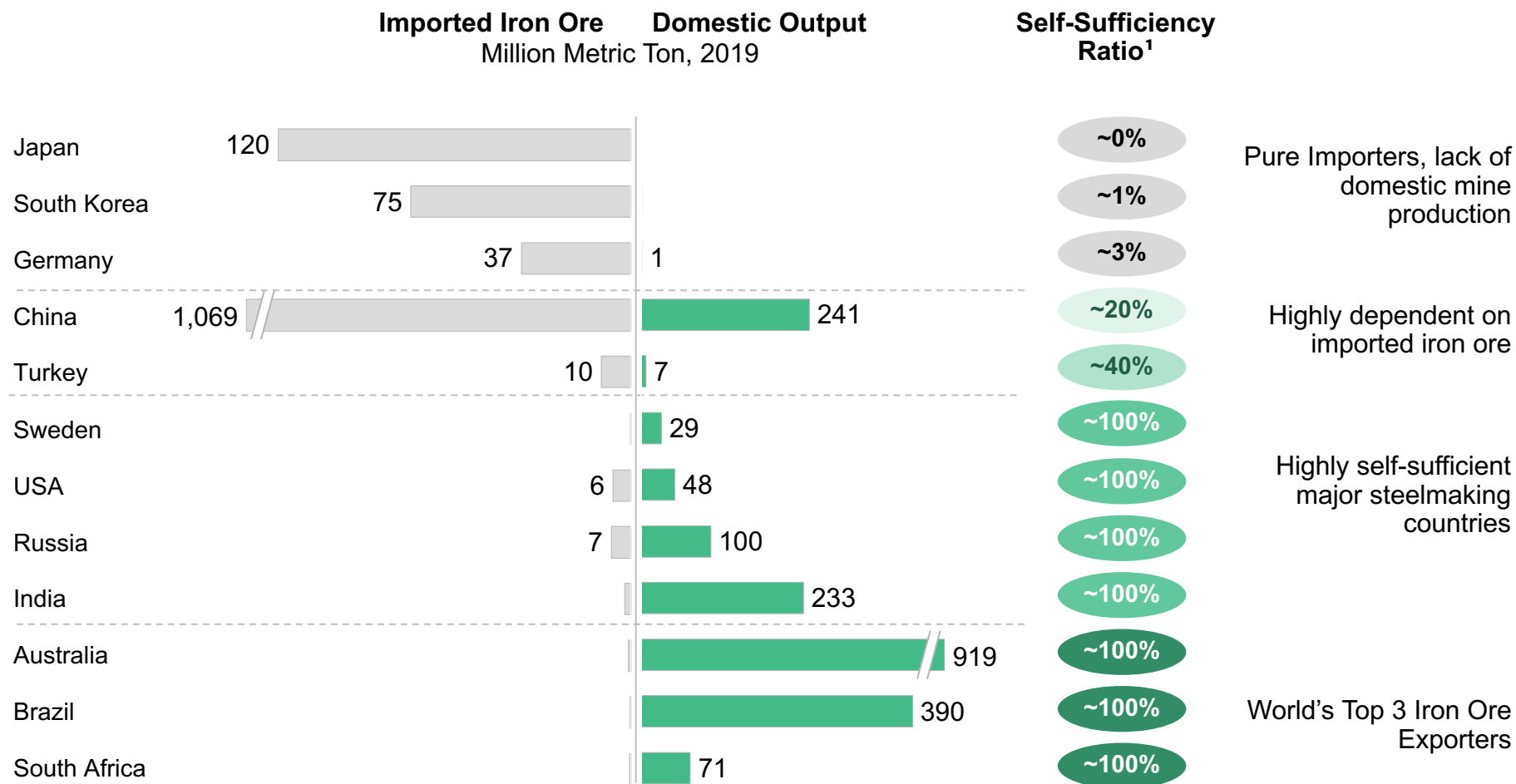
	Vale	Rio Tinto	BHP	FMG
Output Mt, FY20	300	286	248	204
Rev. Size BUSD, FY20	53	63	61	22
Iron Ore¹ % total rev.	80%	65%	48%	90%
Aluminum % total rev.		21%		
Nickel % total rev.	8%			
Copper % total rev.	5%	4%	25%	
China Sales % total rev.	59%	58%	62%	95%

1. Including other ferrous metal, e.g. pellets, ferroalloys

Source: Company financials, Capital IQ, Applied Value Analysis



Only a handful of countries are “self-sufficient” in their Iron Ore production, although even in these countries the price trades as a global commodity.



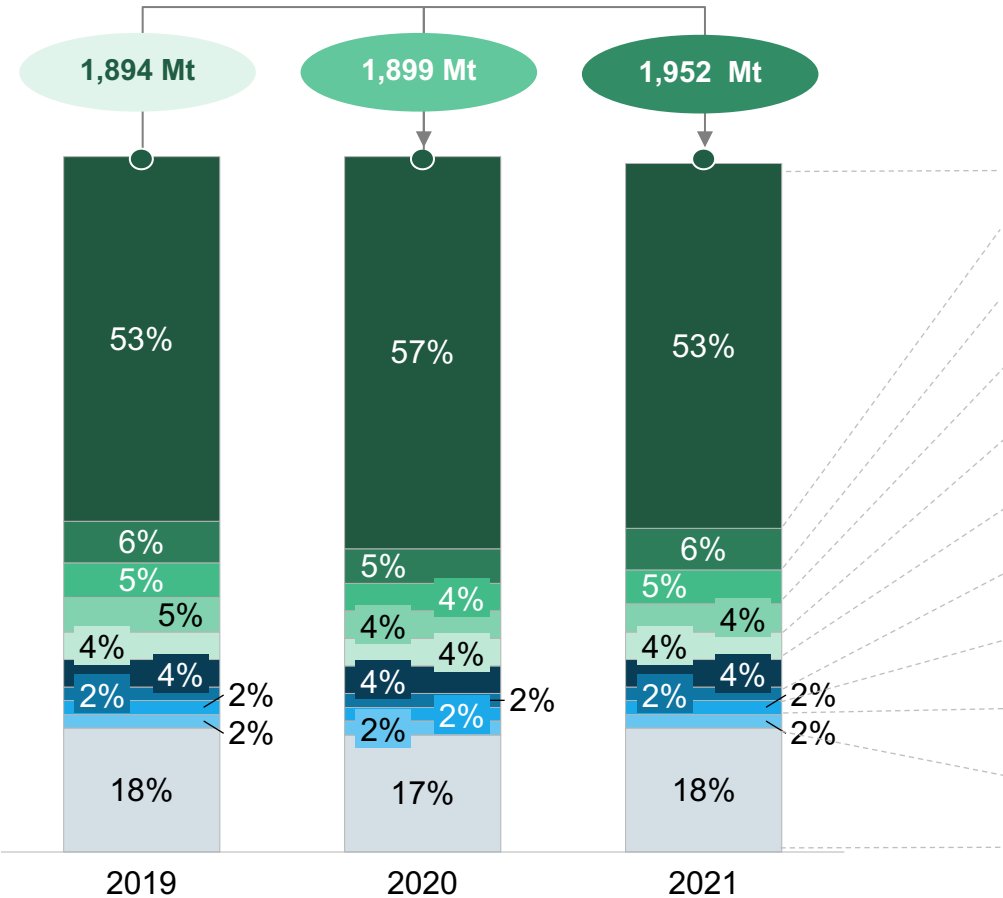
1. Self-sufficiency ratio = Domestic output / Apparent consumption

Source: CRU, WITS, World Steel, Applied Value Analysis



Iron Ore pricing is strongly affected by global crude steel production levels, particularly when Production rises or falls in China.

Total Crude Steel Production by Country
Mt, 2019 - 2021



Top 8 countries contribute 80% of world's crude steel output in 2021

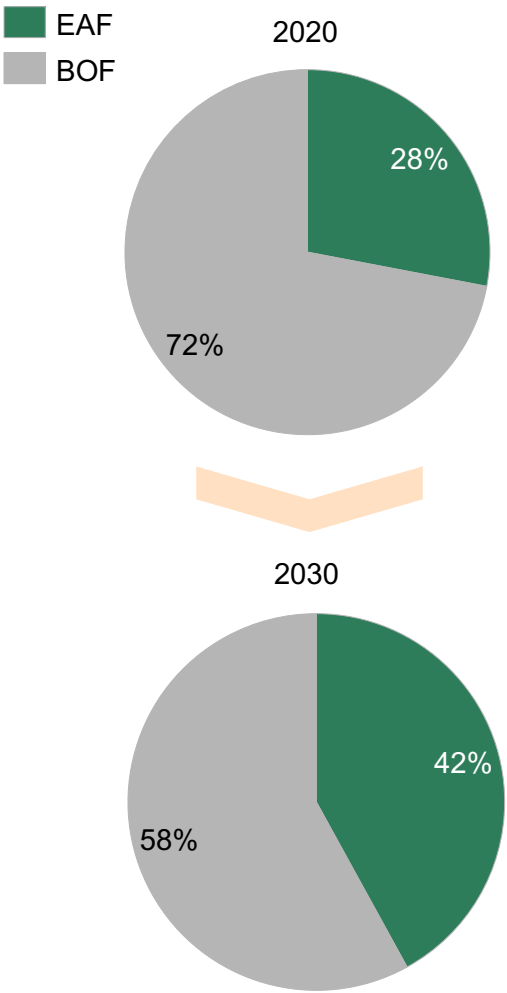
Country	YoY Production Change	
	2020	2021
China	7%	(3%)
India	(10%)	18%
Japan	(16%)	16%
USA	(17%)	18%
Russia	(0%)	6%
South Korea	(6%)	5%
Turkey	6%	13%
Germany	(10%)	12%
Brazil	(4%)	15%
RoW	7%	(3%)

Three-Year CAGR of 2% during period of COVID-19



EAF comprised a mere ~28% of global capacity in 2020, but is expected to grow rapidly to ~42% by 2030, led by EU and China.

EAF Share of Global Steel Production



Summary of Regional Green Steel Production Transformation

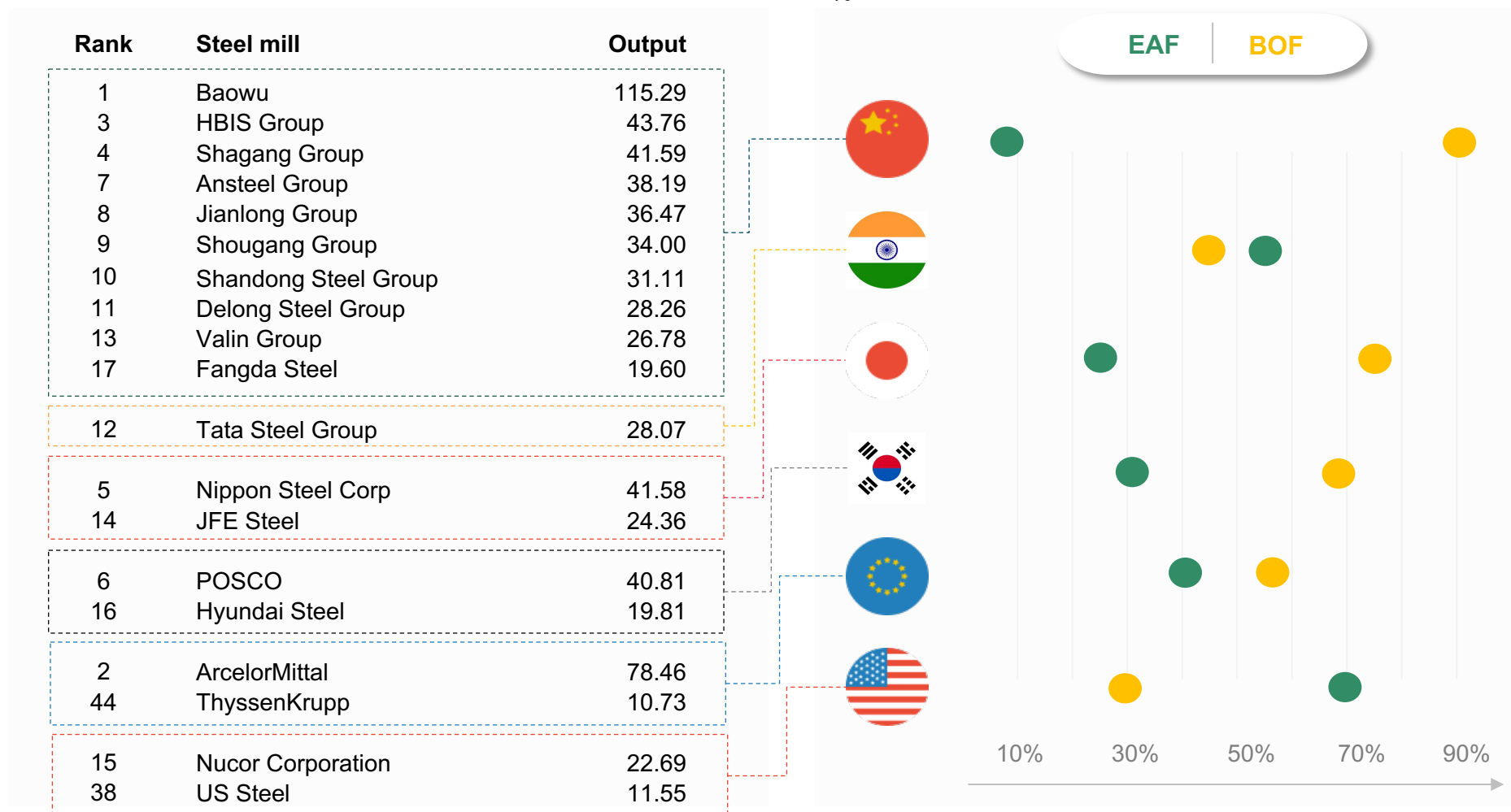
Region	Production Transformation	Iron Ore Demand
Global	› EAF share of global steel production is anticipated to increase from 28% to 42% by 2030	› As China consuming >70% of global iron ore volume, shifting to EAF and increasing ferrous scrap used in the country might lower global iron ore consumption
North America	› Reached 56% EAF capacity, highest among all regions, with US currently having ~70% of EAF production already › To further expand EAF capacity to 61% by 2030	› With already widely adopted EAF and high scrap recovery rate, NA demand for iron ore is expected to stabilize at a low level › NA consumes less than 5% of global iron ore demand
Europe Union	› Reached 39% EAF and largely adopted H₂ DRI-EAF approach › To further expand EAF to 46% by 2030	› As EU moving towards carbon neutrality, it requires steelmakers to use less iron ore content › Shifting from BOF to DRI-EAF production reduces ~70% volume of iron ore input
China	› Expected to triple EAF production by 2030, reaching to 30% › Two major forces are driving China to shift from BOF to EAF: Surging in steel scrap supply and aiming to improve carbon footprint	› After China started to lift its scrap import ban, ferrous scrap used in China for steelmaking has been increasing and substituting iron ore to support new EAF capacity



The transition can be carefully monitored by observing the investment decisions of key steel mills, consuming the majority of Iron Ore globally.

2021 Crude steel production by steel mill,
Million Tonnes

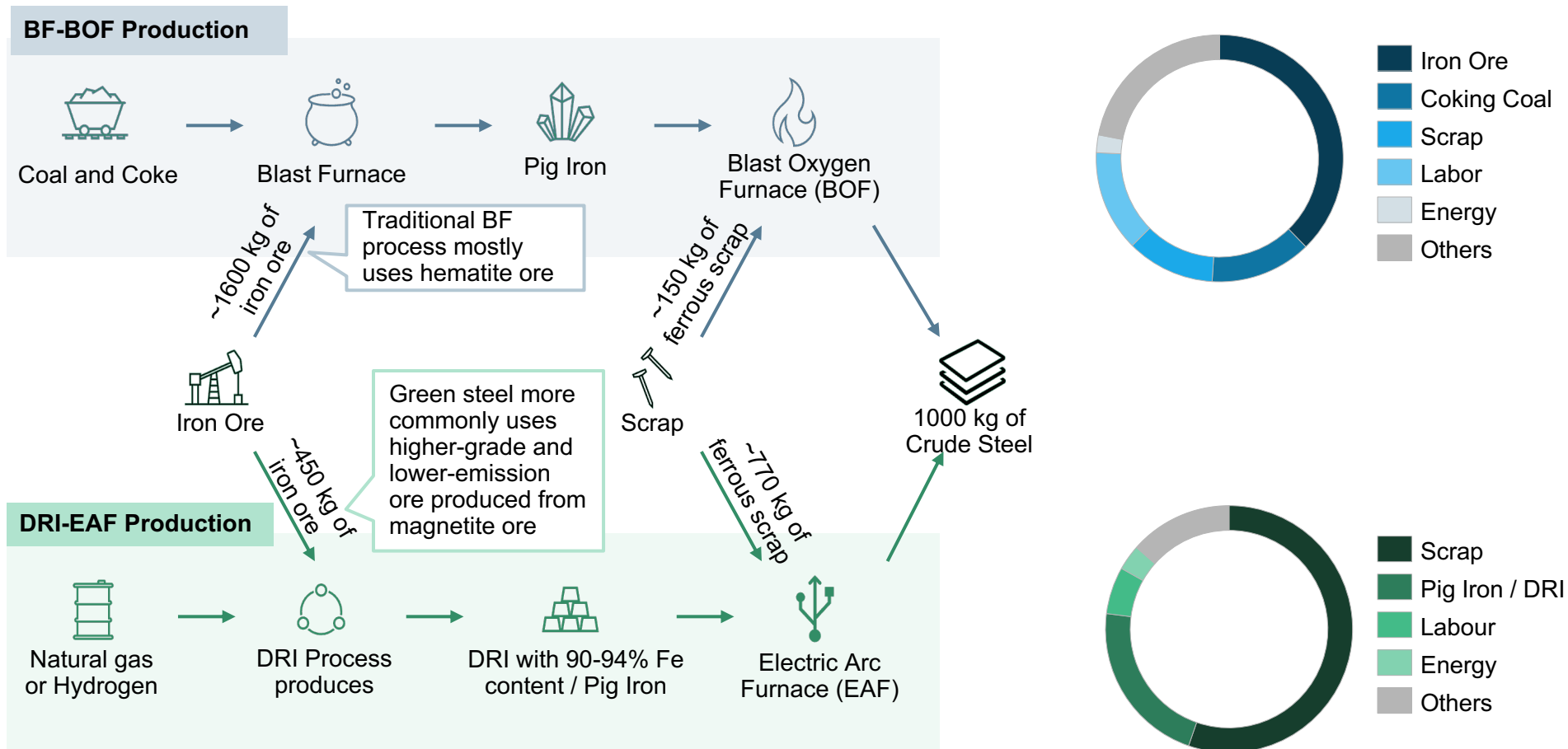
Crude steel production by process,
%



DRI-EAF steel production will drive Green Steel transition, consuming ~72% less iron ore, but utilizing steel scrap and higher-grade of iron ore instead.

Steelmaking Process

Cost Structure by Production Type¹



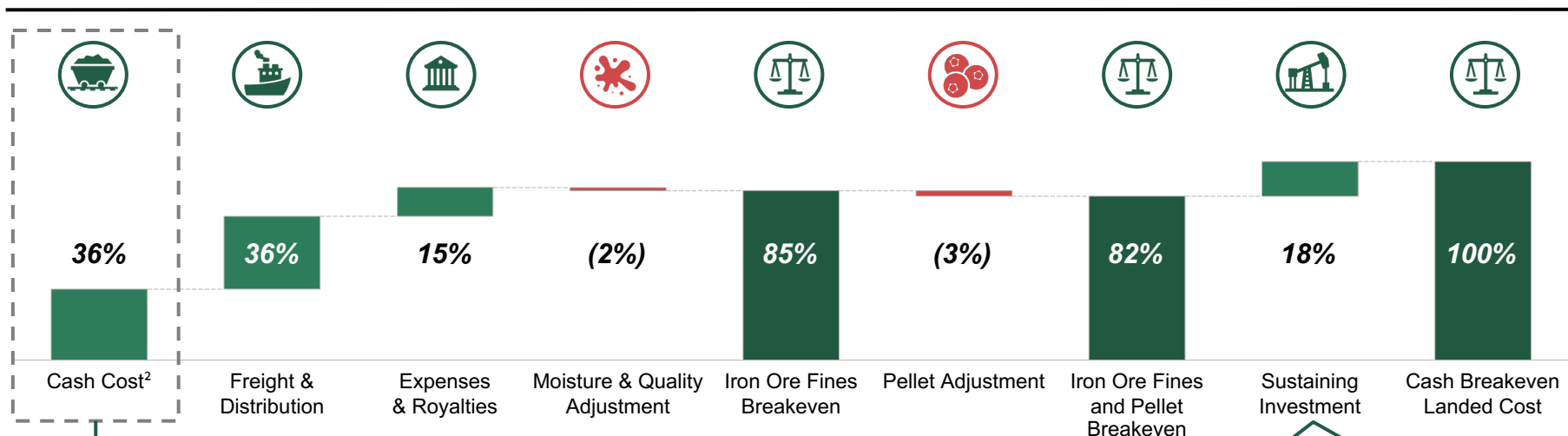
Studied scenarios above show that switching from BOF to DRI-EAF production reduces 72% volume of iron ore input.



While Cash Costs² have been on the rise for miners in 2021, additional increases from sustaining investments are expected soon.

Iron Ore Fines and Pellets Cash Breakeven¹

Indicative %



Green iron processes and development of lower GHG emission iron ore products are driving continued investment in sustaining

Cash cost, USD/t



2019

2020

2021

Vale

\$13.90

\$13.70

\$17.00

Rio Tinto

\$13.30

\$14.40

\$15.40

BHP

\$14.16

\$12.63

\$14.74

Fortescue Metals Group

\$13.11

\$12.94

\$13.93

Recent Drivers of Cash Costs

+ Fuel cost

+ Inflation

± Dilution of fixed cost

± Currency exchange

- Operating efficiency

- Tailing filtration

1. Iron ore and pellets cash break-even landed in China from Brazil

2. Cash Cost (C1 cost) represents the direct production costs (iron ore, leasing, freight, overhead, energy and other) on a wet metric ton basis

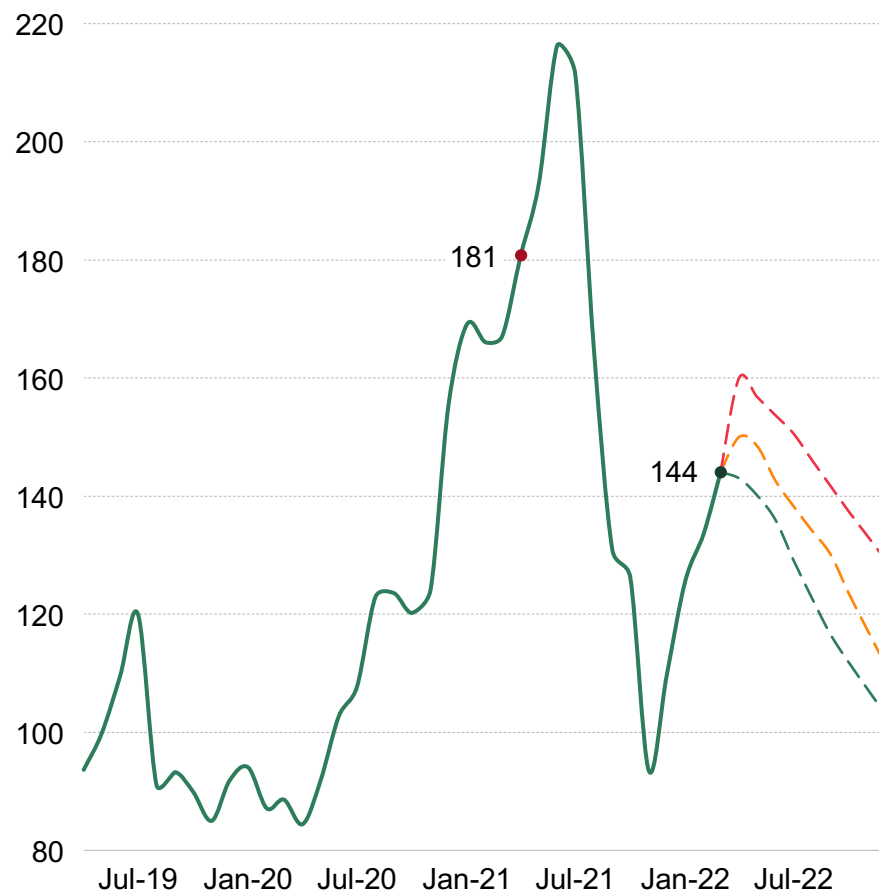
Source: Company financials, Applied Value Analysis



Iron ore price increase is resulted by CN ports stocking up and Russian-Ukrainian shipments stalled, but price might be corrected by lower demand.

Iron Ore Price Development, \$/MT

— Iron Ore Price — High Scenario
— Base Forecast — Low Scenario



Note: Iron ore 62% Fe fines, cfr Qingdao, \$/MT

Scenario Analysis

Main Market Drivers

High Base Low

Short-term Drivers

CN Steel Production at Low Level

Emission control and production halts under COVID lockdown limits demand

Downward Driver

Steel Production Increase (ex. CN)

A strong recovery in key end markets will continue and bring 3-4% growth in steel production globally excluding CN in 2022

Upward Driver

High Inventory Level at CN Ports

Inventory is topping at historical high due to jammed logistics and low prod. level

Downward Driver

Russia-Ukraine War

Both countries are iron ore exporters and together export ~3 MMT per month

Upward Driver

Long-term Drivers

CN to Increase Self-Sufficiency to 45%

Through investing in overseas mines to reduce over-reliance on Brazil and Australia

Downward Driver

Carbon Footprint Reduction

Shifting to EAF production and increasing of scrap used lower iron ore demand

Downward Driver

Average Price in 2022 H1, \$/MT

139 135 130

Average Price in 2022 H2, \$/MT

133 117 106

Upward Driver

Strong Upward Driver

Downward Driver

Strong Downward Driver



Applied Value Quarterly Steel Report

Q2 2022

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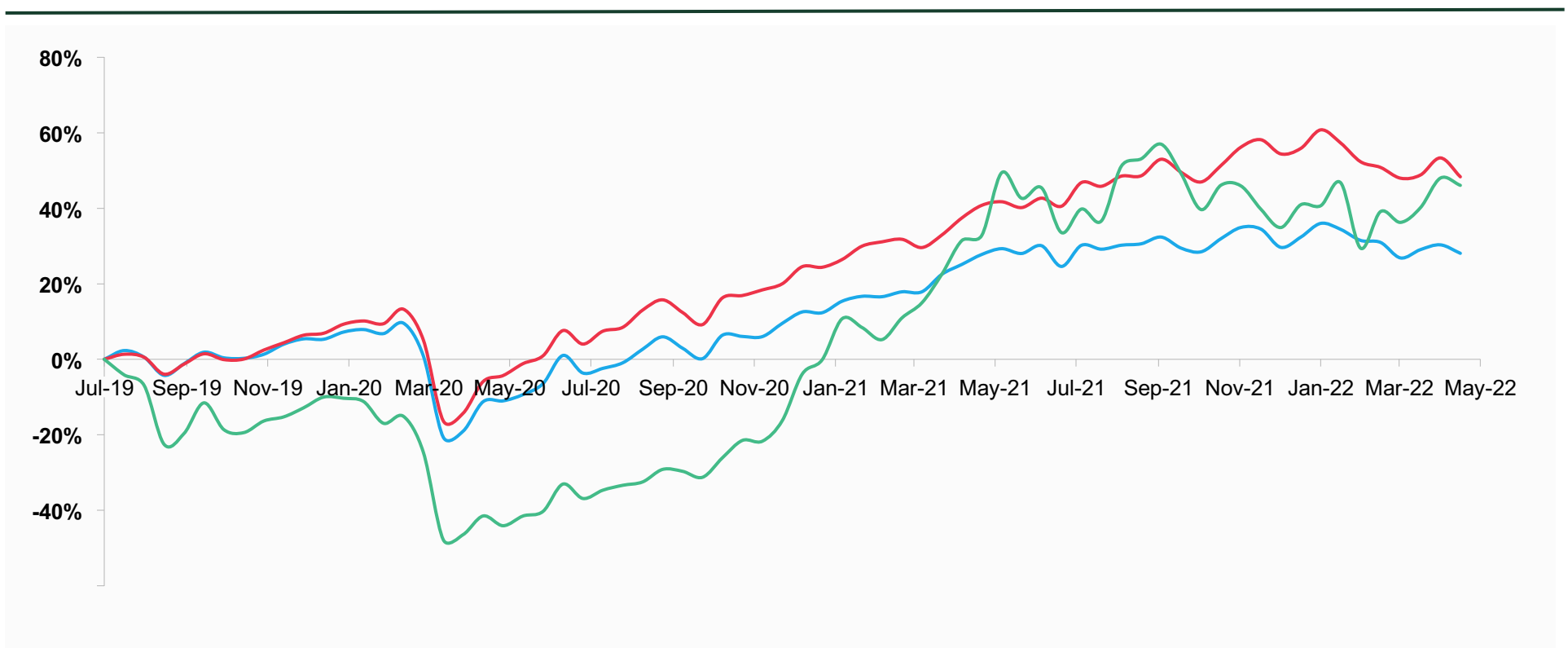
Major Steel Mill Company Performance



Selected steel mills underperformed the S&P500 from Oct'21 as a result of reduced production, but started to recover gradually.

Stock Market Movement Jul '19 - Apr '22

Dow Jones SP 500 Mill Average



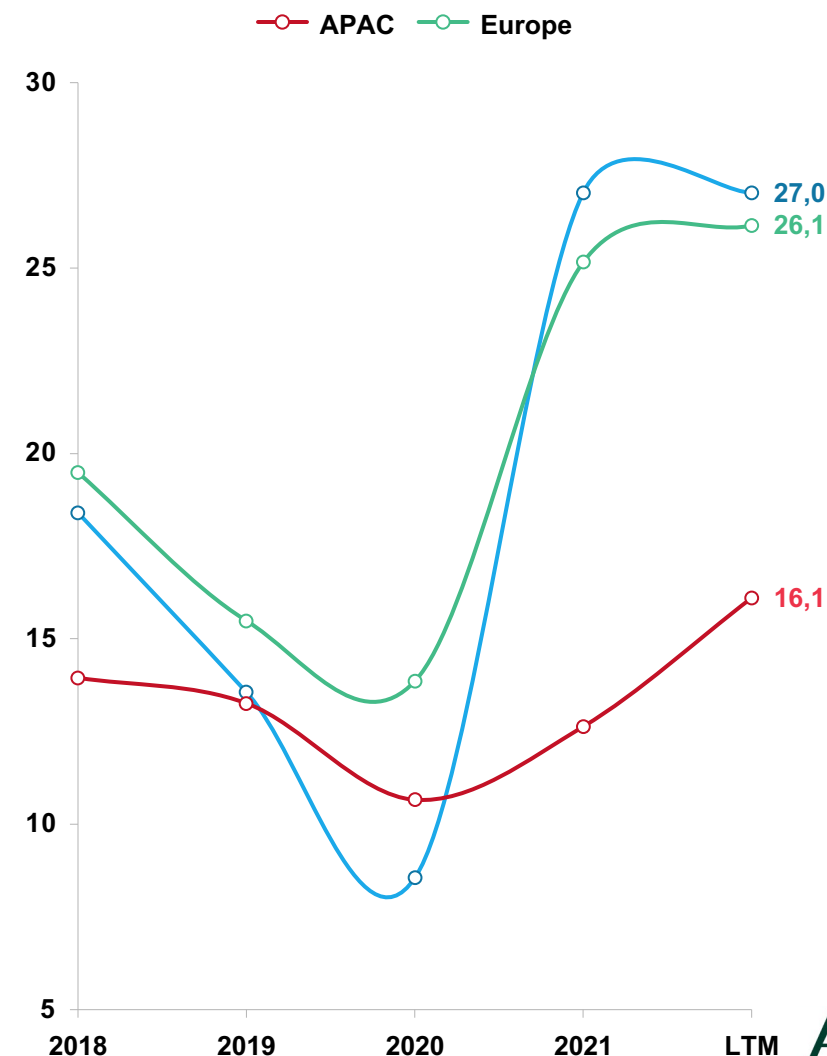
Top Performers:	 CLIFFS	184.4%	 NUCOR®	182.5%	 TATA STEEL	161.9%
Bottom Performers:	 Severstal	-99.6%	 EVRAZ	-87.8%	 ThyssenKrupp	-46.3%



EBITDA margins of selected global mills have increased since 2020 as economy recovers, Asian mills show notable profitability improvement LTM.

Regions	Mills	EBITDA %				
		2018	2019	2020	2021	LTM
Americas	 CLIFFS	33.3	26.1	5.8	25.3	25.3
	 GERDAU	13.4	12.4	17.1	28.3	28.3
	NUCOR	16.6	12.0	12.0	27.9	27.9
	(US\$)	10.4	3.8	-0.7	26.6	26.6
APAC	 BAOSTEEL BAOSTEEL GROUP CORPORATION	15.6	11.2	11.6	15.4*	13.7
	 HBIS 河钢集团 HBIS GROUP	13.4	12.6	12.9	10.6*	10.5
	JFE	11.0	10.1	7.3	6.9	13.6
	TATA STEEL	15.8	19.1	10.8	17.6	26.7
Europe	 ArcelorMittal	12.9	5.6	9.8	24.9	24.9
	 EVRAZ	29.0	26.0	28.4	38.0	38.0
	 Severstal	36.1	33.7	34.3	50.5	50.5
	 ThyssenKrupp	4.3	1.0	-12.3	3.2	4.0
	voestalpine	15.2	11.2	9.0	9.2	13.3

Regional EBITDA Movement 2017-LTM

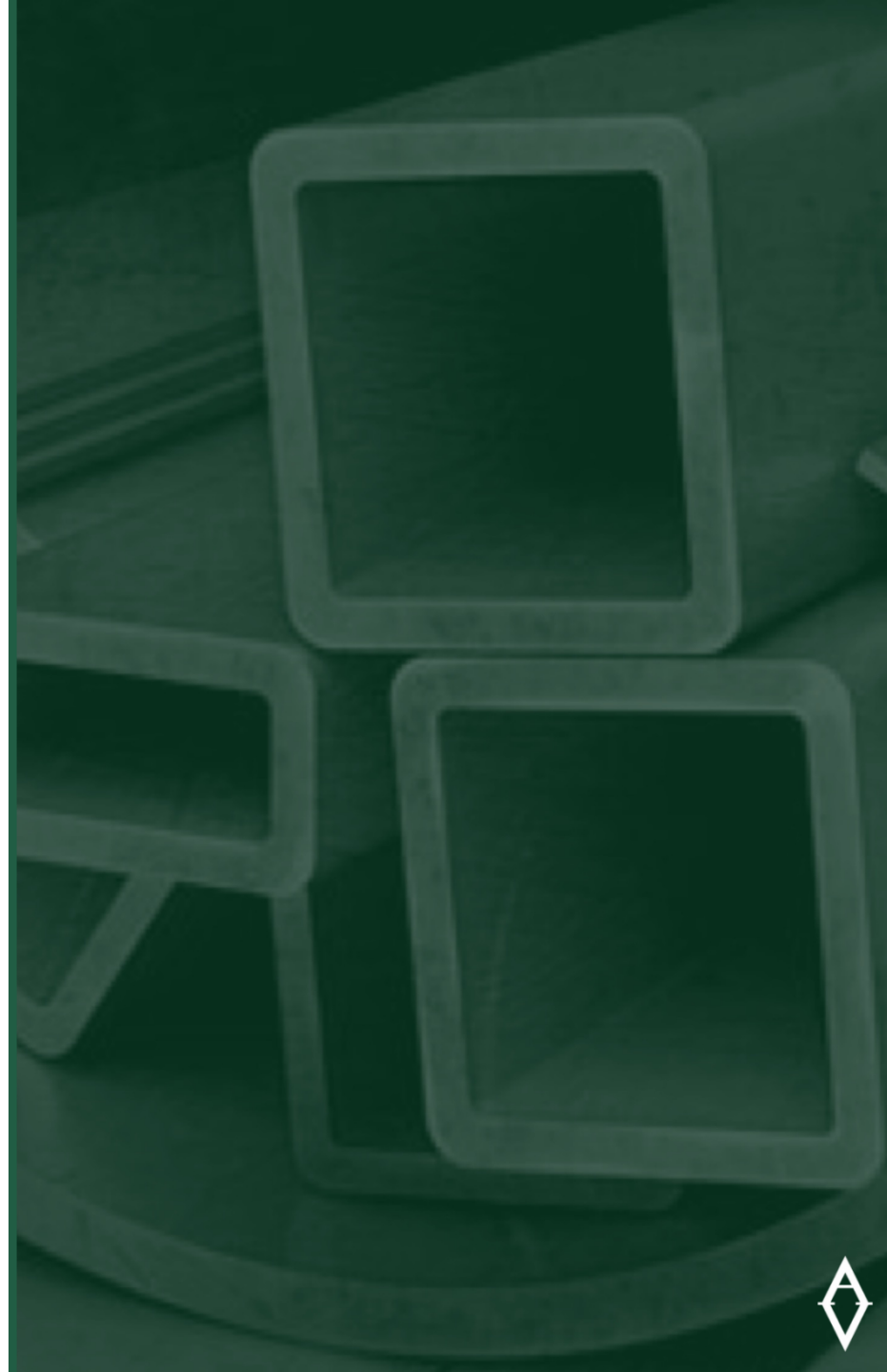


Note: Financial report for BAOSTEEL and HBIS are not established yet, EBITDA margin for 12 months ended on 31/Dec/2021 is used



Introduction to Applied Value

Background



Steel Sourcing has been a core competency at Applied Value for over 20 years.

Improvements provided by Applied Value

Process Improvements

Deeper transparency / cost granularity

Robust tools & templates

Improved negotiations process

Reduced risk exposure

Financial Improvements

Cost savings

Increased free cash flow

Reduced gross margin volatility

Improved payment terms

Why Applied Value?

Savings

Over \$440M+ in savings for our clients since 2009, with minimum 3X ROI return on fees (typically 5-10X+)

Expertise

Global experts in raw matl. categories with over 10M MTs negotiated since 2009 & a comprehensive quarterly steel report

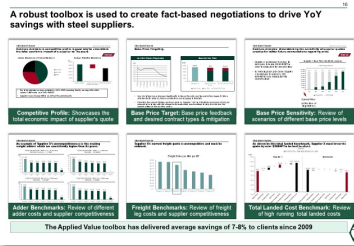
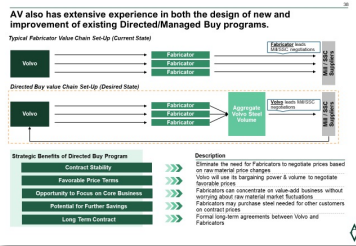
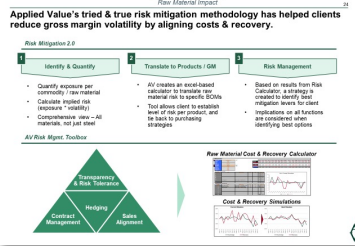
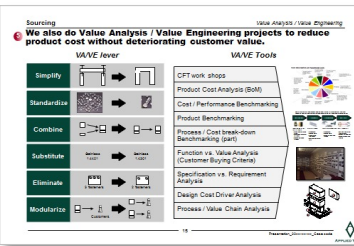
Hands-on approach

Work side by side with teams to execute & drive savings to the bottom-line; we typically don't leave until contracts are signed

AV has helped improve 50+ Fortune 500 companies & saved hundreds of millions of dollars for its clients



Applied Value has an excellent track record of handling a wide range of projects within steel sourcing.

Sample Project Areas				
	Raw Material Tools & Negotiations	Managed Buy	Risk Mitigation	VAVE / Technical Savings
Summary	Creation of world-class steel tools and execution of negotiations / savings	Taking control of steel value chain to generate savings opportunities	Tools & strategies to mitigate/track risk and understand effects of commodity volatility	Optimization of specs, scrap, etc. to generate & execute on savings ideas
Typical Timeline	~10-12 weeks	~16 weeks	~6-8 weeks	~10-12 weeks
AV Expertise / Value add	World-class customized tools based on decades of experience across OEMs & Tier 1s	Functional expertise in setting up dozens of programs	Elaborate risk mgmt. toolbox, executed across a variety of industries	Decades of know-how in building elaborate data-driven models & customized templates
Typical Results	4-8% savings	5-10% savings	~3% Gross margin volatility reduction	Prioritized & quantified opportunities
	 A robust toolbox is used to create fact-based negotiations to drive YoY savings with steel suppliers.	 AV also has extensive experience in both the design of new and improvement of existing Directed/Managed Buy programs.	 Applied Value's tried & true risk mitigation methodology has helped clients reduce gross margin volatility by aligning costs & recovery.	 We also do Value Analysis / Value Engineering projects to reduce product cost without deteriorating customer value.





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