

Copper Dashboard

Positive into 2024; market in balance as ROW demand recovers and supply tightens

Key takeaways: (1) Global copper output was up 1.2% YTD through November with early Dec data from Chile strong indicating that 2023 output was solid; this was largely matched by demand where strong China consumption offset a weak RoW demand. (2) Spot TCs have plunged from \$90/t in Aug-23 to sub \$30/t, indicating a tight concentrate market; meanwhile copper inventories remain at multi-year lows. Furthermore, JPM's Global Commodity team sees a largely balanced market in 2024 and a deficit in 2025 after the recent supply disruptions (Cobre Panama, etc.) ([link](#)). (3) Despite improving fundamentals, copper prices have moved sideways recently, with the macro economic backdrop still uninspiring. Overall, JPM's Global Commodity team's bullish copper view hinges on 3.5% growth in China demand, helped also by a recovery in RoW in 2HCY24. For more on the copper and base metals market, see Greg Shearer's latest report here: [Metals Weekly: The Year of the Dragon casts its long shadow over base metals for now](#).

On equities, JPM's Global copper miner stock ratings are in the comps table below. Based on our constructive copper outlook, we have a positive bias in stock ratings across our global copper coverage, noting we recently upgraded SFR to an Overweight ([link](#)). With the broader sector trading at a 2025E EV/EBITDA of 5.6x, and with a 2025E dividend yield of 5.1%, we see good valuation support among the copper equities.

Metals & Mining

Lyndon Fagan ^{AC}

(61-2) 9003-8648
lyndon.fagan@jpmorgan.com
Bloomberg JPMA LFAGAN <GO>
J.P. Morgan Securities Australia Limited

Bill Peterson

(1-415) 315-6766
bill.peterson@jpmchase.com
J.P. Morgan Securities LLC

Patrick Jones

(44-20) 7742-5964
patrick.jones@jpmorgan.com
J.P. Morgan Securities plc

Al Harvey

(61-3) 9633-4069
al.harvey@jpmorgan.com
J.P. Morgan Securities Australia Limited

Devvrat Vegad

(91-22) 6157-3608
devvrat.vegad@jpmchase.com
J.P. Morgan Securities Australia Limited/ J.P. Morgan India Private Limited

Milan Tomic

(61-3) 9633-4362
milan.tomic@jpmorgan.com
J.P. Morgan Securities Australia Limited

See page 22 for analyst certification and important disclosures, including non-US analyst disclosures.

J.P. Morgan does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

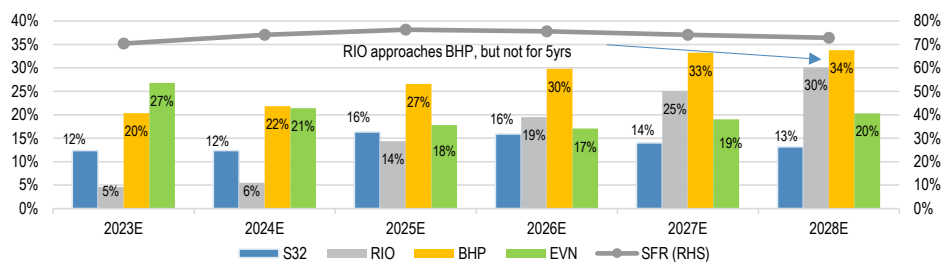
Table 1: JP Morgan Copper coverage comp sheet

Company	Ticker	Covering Analyst	JPM Rating	Market cap (US\$bn)	EV (US\$bn)	Price local FX	JPM Target local FX	Upside %	EV/EBITDA 2024 (x)	EV/EBITDA 2025 (x)	PE 2024 (x)	PE 2025 (x)	Dividend yield 2024 (x)	Dividend yield 2025 (x)	ND/EBITDA 1yr fwd (x)
BHP Ltd.	BHP AU	Lyndon Fagan	Overweight	151.2	165.1	45.9	51.0	11%	5.5	5.7	11.1	11.3	5.0%	4.9%	0.4
Rio Tinto Ltd.	RIO AU	Lyndon Fagan	Overweight	114.9	121.5	128.3	137.0	7%	4.6	4.9	10.4	11.1	6.0%	5.6%	0.2
Rio Tinto Plc	RIO LN	Patrick Jones	Overweight	114.9	120.2	5,349.0	7,000.0	31%	4.5	4.8	8.3	9.0	6.8%	6.5%	0.2
Glencore	GLEN LN	Patrick Jones	Rating Suspended	62.7	85.0	409.4			5.1	4.8	10.9	10.3	4.2%	5.4%	1.2
Southern Copper	SCCO US	Rodolfo Angele	Underweight	61.6	66.9	79.7	63.5	-20%	11.9	10.5	22.5	17.9	3.8%	4.4%	1.0
Vale	VALE3 BZ	Rodolfo Angele	Overweight	58.3	69.8	65.5	102.0	56%	3.7	3.8	5.1	5.6	8.5%	8.2%	0.6
Freeport	FCX US	Bill Peterson	Neutral	55.5	70.7	38.7	43.0	11%	7.5	6.5	24.8	18.7	1.5%	1.7%	0.6
Grupo Mexico	GMEXICOBMM	Rodolfo Angele	Neutral	40.7	45.9	89.5	92.0	3%	5.9	4.9	12.7	9.7	5.1%	6.6%	0.4
Anglo American	AAL LN	Patrick Jones	Overweight	27.8	42.7	1,810.0	2,450.0	35%	4.1	4.1	10.0	9.5	4.1%	4.3%	1.0
Teck	TECK/B CN	Bill Peterson	Overweight	19.9	25.4	52.1	60.0	15%	4.9	7.0	9.3	15.8	1.0%	1.0%	1.1
Antofagasta	ANTO LN	Patrick Jones	Underweight	21.3	25.3	1,720.5	1,380.0	-20%	7.5	6.3	27.8	21.9	1.7%	2.0%	0.3
First Quantum	FM CN	Patrick Jones	Neutral	6.3	12.9	12.3	11.0	-11%	8.1	4.0	64.2	6.6	0.5%	0.6%	2.2
South32	S32 AU	Lyndon Fagan	Overweight	9.2	9.7	3.1	4.2	34%	5.3	4.1	18.2	9.4	2.2%	4.1%	0.8
Boliden	BOL SS	Patrick Jones	Underweight	6.9	7.9	267.2	260.0	-3%	5.6	4.7	11.3	8.8	3.0%	4.1%	0.7
KGHM	KGH PW	Anna Antonova	Underweight	5.4	6.5	109.3	95.0	-13%	5.2	4.7	17.2	12.3	1.2%	1.6%	1.6
Lundin Mining	LUN CN	Patrick Jones	Neutral	6.3	9.3	11.1	8.4	-24%	5.7	5.3	15.1	13.9	3.9%	3.8%	1.3
Sandfire	SFR AU	Lyndon Fagan	Overweight	2.1	2.5	7.0	8.1	15%	7.8	5.0	4559.0	15.5	0.1%	1.6%	1.7
Ivanhoe Electric	IE US	Bill Peterson	Overweight	1.0	0.8	8.2	18.0	120%							
Average									5.7	5.6	25.4	11.7	4.9%	5.1%	0.6

Source: Bloomberg Finance L.P., J.P. Morgan estimates. Prices are based on the most recent close.

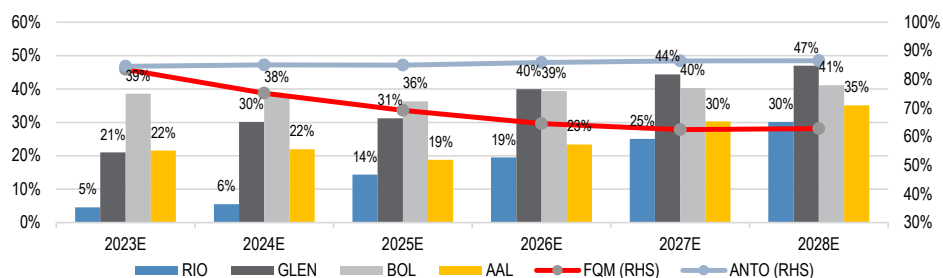
Copper miners

Figure 1: ASX copper exposure – EBIT exposure*



Source: J.P. Morgan estimates. *Note SFR and EVN show revenue exposure.

Figure 2: EMEA copper exposure – EBIT exposure*



Source: J.P. Morgan estimates. *Note BOL, FQM and ANTO show revenue exposure. Note: FQM stands for First Quantum.

Table 2: Global consensus copper comps

Company	Ticker	JPM Rating	Market cap USD (\$bn)	EV USD (\$bn)	Price local FX	EV/EBITDA 1yr fw	PE 1yr fw	Div yield 1yr fw	ND/EBITDA 1yr fw
BHP Ltd.	BHP AU	Overweight	151.2	165.1	45.9	5.6	11.2	5.0%	0.4
Rio Tinto Ltd.	RIO AU	Overweight	114.9	121.5	128.3	4.6	10.4	6.0%	0.2
Rio Tinto Plc	RIO LN	Overweight	114.9	120.2	53.5	4.6	8.4	6.8%	0.2
Glencore	GLEN LN	Rating Suspended	62.7	85.0	4.1	5.1	10.9	4.3%	1.2
Anglo American	AAL LN	Overweight	27.8	42.7	18.1	4.1	9.9	4.1%	1.0
Vale	VALE3 BZ	Overweight	58.3	69.8	65.5	3.7	5.1	8.5%	0.6
South32	S32 AU	Overweight	9.2	9.7	3.1	4.5	11.6	3.4%	0.8
Freeport	FCX US	Neutral	55.5	70.7	38.7	7.4	24.0	1.5%	0.6
Southern Copper	SCCO US	Underweight	61.6	66.9	80	11.8	21.9	3.9%	1.0
Grupo Mexico	GMEXICOBMM	Neutral	40.7	45.9	89	5.8	12.3	5.2%	0.4
Antofagasta	ANTO LN	Underweight	21.3	25.3	17.2	7.4	27.1	1.7%	0.3
First Quantum	FM CN	Neutral	6.3	12.9	12.3	7.3	33.7	0.6%	2.2
KGHM	KGH PW	Underweight	5.4	6.5	109.3	5.2	16.5	1.3%	1.6
MMG	1208 HK		2.1	9.4	1.9	6.0	9.4	0.0%	3.4
Jianxi Copper	358 HK		7.0	10.8	10.7	6.3	5.2	5.5%	
Zijin Mining	2899 HK		43.3	63.4	11.6	8.5	10.2	2.8%	
Teck	TECK/B CN	Overweight	19.9	25.4	52.1	5.0	9.7	1.0%	1.1
Lundin Mining	LUN CN	Neutral	6.3	9.3	11.1	5.6	15.0	3.9%	1.3
Boliden	BOL SS	Underweight	6.9	7.9	267	5.5	10.9	3.1%	0.7
Hud Bay	HBM CN		1.9	3.2	7.2	3.6	8.4	0.2%	2.3
Sandfire	SFR AU	Overweight	2.1	2.5	7.0	5.8	25.5	1.0%	1.7
29 Metals	29M AU		0.1	0.1	0.3	4.1		0.0%	
Average						5.9	12.5	4.8%	0.5

Source: Bloomberg Finance L.P., J.P. Morgan. Prices are based on the most recent close. Consensus estimates from Bloomberg for all stocks.

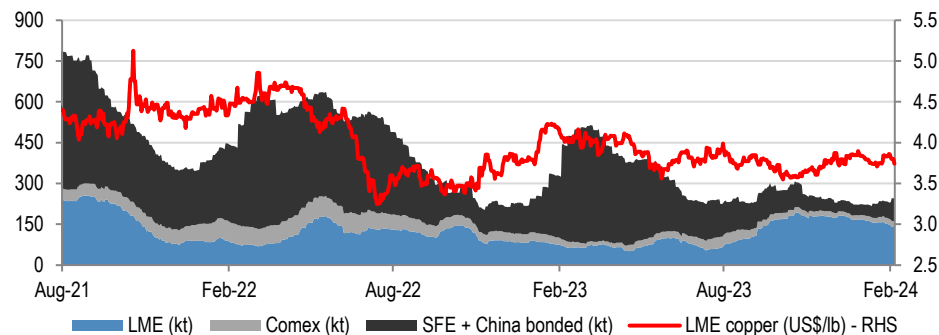
Table 3: Global copper production

Mined Copper	2020	2021	2022	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Global (Mt)	20.7	21.1	22.1	1.9	1.9	1.8	1.9	1.8	1.9	1.9	1.8	1.8	1.9	1.9	1.8	
Annualised (Mtpa)				22.9	22.0	23.3	21.9	22.4	21.9	23.0	21.7	21.8	22.5	22.0	22.5	
Year to date production (Mt)				22.1	1.9	3.7	5.5	7.4	9.2	11.1	13.0	14.8	16.7	18.5	20.4	
Year to date change (YoY)				4.6%	3.6%	5.8%	4.6%	4.5%	3.4%	3.0%	2.5%	2.1%	1.7%	1.4%	1.2%	
Change MoM				1.6%	-4.0%	5.9%	-5.9%	2.1%	-2.4%	5.0%	-5.7%	0.5%	3.4%	-2.4%	2.2%	
Change YoY		2.1%	4.6%	5.7%	3.6%	8.1%	2.4%	4.2%	-0.9%	1.2%	-0.2%	-0.5%	-1.4%	-1.6%	-0.4%	
Chile (Mtpa)	5.8	5.7	5.4	5.8	5.1	5.0	5.2	5.1	4.9	5.6	5.1	5.2	5.6	5.4	5.4	5.8
Peru (Mtpa)	2.1	2.3	2.5	2.9	2.5	2.7	2.6	2.7	2.7	2.8	2.3	2.6	2.9	2.8	3.1	
DRC (Mtpa)	1.5	1.8	2.2	2.3	2.5	2.7	2.5	2.6	2.5	2.5	2.4	2.5	2.6	2.6	2.6	
China (Mtpa)	1.8	1.9	2.1	2.2	1.9	2.1	1.9	1.9	1.8	2.0	1.9	1.8	1.8	1.8	1.8	
US (Mtpa)	1.2	1.2	1.3	1.3	1.2	1.3	1.2	1.2	1.2	1.3	1.2	1.2	1.2	1.2	1.2	
Russia (Mtpa)	0.8	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	0.9	1.0	
Indonesia (Mtpa)	0.5	0.7	0.9	1.0	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.9	1.0	0.9	0.9	
Zambia (Mtpa)	0.9	0.9	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	
Australia (Mtpa)	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	
Others (Mtpa)	5.2	4.9	5.0	4.8	5.2	5.8	5.1	5.4	5.3	5.1	5.0	5.0	4.9	4.7	4.8	
Change YoY (%)		2021	2022	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
Chile		-2.4%	-5.2%	-1.0%	1.3%	-3.7%	-4.8%	-0.7%	-13.5%	-0.2%	1.8%	4.5%	5.0%	-4.4%	-2.6%	0.0%
Peru		6.6%	8.0%	18.0%	5.6%	16.9%	17.8%	25.3%	25.9%	12.2%	-4.2%	5.5%	0.5%	4.4%	13.9%	
DRC		19.1%	24.8%	20.4%	19.9%	25.2%	21.3%	12.9%	9.9%	11.2%	8.0%	11.0%	16.3%	12.3%	6.3%	
China		6.1%	8.9%	10.4%	-0.9%	15.3%	-1.1%	-0.1%	-6.1%	-8.5%	-7.0%	-18.2%	-23.8%	-18.3%	-10.8%	
US		2.6%	6.2%	0.8%	-8.7%	-11.7%	-12.4%	-10.8%	-7.1%	0.2%	-2.8%	-8.8%	-8.8%	-5.0%	-5.4%	
Russia		2.5%	10.8%	9.7%	8.9%	11.3%	6.1%	1.6%	-2.6%	-1.3%	8.7%	-2.5%	-1.7%	-1.6%	4.9%	
Indonesia		49.9%	26.7%	16.5%	8.2%	5.4%	0.3%	0.5%	-1.1%	1.1%	-0.6%	0.6%	1.0%	0.9%	-3.4%	
Zambia		5.5%	-6.1%	-10.3%	-5.2%	6.0%	-8.2%	-6.8%	-8.1%	0.2%	2.1%	-4.0%	-4.0%	1.6%	-3.6%	
Australia		-5.3%	3.9%	16.2%	11.0%	1.3%	-1.4%	-5.8%	-8.1%	-6.3%	-4.3%	-9.1%	-9.8%	-3.0%	-1.5%	
Others		-5.3%	2.3%	-0.1%	1.9%	13.8%	3.2%	6.5%	3.3%	-0.6%	-1.5%	-1.2%	-3.1%	-0.7%	-3.4%	

Source: Bloomberg Finance L.P.

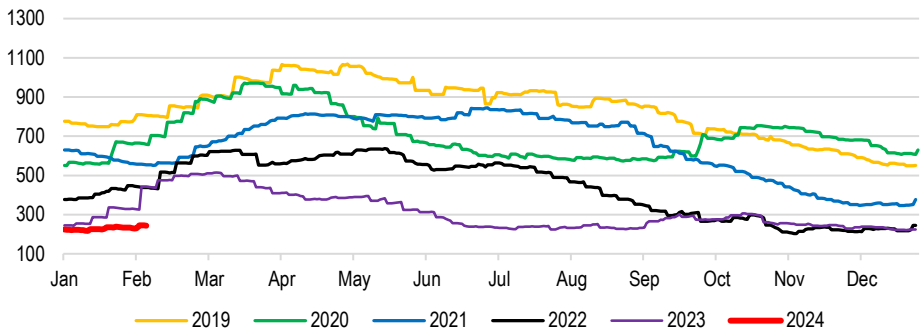
Copper price and inventory data

Figure 3: Global copper inventory vs price



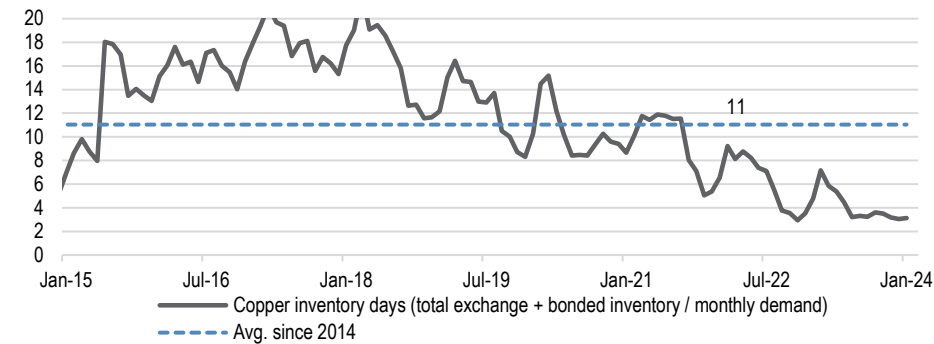
Source: Bloomberg Finance L.P.

Figure 4: Global copper warehouse inventory (LME+Comex+China) seasonality (kt)



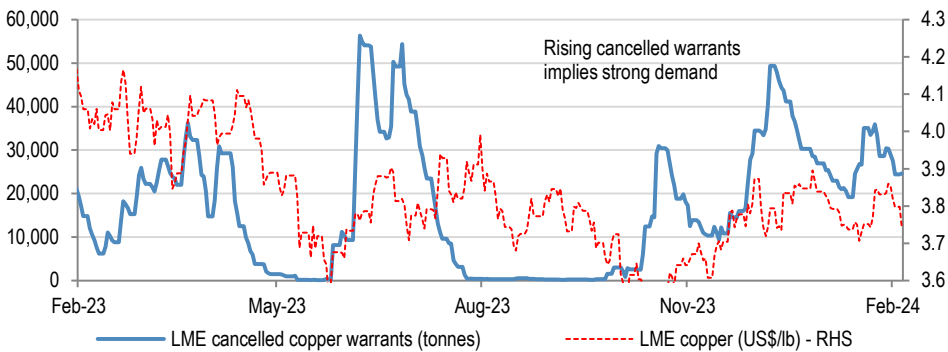
Source: Bloomberg Finance L.P.

Figure 5: Global copper inventory days (LME+China SHFE & bonded+Comex)



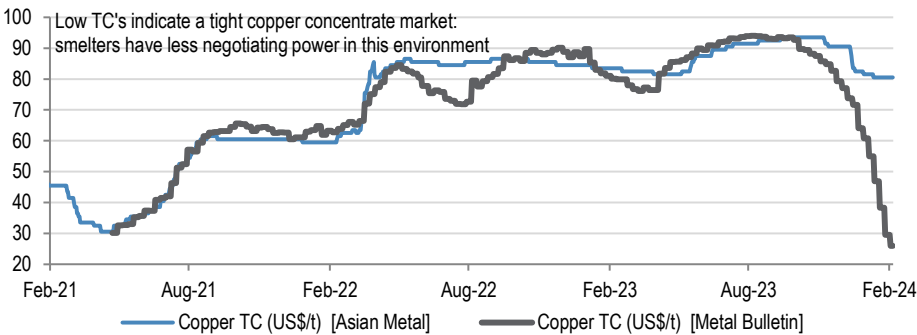
Source: Bloomberg Finance L.P.

Figure 6: LME cancelled warrants (tonnes)



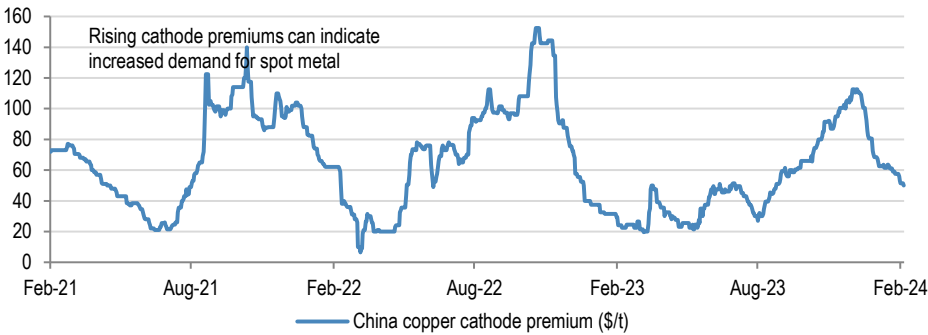
Source: Bloomberg Finance L.P.

Figure 7: Copper smelter treatment charge (\$/t)



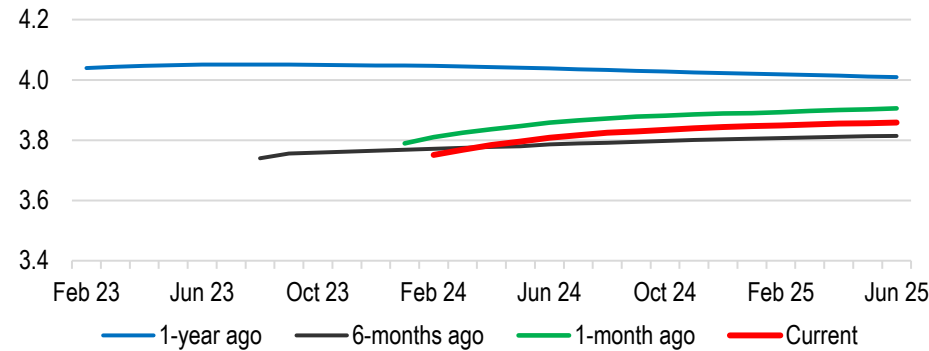
Source: Bloomberg Finance L.P.

Figure 8: China cathode premium (\$/t)



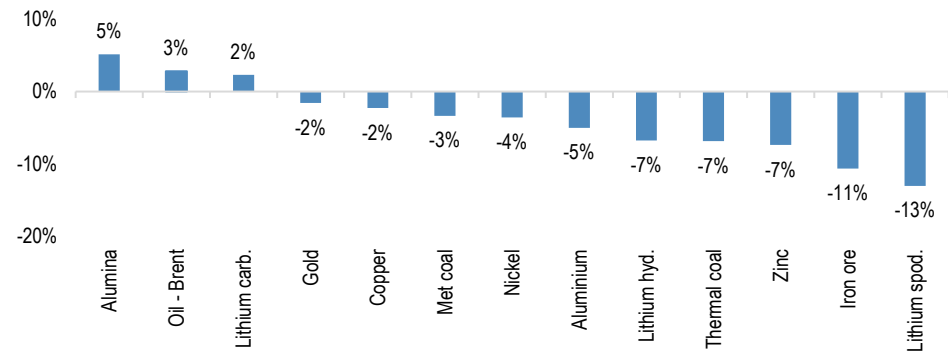
Source: Bloomberg Finance L.P.

Figure 9: LME copper price forward curve (\$/lb)



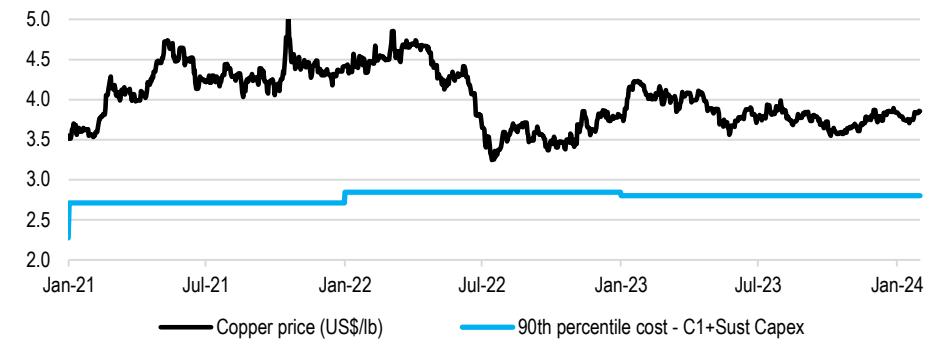
Source: Bloomberg Finance L.P.

Figure 10: Copper vs. other commodities – 2024 calendar YTD move



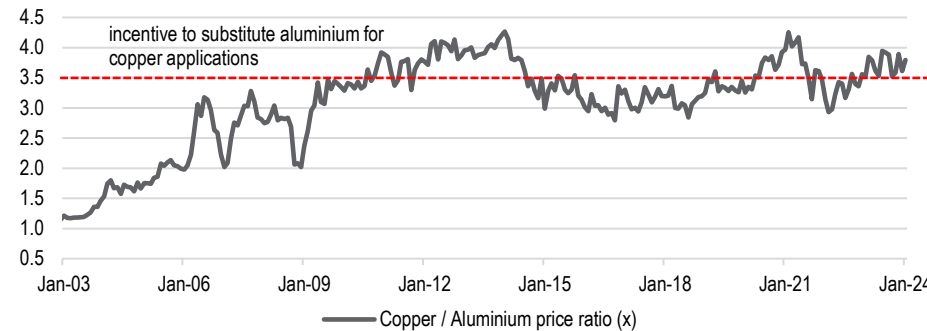
Source: Bloomberg Finance L.P.

Figure 11: Copper price vs. marginal cost (US\$/lb)



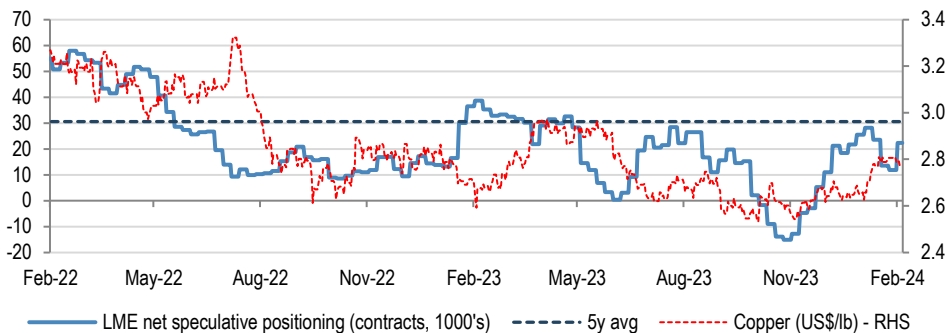
Source: Bloomberg Finance L.P., WoodMac.

Figure 12: Copper / Aluminium price ratio – a ratio above 4x typically indicates substitution risk to demand



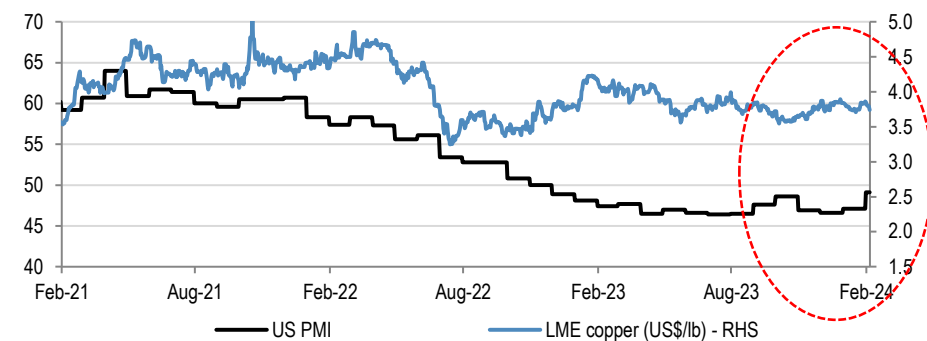
Source: Bloomberg Finance L.P.

Figure 13: LME net speculative positioning



Source: Bloomberg Finance L.P.

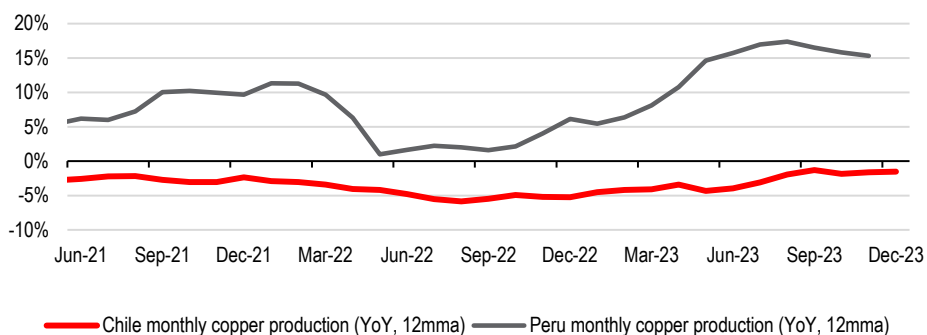
Figure 14: Copper price vs. US PMI



Source: Bloomberg Finance L.P.

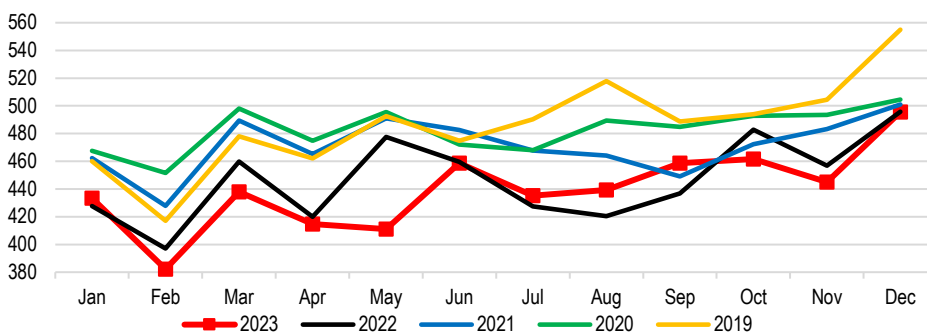
Chile and Peru copper production

Figure 15: Chile vs. Peru monthly copper production (YoY changes, 12-month moving average)



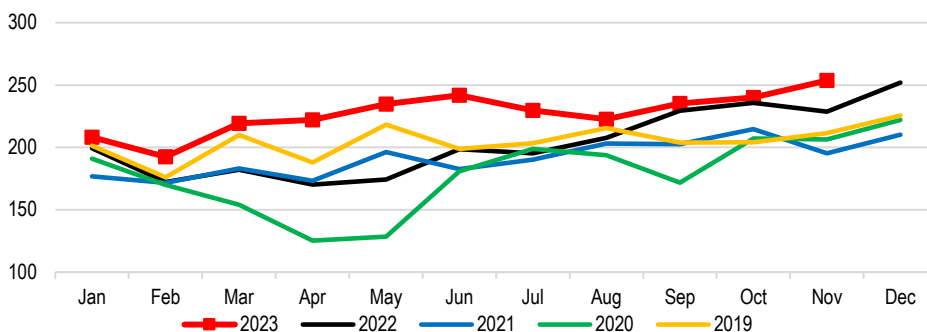
Source: Bloomberg Finance L.P.

Figure 16: Chile monthly copper production (kt)



Source: Bloomberg Finance L.P.

Figure 17: Peru monthly copper production (kt)



Source: Bloomberg Finance L.P.

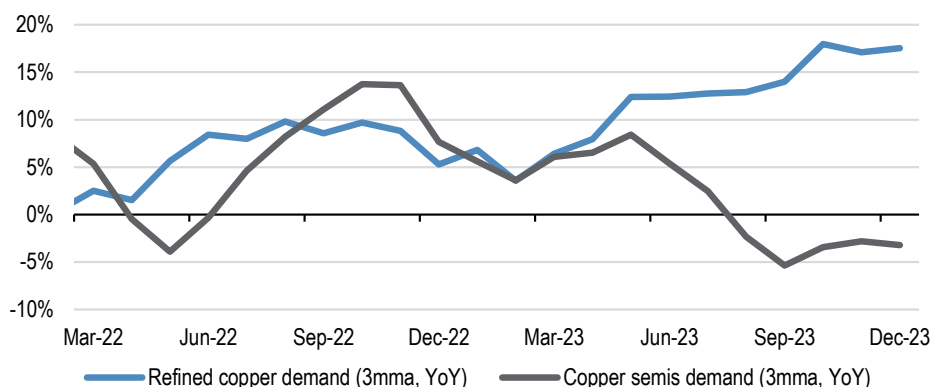
China production and consumption

Table 4: China copper production and trade

Copper	Dec-22 Month	Nov-23 Month	Dec-23 Month	Change MoM	Change YoY	Dec-22 YTD	Dec-23 YTD	Change YoY
Refined copper production (kt)	961	1,140	1,169	3%	22%	11,063	12,988	17%
Refined copper net imports (kt)	354	384	328	-15%	-7%	3,632	3,459	-5%
Inventory draw (build), SFE + bonded (kt)	-9	31	9			-37	-80	
Refined copper demand (kt)	1,306	1,554	1,506	-3%	15%	14,658	16,368	12%
Copper product production (kt)	2,164	2,012	1,950	-3%	-10%	22,865	22,170	-3%
Copper product net imports (kt)	455	474	393	-17%	-14%	4,955	4,545	-8%
Copper product demand (kt)	2,619	2,486	2,343	-6%	-11%	27,820	26,715	-4%
Copper concentrate net imports (Mt)	2.1	2.4	2.5	2%	18%	25	28	9%
Copper scrap imports (kt)	139	183	200	9%	44%	1,772	1,987	12%
Refined + products + conc. + scrap imports (Mt)	1.5	1.7	1.5	-7%	5%	16.7	16.9	1%

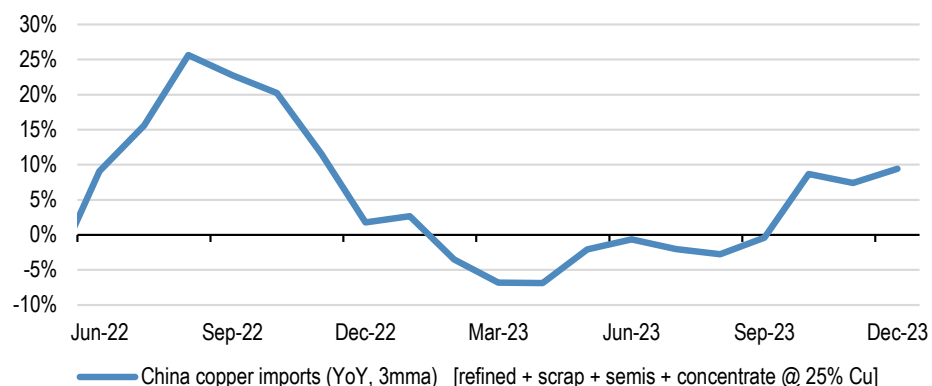
Source: Bloomberg Finance L.P.

Figure 18: China refined copper demand, YoY change



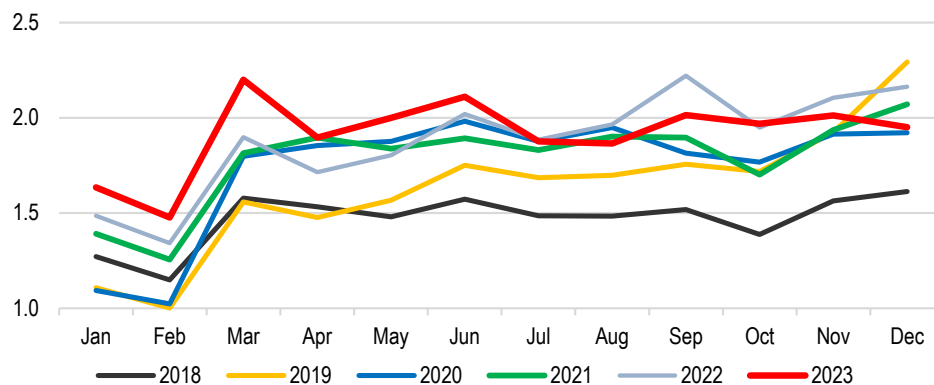
Source: Bloomberg Finance L.P.

Figure 19: China copper imports, YoY change



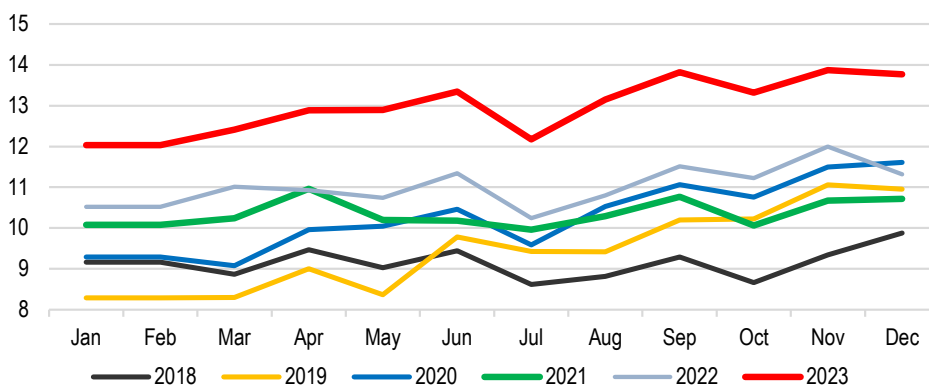
Source: Bloomberg Finance L.P., J.P. Morgan.

Figure 20: China copper product (semis) production (Mtpa rate)



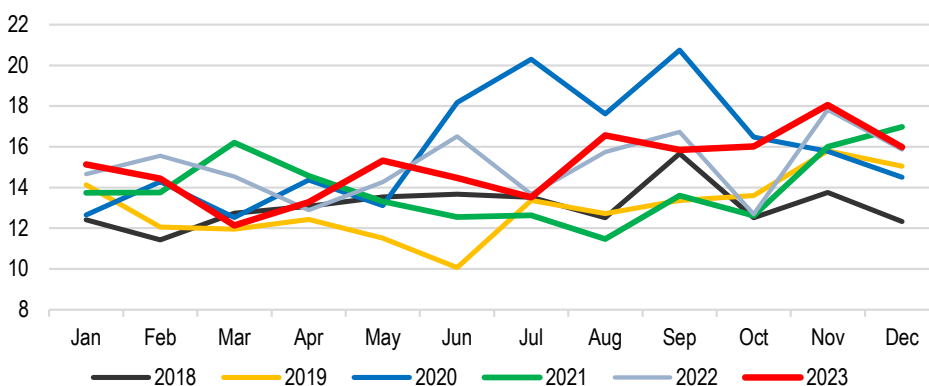
Source: Bloomberg Finance L.P.

Figure 21: China refined copper production (Mtpa rate)



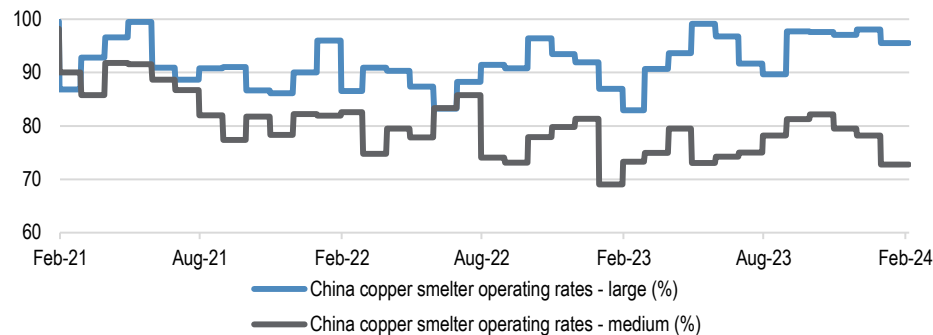
Source: Bloomberg Finance L.P.

Figure 22: Copper refined + scrap + concentrate net imports (Mtpa rate)



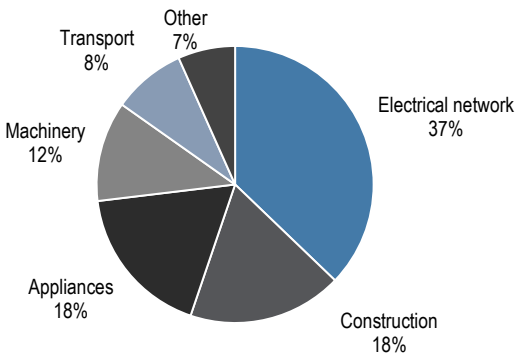
Source: Bloomberg Finance L.P.

Figure 23: China copper smelter operating rates



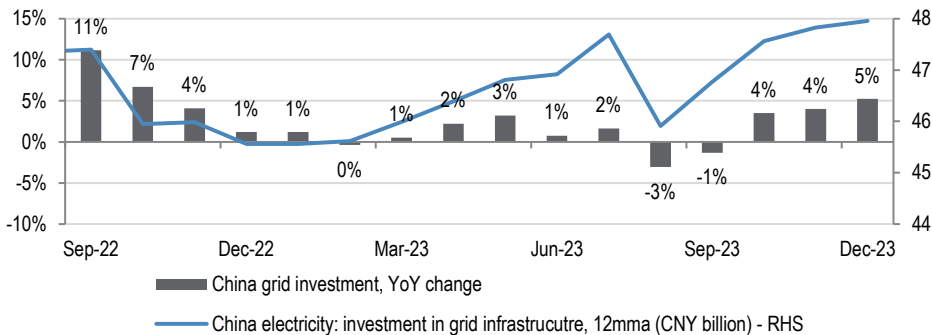
Source: Bloomberg Finance L.P.

Figure 24: China copper demand by sector



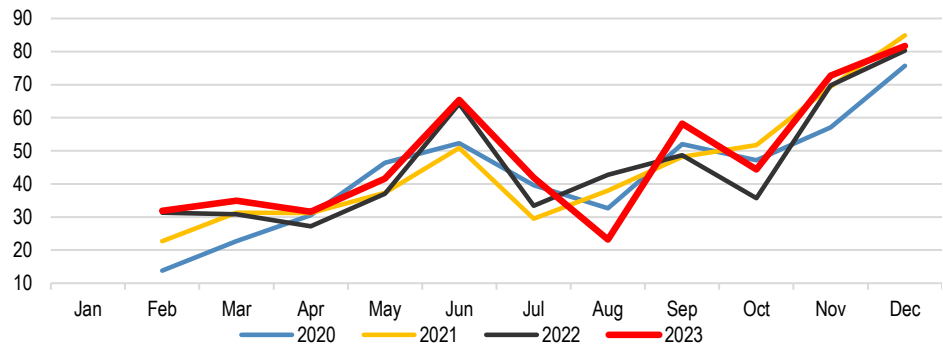
Source: WoodMac.

Figure 25: China investment in electrical infrastructure



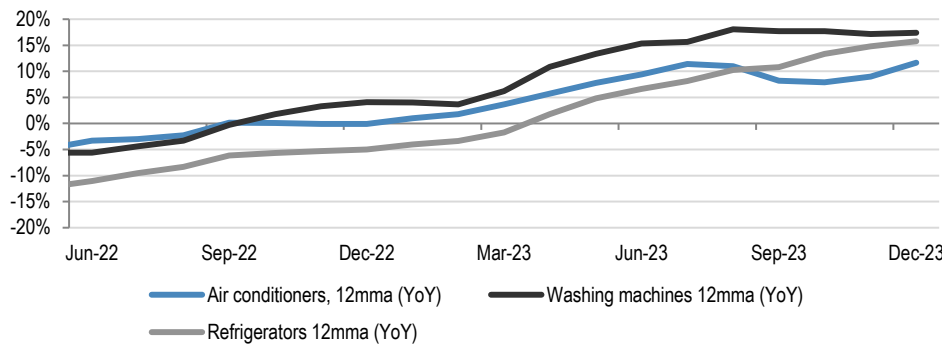
Source: Bloomberg Finance L.P.

Figure 26: China investment in electrical infrastructure (CNY bn)



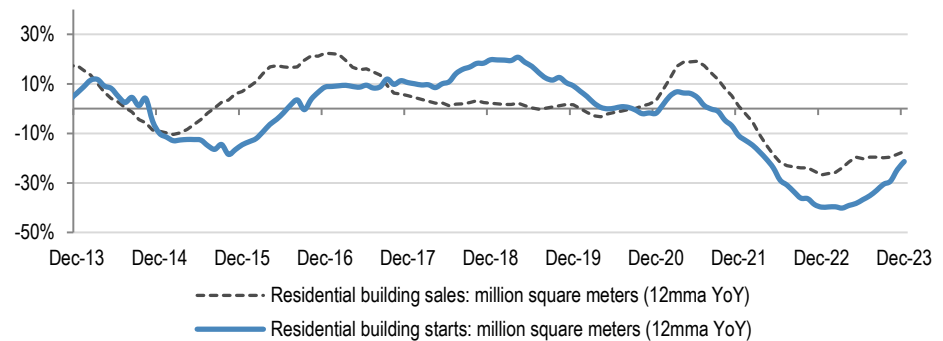
Source: Bloomberg Finance L.P.

Figure 27: China appliances production growth



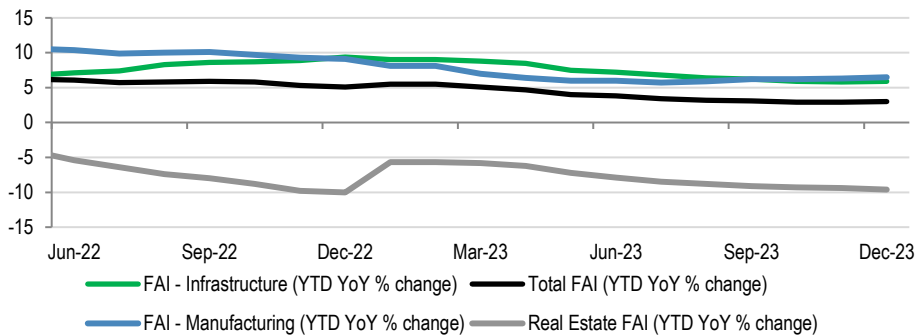
Source: Bloomberg Finance L.P.

Figure 28: China property



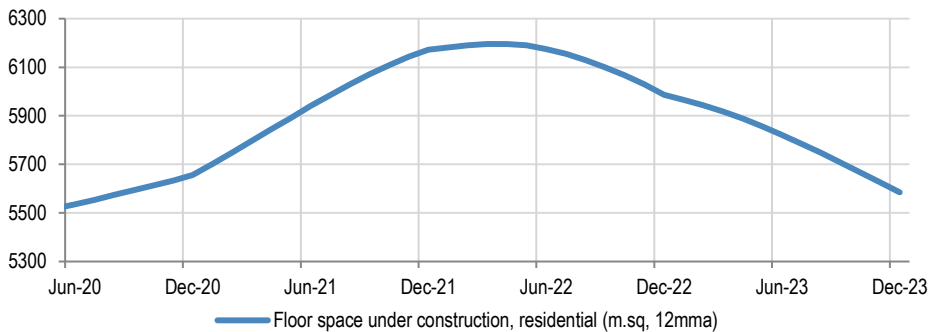
Source: Bloomberg Finance L.P.

Figure 29: China FAI



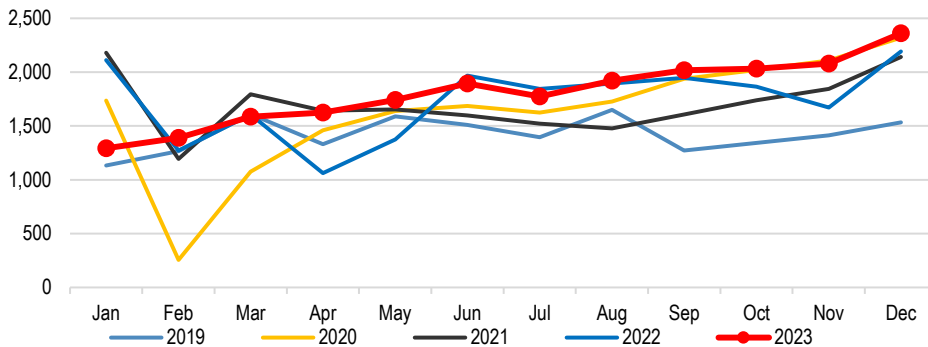
Source: Bloomberg Finance L.P.

Figure 30: China property – residential area under construction



Source: Bloomberg Finance L.P.

Figure 31: China total vehicle sales



Source: Bloomberg Finance L.P.

Table 5: Global PMI

		Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24
Groups	JP Morgan Global	48.8	48.7	49.1	49.9	49.6	49.6	49.5	48.7	48.6	49.0	49.2	48.8	49.3	49.0	50.0
	Developed Markets	47.8	47.3	48.1	48.1	48.4	48.5	47.6	46.3	47.1	46.8	47.4	47.5	47.7	47.0	48.9
	Emerging Markets	49.7	49.8	49.9	51.6	50.7	50.5	51.4	51.1	50.2	51.4	50.9	50.1	50.9	50.9	51.1
	European Union	46.7	47.5	48.6	48.3	47.3	45.8	44.9	43.4	42.7	43.4	43.4	43.2	44.4	44.5	46.5
	Eurozone	47.1	47.8	48.8	48.5	47.3	45.8	44.8	43.4	42.7	43.5	43.4	43.1	44.2	44.4	46.6
Asia Pacific	China (Caixin/Markit)	49.4	49.0	49.2	51.6	50.0	49.5	50.9	50.5	49.2	51.0	50.6	49.5	50.7	50.8	50.8
	China (Official PMI)	48.0	47.0	50.1	52.6	51.9	49.2	48.8	49.0	49.3	49.7	50.2	49.5	49.4	49.0	49.2
	Hong Kong	48.7	49.6	51.2	53.9	53.5	52.4	50.6	50.3	49.4	49.8	49.6	48.9	50.1	51.3	49.9
	India	55.7	57.8	55.4	55.3	56.4	57.2	58.7	57.8	57.7	58.6	57.5	55.5	56.0	54.9	56.5
	Indonesia	50.3	50.9	51.3	51.2	51.9	52.7	50.3	52.5	53.3	53.9	52.3	51.5	51.7	52.2	52.9
	Japan	49.0	48.9	48.9	47.7	49.2	49.5	50.6	49.8	49.6	49.6	48.5	48.7	48.3	47.9	48.0
	Malaysia	47.9	47.8	46.5	48.4	48.8	48.8	47.8	47.7	47.8	47.8	46.8	46.8	47.9	47.9	49.0
	Singapore	49.8	49.7	49.8	50.0	49.9	49.7	49.5	49.7	49.8	49.9	50.1	50.2	50.3	50.5	50.7
	South Korea	49.0	48.2	48.5	48.5	47.6	48.1	48.4	47.8	49.4	48.9	49.9	49.8	50.0	49.9	51.2
	Taiwan	41.6	44.6	44.3	49.0	48.6	47.1	44.3	44.8	44.1	44.3	46.4	47.6	48.3	47.1	48.8
	Vietnam	47.4	46.4	47.4	51.2	47.7	46.7	45.3	46.2	48.7	50.5	49.7	49.6	47.3	48.9	50.3
	Australia	51.3	50.2	50.0	50.5	49.1	48.0	48.4	48.2	49.6	49.6	48.7	48.2	47.7	47.6	50.1
	New Zealand	47.3	48.0	51.0	51.5	48.0	48.7	48.7	47.5	46.7	45.9	45.2	42.8	46.5	43.1	-
Europe	Austria	46.6	47.3	48.4	47.1	44.7	42.0	39.7	39.0	38.8	40.6	39.6	41.7	42.2	42.0	43.0
	Czech Republic	41.6	42.6	44.6	44.3	44.3	42.8	42.8	40.8	41.4	42.9	41.7	42.0	43.2	41.8	43.0
	France	48.3	49.2	50.5	47.4	47.3	45.6	45.7	46.0	45.1	46.0	44.2	42.8	42.9	42.1	43.1
	Germany	46.2	47.1	47.3	46.3	44.7	44.5	43.2	40.6	38.8	39.1	39.6	40.8	42.6	43.3	45.5
	Greece	48.4	47.2	49.2	51.7	52.8	52.4	51.5	51.8	53.5	52.9	50.3	50.8	50.9	51.3	54.7
	Ireland	48.7	48.7	50.1	51.3	49.7	48.6	47.5	47.3	47.0	50.8	49.6	48.2	50.0	48.9	49.5
	Italy	48.4	48.5	50.4	52.0	51.1	46.8	45.9	43.8	44.5	45.4	46.8	44.9	44.4	45.3	48.5
	Netherlands	46.0	48.6	49.6	48.7	46.4	44.9	44.2	43.8	45.3	45.9	43.6	43.8	44.9	44.8	48.9
	Poland	43.4	45.6	47.5	48.5	48.3	46.6	47.0	45.1	43.5	43.1	43.9	44.5	48.7	47.4	47.1
	Spain	45.7	46.4	48.4	50.7	51.3	49.0	48.4	48.0	47.8	46.5	47.7	45.1	46.3	46.2	49.2
	United Kingdom	46.5	45.3	47.0	49.3	47.9	47.8	47.1	46.5	45.3	43.0	44.3	44.8	47.2	46.2	47.0
	Russia	53.2	53.0	52.6	53.6	53.2	52.6	53.5	52.6	52.1	52.7	54.5	53.8	53.8	54.6	52.4
	Switzerland	54.4	54.5	49.3	48.9	47.0	45.3	43.2	44.9	38.5	39.9	44.9	40.6	42.1	43.0	43.1
	Turkey	45.7	48.1	50.1	50.1	50.9	51.5	51.5	51.5	49.9	49.0	49.6	48.4	47.2	47.4	49.2
Americas	Brazil	44.3	44.2	47.5	49.2	47.0	44.3	47.1	46.6	47.8	50.1	49.0	48.6	49.4	48.4	52.8
	Canada	49.6	49.2	51.0	52.4	48.6	50.2	49.0	48.8	49.6	48.0	47.5	48.6	47.7	45.4	48.3
	Mexico	50.6	51.3	48.9	51.0	51.0	51.1	50.5	50.9	53.2	51.2	49.8	52.1	52.5	52.0	50.2
	United States	47.7	46.2	46.9	47.3	49.2	50.2	48.4	46.3	49.0	47.9	49.8	50.0	49.4	47.9	50.7
	US ISM	49.0	48.4	47.4	47.7	46.3	47.1	46.9	46.0	46.4	47.6	48.6	46.9	46.6	47.1	49.1
Middle East	Egypt	45.4	47.2	45.5	46.9	46.7	47.3	47.8	49.1	49.2	49.2	48.7	47.9	48.4	48.5	48.1
	Israel	49.0	56.9	53.9	52.3	51.5	48.9	50.2	48.2	48.3	48.1	49.2	47.6	47.1	49.2	-
	Lebanon	48.1	47.3	47.7	48.8	49.7	49.5	49.4	50.2	50.3	48.7	49.1	48.9	49.5	48.4	49.4
	Saudi Arabia	58.5	56.9	58.2	59.8	58.7	59.6	58.5	59.6	57.7	56.6	57.2	58.4	57.5	57.5	55.4
	South Africa	50.6	50.2	48.7	50.5	49.7	49.6	47.9	48.7	48.2	51.0	49.9	48.9	50.0	49.0	49.2
	United Arab Emirates	54.4	54.2	54.1	54.3	55.9	56.6	55.5	56.9	56.0	55.0	56.7	57.7	57.0	57.4	56.6

Source: Bloomberg Finance L.P.

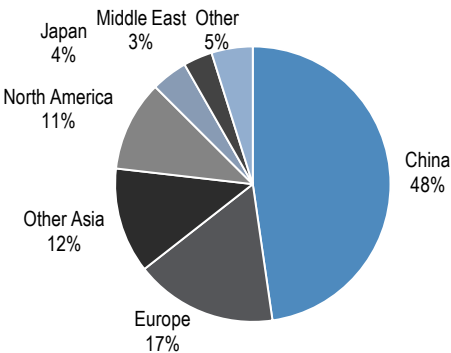
Table 6: Global demand

Copper	Dec-22	Dec-23	Change
	YTD	YTD	YoY
Refined copper production (kt)	11,063	12,988	17%
Refined copper net imports (kt)	3,632	3,459	-5%
Inventory draw (build), SFE + bonded (kt)	-37	-80	
Refined copper demand (kt)	14,658	16,368	12%
RoW copper production (kt)	11,007	9,235	-16%
RoW copper demand (kt)	7,638	6,086	-20%
Global copper production (kt)	22,070	22,223	0.7%
Inventory draw (build), Global (kt)	226	231	
Global copper demand (kt)	22,296	22,454	0.7%

Source: J.P. Morgan.

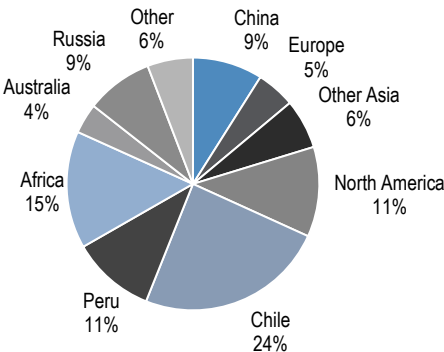
Global supply and demand

Figure 32: Copper demand by region, 2022



Source: WoodMac.

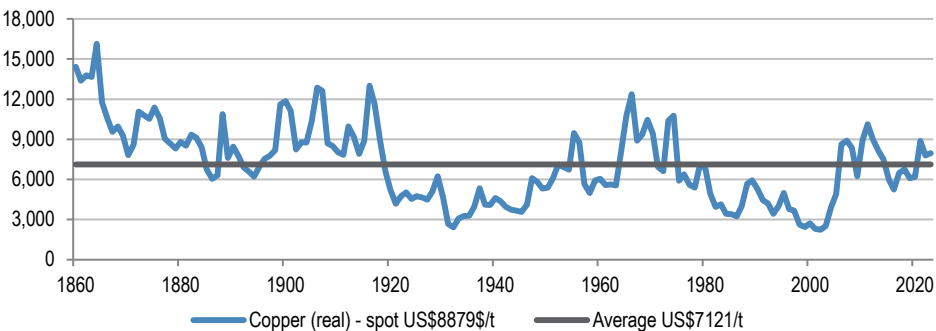
Figure 33: Copper mine supply by region, 2022



Source: WoodMac,

Long-term prices

Figure 34: Long-term copper price history (\$/t)



Source: Bloomberg Finance L.P.

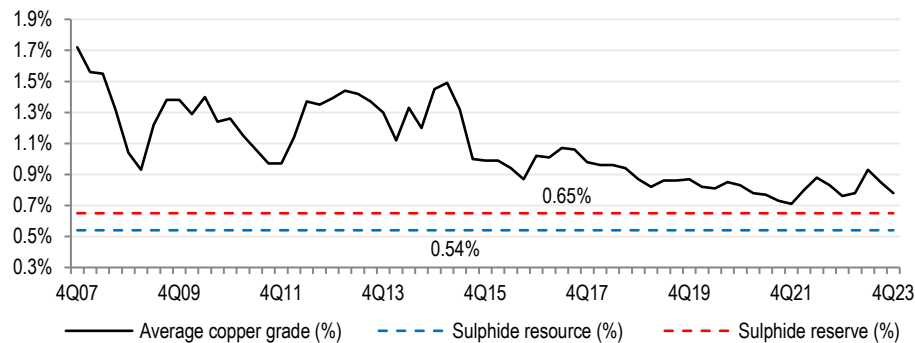
Table 7: J.P. Morgan Commodities Research – copper supply and demand balance (kt)

Global refined copper balance Thousand metric tonnes											
Mine Production	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024E	2025E
Asia	2,901	3,047	3,006	3,208	2,956	3,069	3,174	3,409	3,433	3,661	3,823
China	1,543	1,501	1,531	1,616	1,691	1,709	1,832	1,916	1,973	2,000	2,075
North America	2,728	2,878	2,635	2,513	2,611	2,493	2,491	2,397	2,414	2,544	2,569
Central & South America	7,990	8,351	8,349	8,619	8,764	8,493	8,688	8,566	8,850	9,241	9,398
Europe	1,047	1,084	1,106	1,061	1,016	1,039	1,057	1,112	1,093	1,152	1,174
Eurasia	1,325	1,511	1,663	1,768	1,856	1,880	1,803	1,904	1,914	2,091	2,189
Middle East	280	328	341	379	379	373	408	417	440	495	526
Africa	2,011	2,017	2,137	2,443	2,455	2,723	3,006	3,414	3,734	4,099	4,593
Oceania	950	966	862	913	858	905	832	833	812	824	828
Mine Production	19,233	20,182	20,100	20,903	20,896	20,973	21,459	22,051	22,689	24,107	25,100
Refined Use	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024F	2025F
Asia	13,978	14,553	15,256	15,951	16,239	16,176	16,942	17,284	17,921	18,501	19,072
China	10,151	10,613	11,168	11,873	12,209	12,556	13,108	13,366	14,035	14,526	14,860
North America	2,188	2,222	2,186	2,257	2,264	2,080	2,213	2,209	2,191	2,216	2,335
Central & South America	537	469	429	436	453	389	431	404	420	427	440
Europe	3,529	3,526	3,515	3,574	3,322	3,086	3,393	3,417	3,316	3,339	3,515
Eurasia	447	399	394	396	377	361	402	323	308	310	316
Middle East	706	756	767	796	780	719	734	760	781	803	844
Africa	244	193	185	181	164	135	159	159	161	162	164
Oceania	14	17	19	19	15	11	12	12	12	12	11
Refined Use	21,643	22,136	22,752	23,609	23,614	22,958	24,286	24,567	25,109	25,771	26,697
Global Balance	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024F	2025F
Refined Production	22,056	22,461	22,683	23,429	23,463	23,523	24,270	24,526	25,378	25,799	26,433
Refined Use	21,643	22,136	22,752	23,609	23,614	22,958	24,286	24,567	25,109	25,771	26,697
Balance	413	325	-69	-180	-151	566	-16	-41	269	28	-264
Balance adjusted for governmental purchases/sales	38	125	-69	-180	-151	-34	94	-41	269	28	-264
	2015	2016	2017	2018	2019	2020	2021	2022	2023E	2024F	2025F
Mine Production	19,233	20,182	20,100	20,903	20,896	20,973	21,459	22,051	22,349	22,540	23,273
growth	3.7%	4.9%	-0.4%	4.0%	0.0%	0.4%	2.3%	2.8%	1.3%	0.9%	3.3%
Refined Production	22,056	22,461	22,683	23,429	23,463	23,523	24,270	24,526	25,378	25,799	26,433
growth	1.1%	1.8%	1.0%	3.3%	0.1%	0.3%	3.2%	1.1%	3.5%	1.7%	2.5%
Refined Use	21,643	22,136	22,752	23,609	23,614	22,958	24,286	24,567	25,109	25,771	26,697
growth	1.1%	2.3%	2.8%	3.8%	0.0%	-2.8%	5.8%	1.2%	2.2%	2.6%	3.6%
Balance	413	325	-69	-180	-151	566	-16	-41	269	28	-264
Balance adjusted for governmental purchases/sales	38	125	-69	-180	-151	-34	94	-41	269	28	-264

Source: Company reports, government and industry data, CRU, Wood Mackenzie, BGRIMM, J.P. Morgan Commodities Research.

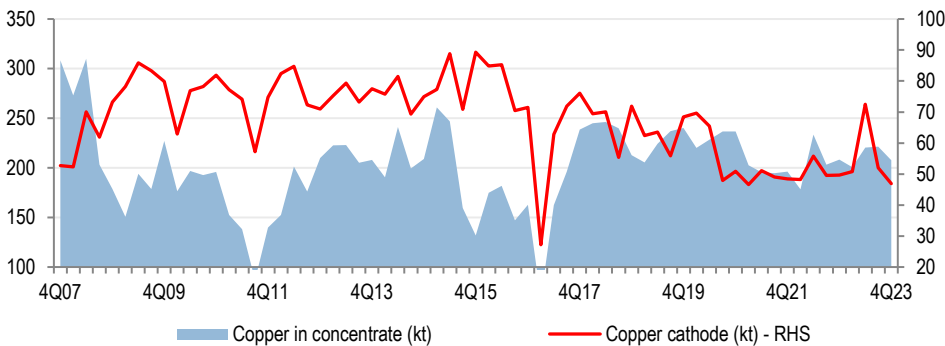
Escondida tracker

Figure 35: Escondida copper grades (%)



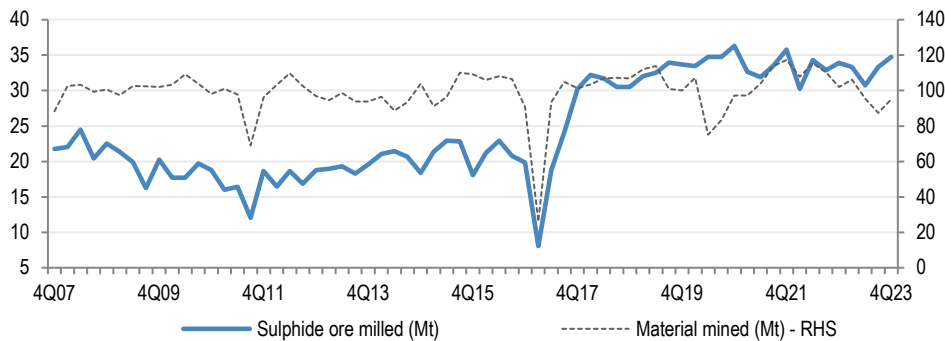
Source: Company reports.

Figure 36: Escondida copper production (kt per quarter)



Source: Company reports.

Figure 37: Escondida mill throughput and material mined per quarter (Mt)



Source: Company reports.

Market shares

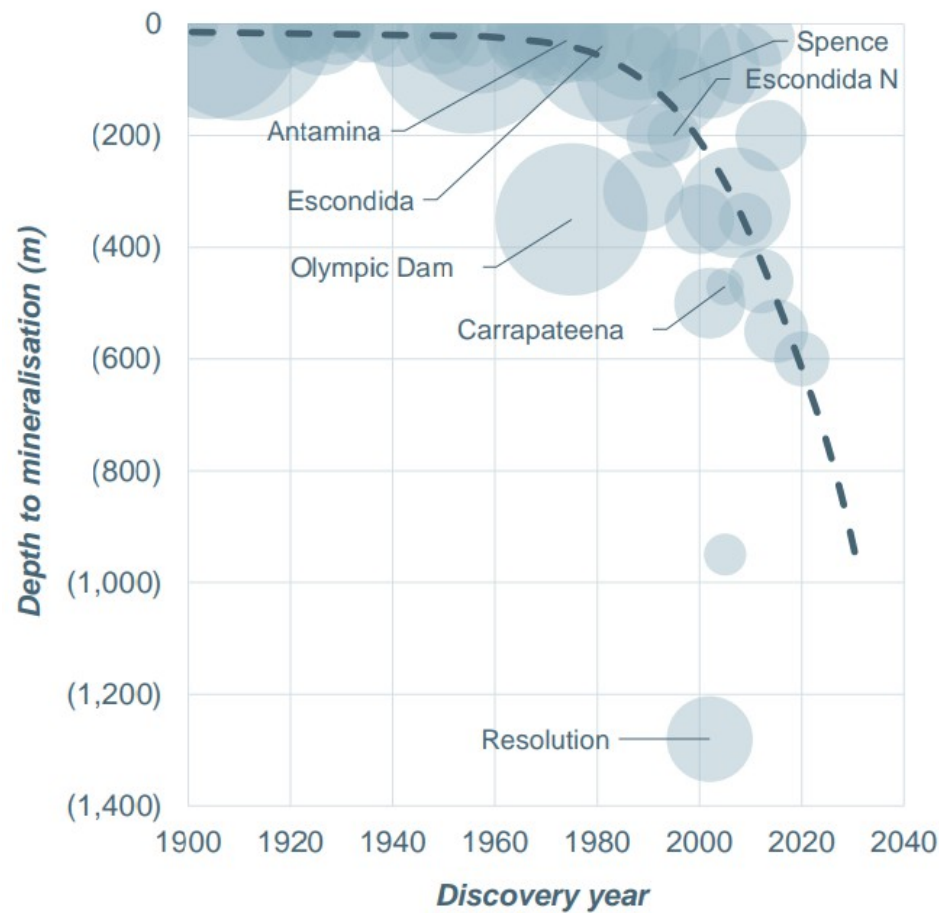
Table 8: Major producer market share (as of 2022)

Copper (attributable basis)				
Producer	Primary Location	Output (kt)	Market cap (\$m)	% share
Freeport	Multiple	2,105	57,603	9.5%
BHP	Chile	1,716	152,242	7.8%
Codelco	Chile	1,312	Not listed	8.0%
Glencore	DRC, Peru	1,183	63,166	5.4%
Group Mexico	Mexico, Peru	913	63,557	4.1%
Zijin Mining group	DRC	877	43,647	4.0%
First Quantum	Zambia, Panama	776	5,505	3.5%
Rio Tinto	Multiple	730	116,661	3.3%
Anglo American	Chile	660	28,165	3.0%
Antofagasta	Chile	486	21,939	2.2%
2022 global mine supply - total		22,051		
2022 global refined production - total		24,526		

Source: Bloomberg Finance L.P., J.P. Morgan.

Appendix

Figure 38: Major copper discoveries – depth of ore body



Source: BHP May 2023 presentation.

Table 9: Largest undeveloped copper projects by copper equivalent

Asset	Ownership	Location	Tonnage (Mt)	Grade (%)		Cont. Metal (Mt)	
				Cu	CuEq	Cu	CuEq
Pebble	Northern Dynasty	Alaska	10,910	0.34%	0.62%	36.9	67.8
KSM	Seabridge	British Columbia	11,042	0.22%	0.53%	24.8	59.0
Resolution	Rio Tinto (55%) / BHP (45%)	Arizona	1,859	1.52%	1.66%	28.3	30.9
Twin Metals	Antofagasta (83%) / Beaver Bay (17%)	Minnesota	2,509	0.52%	1.15%	13.0	28.7
Reko Diq	Barrick (50%) / Government of Pakistan (50%)	Pakistan	4,980	0.41%	0.56%	20.5	27.9
Mesaba	Teck (50%) / PolyMet (50%)	Minnesota	2,947	0.41%	0.80%	12.2	23.6
Onto	Vale (80%) / PT Aneka Tambang (20%)	Indonesia	2,057	0.83%	1.15%	17.2	23.6
El Arco	Southern Copper		4,542	0.39%	0.50%	17.8	22.6
NuevaUnion	Newmont (50%) / Teck (50%)	Chile	4,469	0.37%	0.50%	16.6	22.5
La Granja	Rio Tinto	Peru	4,320	0.51%	0.51%	22.0	22.0
Cascabel	SolGold	Ecuador	3,841	0.33%	0.48%	12.7	18.4
El Pachon	Glencore	Argentina	3,380	0.47%	0.52%	15.9	17.6
Norte Abierto	Barrick (50%) / Newmont (50%)	Chile	6,380	0.10%	0.27%	6.3	17.3
Ilurimagua	Enami EP (51%) / Corporación Nacional del Cobre (49%)	Ecuador	3,846	0.44%	0.44%	16.9	16.9
Frieda River	Guangdong Rising	Papua New Guinea	2,640	0.44%	0.59%	11.6	15.6
Los Azules	McEwen Copper	Argentina	3,628	0.37%	0.41%	13.4	15.0
Baïmskaya	Nova Resources	Russia	2,510	0.39%	0.57%	9.8	14.3
Taca Taca	First Quantum	Argentina	2,920	0.40%	0.49%	11.7	14.3
Vizcachitas	Los Andes Copper	Chile	3,364	0.36%	0.42%	12.1	14.0
Los Helados	NGEx (69.1%) / JX Nippon (30.9%)	Chile	2,926	0.36%	0.46%	10.6	13.5
MARA	Pan American (56.25%) / Glencore (43.75%)	Argentina	2,134	0.38%	0.61%	8.2	12.9
Casino	Western Copper & Gold	Yukon	3,903	0.12%	0.28%	4.9	11.1
West Wall	Glencore (50%) / Anglo American (50%)	Chile	1,961	0.46%	0.52%	9.0	10.3
Michiquillay	Southern Copper	Peru	2,288	0.43%	0.43%	9.8	9.8
Los Volcanes	Antofagasta (51%) / Luksic Group (49%)	Chile	1,911	0.50%	0.50%	9.6	9.6
Namori	Newcrest (72.88%) / Mitsubishi Materials (25.12%) / Nittetsu (2%)	Fiji	2,260	0.35%	0.41%	8.0	9.3
Galore Creek	Newmont (50%) / Teck (50%)	British Columbia	1,435	0.43%	0.61%	6.1	8.8
Ann Mason	Hudbay	Nevada	2,456	0.29%	0.33%	7.0	8.2
Warintza	Solaris	Ecuador	1,466	0.42%	0.51%	6.2	7.5
Canariaco Norte	Candente	Peru	1,889	0.34%	0.40%	6.4	7.5

Source: Company reports (Filo Mining corporate presentation May 2023).

Companies Discussed in This Report (all prices in this report as of market close on 06 February 2024, unless otherwise indicated)

Sandfire Resources(SFR.AX/A\$6.99/OW)

Analyst Certification: The Research Analyst(s) denoted by an “AC” on the cover of this report certifies (or, where multiple Research Analysts are primarily responsible for this report, the Research Analyst denoted by an “AC” on the cover or within the document individually certifies, with respect to each security or issuer that the Research Analyst covers in this research) that: (1) all of the views expressed in this report accurately reflect the Research Analyst’s personal views about any and all of the subject securities or issuers; and (2) no part of any of the Research Analyst’s compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the Research Analyst(s) in this report. For all Korea-based Research Analysts listed on the front cover, if applicable, they also certify, as per KOFIA requirements, that the Research Analyst’s analysis was made in good faith and that the views reflect the Research Analyst’s own opinion, without undue influence or intervention.

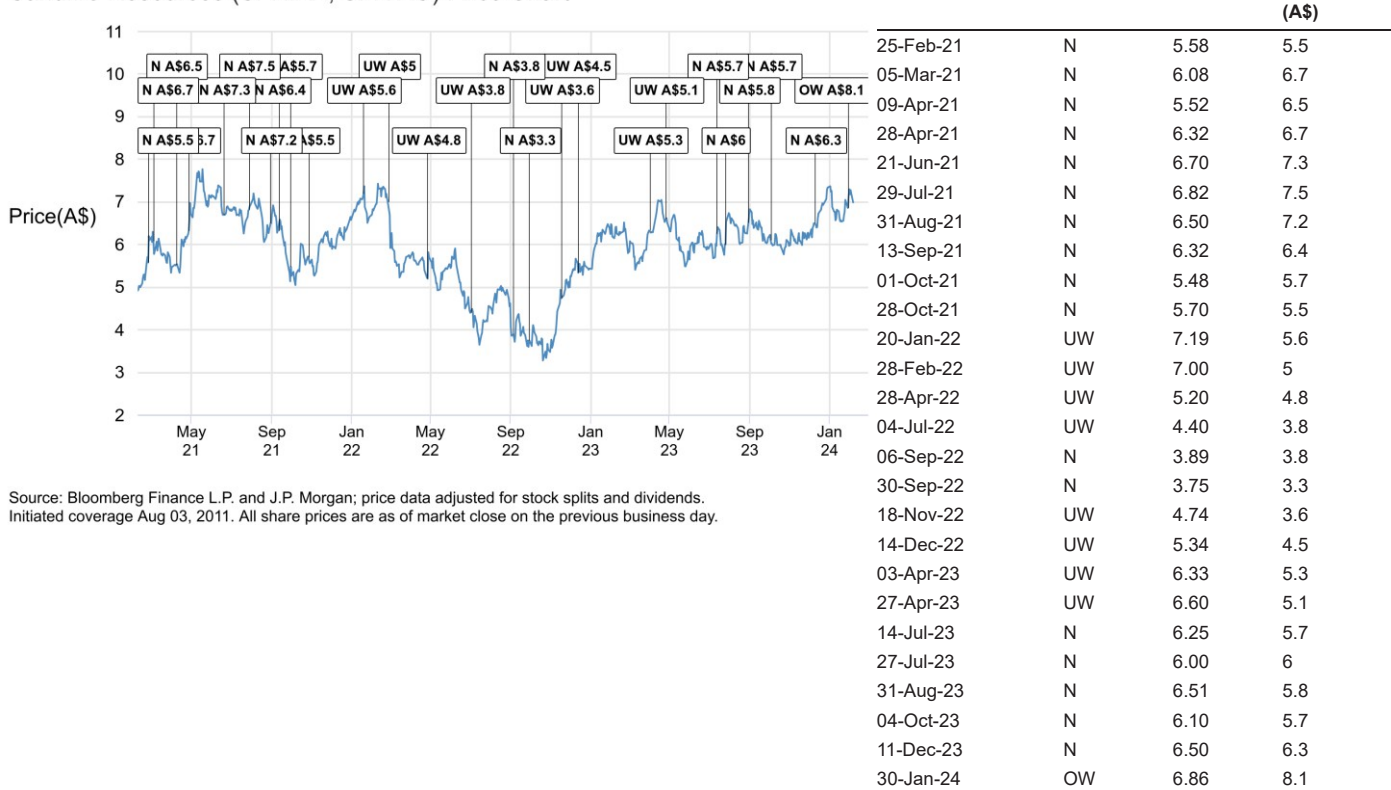
All authors named within this report are Research Analysts who produce independent research unless otherwise specified. In Europe, Sector Specialists (Sales and Trading) may be shown on this report as contacts but are not authors of the report or part of the Research Department.

Important Disclosures

- **Market Maker/ Liquidity Provider:** J.P. Morgan is a market maker and/or liquidity provider in the financial instruments of/related to Sandfire Resources.
- **Client:** J.P. Morgan currently has, or had within the past 12 months, the following entity(ies) as clients: Sandfire Resources.
- **Debt Position:** J.P. Morgan may hold a position in the debt securities of Sandfire Resources, if any.

Company-Specific Disclosures: Important disclosures, including price charts and credit opinion history tables, are available for compendium reports and all J.P. Morgan–covered companies, and certain non-covered companies, by visiting <https://www.jpmm.com/research/disclosures>, calling 1-800-477-0406, or e-mailing research.disclosure.inquiries@jpmorgan.com with your request.

Sandfire Resources (SFR.AX, SFR AU) Price Chart



Source: Bloomberg Finance L.P. and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Aug 03, 2011. All share prices are as of market close on the previous business day.

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period. J.P. Morgan ratings or designations: OW = Overweight, N= Neutral, UW = Underweight, NR = Not Rated

Explanation of Equity Research Ratings, Designations and Analyst(s) Coverage Universe:

J.P. Morgan uses the following rating system: Overweight (over the duration of the price target indicated in this report, we expect this stock will outperform the average total return of the stocks in the Research Analyst's, or the Research Analyst's team's, coverage universe); Neutral (over the duration of the price target indicated in this report, we expect this stock will perform in line with the average total return of the stocks in the Research Analyst's, or the Research Analyst's team's, coverage universe); and Underweight (over the duration of the price target indicated in this report, we expect this stock will underperform the average total return of the stocks in the Research Analyst's, or the Research Analyst's team's, coverage universe). NR is Not Rated. In this case, J.P. Morgan has removed the rating and, if applicable, the price target, for this stock because of either a lack of a sufficient fundamental basis or for legal, regulatory or policy reasons. The previous rating and, if applicable, the price target, no longer should be relied upon. An NR designation is not a recommendation or a rating. In our Asia (ex-Australia and ex-India) and U.K. small- and mid-cap Equity Research, each stock's expected total return is compared to the expected total return of a benchmark country market index, not to those Research Analysts' coverage universe. If it does not appear in the Important Disclosures section of this report, the certifying Research Analyst's coverage universe can be found on J.P. Morgan's Research website, <https://www.jpmorganmarkets.com>.

Coverage Universe: Fagan, Lyndon: Alumina Limited (AWC.AX), BHP (BHP.AX), BlueScope Steel (BSL.AX), Deterra Royalties (DRR.AX), Fortescue (FMG.AX), IGO Ltd. (IGO.AX), Leo Lithium (LLL.AX), Lontown Resources (LTR.AX), Mineral Resources Ltd. (MIN.AX), Rio Tinto Limited (RIO.AX), Sandfire Resources (SFR.AX), Sims Limited (SGM.AX), South32 (S32.AX)

J.P. Morgan Equity Research Ratings Distribution, as of January 01, 2024

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage*	47%	39%	13%
IB clients**	48%	43%	32%
JPMS Equity Research Coverage*	46%	42%	12%
IB clients**	68%	63%	46%

*Please note that the percentages may not add to 100% because of rounding.

**Percentage of subject companies within each of the "buy," "hold" and "sell" categories for which J.P. Morgan has provided investment banking services within the previous 12 months.

For purposes of FINRA ratings distribution rules only, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category. Please note that stocks with an NR designation are not included in the table above. This information is current as of the end of the most recent calendar quarter.

Equity Valuation and Risks: For valuation methodology and risks associated with covered companies or price targets for covered companies, please see the most recent company-specific research report at <http://www.jpmorganmarkets.com>, contact the primary analyst or your J.P. Morgan representative, or email research.disclosure.inquiries@jpmorgan.com. For material information about the proprietary models used, please see the Summary of Financials in company-specific research reports and the Company Tearsheets, which are available to download on the company pages of our client website, <http://www.jpmorganmarkets.com>. This report also sets out within it the material underlying assumptions used.

A history of J.P. Morgan investment recommendations disseminated during the preceding 12 months can be accessed on the Research & Commentary page of <http://www.jpmorganmarkets.com> where you can also search by analyst name, sector or financial instrument.

Analysts' Compensation: The research analysts responsible for the preparation of this report receive compensation based upon various factors, including the quality and accuracy of research, client feedback, competitive factors, and overall firm revenues.

Registration of non-US Analysts: Unless otherwise noted, the non-US analysts listed on the front of this report are employees of non-US affiliates of J.P. Morgan Securities LLC, may not be registered as research analysts under FINRA rules, may not be associated persons of J.P. Morgan Securities LLC, and may not be subject to FINRA Rule 2241 or 2242 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

Other Disclosures

J.P. Morgan is a marketing name for investment banking businesses of JPMorgan Chase & Co. and its subsidiaries and affiliates worldwide.

UK MIFID FICC research unbundling exemption: UK clients should refer to [UK MIFID Research Unbundling exemption](#) for details of J.P. Morgan's implementation of the FICC research exemption and guidance on relevant FICC research categorisation.

All research material made available to clients are simultaneously available on our client website, J.P. Morgan Markets, unless specifically permitted by relevant laws. Not all research content is redistributed, e-mailed or made available to third-party aggregators. For all research material available on a particular stock, please contact your sales representative.

Any long form nomenclature for references to China; Hong Kong; Taiwan; and Macau within this research material are Mainland China; Hong Kong SAR (China); Taiwan (China); and Macau SAR (China).

J.P. Morgan Research may, from time to time, write on issuers or securities targeted by economic or financial sanctions imposed or administered by the governmental authorities of the U.S., EU, UK or other relevant jurisdictions (Sanctioned Securities). Nothing in this report is intended to be read or construed as encouraging, facilitating, promoting or otherwise approving investment or dealing in such Sanctioned Securities. Clients should be aware of their own legal and compliance obligations when making investment decisions.

Any digital or crypto assets discussed in this research report are subject to a rapidly changing regulatory landscape. For relevant regulatory advisories on crypto assets, including bitcoin and ether, please see <https://www.jpmorgan.com/disclosures/cryptoasset-disclosure>.

The author(s) of this research report may not be licensed to carry on regulated activities in your jurisdiction and, if not licensed, do not hold themselves out as being able to do so.

Exchange-Traded Funds (ETFs): J.P. Morgan Securities LLC ("JPMS") acts as authorized participant for substantially all U.S.-listed ETFs. To the extent that any ETFs are mentioned in this report, JPMS may earn commissions and transaction-based compensation in connection with the distribution of those ETF shares and may earn fees for performing other trade-related services, such as securities lending to short sellers of the ETF shares. JPMS may also perform services for the ETFs themselves, including acting as a broker or dealer to the ETFs. In addition, affiliates of JPMS may perform services for the ETFs, including trust, custodial, administration, lending, index calculation and/or maintenance and other services.

Options and Futures related research: If the information contained herein regards options- or futures-related research, such information is available only to persons who have received the proper options or futures risk disclosure documents. Please contact your J.P. Morgan Representative or visit <https://www.theocc.com/components/docs/riskstoc.pdf> for a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options or http://www.finra.org/sites/default/files/Security_Futures_Risk_Disclosure_Statement_2018.pdf for a copy of the Security Futures Risk Disclosure Statement.

Changes to Interbank Offered Rates (IBORs) and other benchmark rates: Certain interest rate benchmarks are, or may in the future become, subject to ongoing international, national and other regulatory guidance, reform and proposals for reform. For more information, please consult: https://www.jpmorgan.com/global/disclosures/interbank_offered_rates

Private Bank Clients: Where you are receiving research as a client of the private banking businesses offered by JPMorgan Chase & Co. and its subsidiaries ("J.P. Morgan Private Bank"), research is provided to you by J.P. Morgan Private Bank and not by any other division of J.P. Morgan, including, but not limited to, the J.P. Morgan Corporate and Investment Bank and its Global Research division.

Legal entity responsible for the production and distribution of research: The legal entity identified below the name of the Reg AC Research Analyst who authored this material is the legal entity responsible for the production of this research. Where multiple Reg AC Research Analysts authored this material with different legal entities identified below their names, these legal entities are jointly responsible for the production of this research. Research Analysts from various J.P. Morgan affiliates may have contributed to the production of this material but may not be licensed to carry out regulated activities in your jurisdiction (and do not hold themselves out as being able to do so). Unless otherwise stated below, this material has been distributed by the legal entity responsible for production. If you have any queries, please contact the relevant Research Analyst in your jurisdiction or the entity in your jurisdiction that has distributed this research material.

Legal Entities Disclosures and Country-/Region-Specific Disclosures:

Argentina: JPMorgan Chase Bank N.A Sucursal Buenos Aires is regulated by Banco Central de la República Argentina ("BCRA" - Central Bank of Argentina) and Comisión Nacional de Valores ("CNV" - Argentinian Securities Commission - ALYC y AN Integral N°51). **Australia:** J.P. Morgan Securities Australia Limited ("JPMSAL") (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by the Australian Securities and Investments Commission and is a Market Participant of ASX Limited, a Clearing and Settlement Participant of ASX Clear Pty Limited and a Clearing Participant of ASX Clear (Futures) Pty Limited. This material is issued and distributed in Australia by or on behalf of JPMSAL only to "wholesale clients" (as defined in section 761G of the Corporations Act 2001). A list of all financial products covered can be found by visiting <https://www.jpmm.com/research/disclosures>. J.P. Morgan seeks to cover companies of relevance to the domestic and international investor base across all Global Industry Classification Standard (GICS) sectors, as well as across a range of market capitalisation sizes. If applicable, in the course of conducting public side due diligence on the subject company(ies), the Research Analyst team may at times perform such diligence through corporate engagements such as site visits, discussions with company representatives, management presentations, etc. Research issued by JPMSAL has been prepared in accordance with J.P. Morgan Australia's Research Independence Policy which can be found at the following link: [J.P. Morgan Australia - Research Independence Policy](#). **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissão de Valores Mobiliários (CVM) and by the Central Bank of Brazil. Ombudsman J.P. Morgan: 0800-7700847 / 0800-7700810 (For Hearing Impaired) / ouvidoria.jp.morgan@jpmorgan.com. **Canada:** J.P. Morgan Securities Canada Inc. is a registered investment dealer, regulated by the Canadian Investment Regulatory Organization and the Ontario Securities Commission and is the participating member on Canadian exchanges. This material is distributed in Canada by or on behalf of J.P.Morgan Securities Canada Inc. **Chile:** Inversiones J.P. Morgan Limitada is an unregulated entity incorporated in Chile. **China:** J.P. Morgan Securities (China) Company Limited has been approved by CSRC to conduct the securities investment consultancy business. **Dubai International Financial Centre (DIFC):** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - The Gate, West Wing, Level 3 and 9 PO Box 506551, Dubai, UAE. This material has been distributed by JP Morgan Chase Bank, N.A., Dubai Branch to persons regarded as professional clients or market counterparties as defined under the DFSA rules. **European Economic Area (EEA):** Unless specified to the contrary, research is distributed in the EEA by J.P. Morgan SE ("JPM SE"), which is authorised as a credit institution by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and jointly supervised by the BaFin, the German Central Bank (Deutsche Bundesbank) and the European Central Bank (ECB). JPM SE is a company headquartered in

Frankfurt with registered address at TaunusTurm, Taunustor 1, Frankfurt am Main, 60310, Germany. The material has been distributed in the EEA to persons regarded as professional investors (or equivalent) pursuant to Art. 4 para. 1 no. 10 and Annex II of MiFID II and its respective implementation in their home jurisdictions ("EEA professional investors"). This material must not be acted on or relied on by persons who are not EEA professional investors. Any investment or investment activity to which this material relates is only available to EEA relevant persons and will be engaged in only with EEA relevant persons. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong, and J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. JP Morgan Chase Bank, N.A., Hong Kong Branch (CE Number AAL996) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission, is organized under the laws of the United States with limited liability. Where the distribution of this material is a regulated activity in Hong Kong, the material is distributed in Hong Kong by or through J.P. Morgan Securities (Asia Pacific) Limited and/or J.P. Morgan Broking (Hong Kong) Limited. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz - East, Mumbai - 400098, is registered with the Securities and Exchange Board of India (SEBI) as a 'Research Analyst' having registration number INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited and the Bombay Stock Exchange Limited (SEBI Registration Number - INZ000239730) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: <http://www.jpimipl.com>. JPMorgan Chase Bank, N.A. - Mumbai Branch is licensed by the Reserve Bank of India (RBI) (Licence No. 53/ Licence No. BY.4/94; SEBI - IN/CUS/014/ CDSL : IN-DP-CDSL-444-2008/ IN-DP-NSDL-285-2008/ INBI00000984/ INE231311239) as a Scheduled Commercial Bank in India, which is its primary license allowing it to carry on Banking business in India and other activities, which a Bank branch in India are permitted to undertake. For non-local research material, this material is not distributed in India by J.P. Morgan India Private Limited. Compliance Officer: Spurthi Gadamsetty; spurthi.gadamsetty@jpmchase.com; +912261573225. Grievance Officer: Ramprasadh K, jpimipl.research.feedback@jpmorgan.com; +912261573000.

Investment in securities market are subject to market risks. Read all the related documents carefully before investing. Registration granted by SEBI and certification from NISM in no way guarantee performance of the intermediary or provide any assurance of returns to investors.

Indonesia: PT J.P. Morgan Sekuritas Indonesia is a member of the Indonesia Stock Exchange and is registered and supervised by the Otoritas Jasa Keuangan (OJK). **Korea:** J.P. Morgan Securities (Far East) Limited, Seoul Branch, is a member of the Korea Exchange (KRX). JPMorgan Chase Bank, N.A., Seoul Branch, is licensed as a branch office of foreign bank (JPMorgan Chase Bank, N.A.) in Korea. Both entities are regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). For non-macro research material, the material is distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch. **Japan:** JPMorgan Securities Japan Co., Ltd. and JPMorgan Chase Bank, N.A., Tokyo Branch are regulated by the Financial Services Agency in Japan. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X), which is a Participating Organization of Bursa Malaysia Berhad and holds a Capital Markets Services License issued by the Securities Commission in Malaysia. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V. and J.P. Morgan Grupo Financiero are members of the Mexican Stock Exchange and are authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to "wholesale clients" (as defined in the Financial Markets Conduct Act 2013). JPMSAL is registered as a Financial Service Provider under the Financial Service providers (Registration and Dispute Resolution) Act of 2008. **Philippines:** J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Singapore:** This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMSS) [MCI (P) 030/08/2023 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited, and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore), both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of "accredited investors," "expert investors" or "institutional investors," as defined under Section 4A of the SFA. Recipients of this material in Singapore are to contact JPMSS or JPMCB Singapore in respect of any matters arising from, or in connection with, the material. **South Africa:** J.P. Morgan Equities South Africa Proprietary Limited and JPMorgan Chase Bank, N.A., Johannesburg Branch are members of the Johannesburg Securities Exchange and are regulated by the Financial Services Conduct Authority (FSCA). **Taiwan:** J.P. Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. Material relating to equity securities is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited, subject to the license scope and the applicable laws and the regulations in Taiwan. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material that may give rise to conflicts of interests, unless otherwise disclosed in the "Important Disclosures" in this material. **Thailand:** This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission, and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **UK:** Unless specified to the contrary, research is distributed in the UK by J.P. Morgan Securities plc ("JPMS plc") which is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. JPMS plc is registered in England & Wales No. 2711006, Registered Office 25 Bank Street, London, E14 5JP. This material is directed in the UK only to: (a) persons having professional experience in matters relating to investments falling within article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) (Order) 2005 ("the FPO"); (b) persons outlined in article 49 of the FPO (high net worth companies, unincorporated associations or partnerships, the trustees of high value trusts, etc.); or (c) any persons to whom

this communication may otherwise lawfully be made; all such persons being referred to as "UK relevant persons". This material must not be acted on or relied on by persons who are not UK relevant persons. Any investment or investment activity to which this material relates is only available to UK relevant persons and will be engaged in only with UK relevant persons. Research issued by JPMS plc has been prepared in accordance with JPMS plc's policy for prevention and avoidance of conflicts of interest related to the production of Research which can be found at the following link: [J.P. Morgan EMEA - Research Independence Policy](#). U.S.: J.P. Morgan Securities LLC ("JPMS") is a member of the NYSE, FINRA, SIPC, and the NFA. JPMorgan Chase Bank, N.A. is a member of the FDIC. Material published by non-U.S. affiliates is distributed in the U.S. by JPMS who accepts responsibility for its content.

General: Additional information is available upon request. The information in this material has been obtained from sources believed to be reliable. While all reasonable care has been taken to ensure that the facts stated in this material are accurate and that the forecasts, opinions and expectations contained herein are fair and reasonable, JPMorgan Chase & Co. or its affiliates and/or subsidiaries (collectively J.P. Morgan) make no representations or warranties whatsoever to the completeness or accuracy of the material provided, except with respect to any disclosures relative to J.P. Morgan and the Research Analyst's involvement with the issuer that is the subject of the material. Accordingly, no reliance should be placed on the accuracy, fairness or completeness of the information contained in this material. There may be certain discrepancies with data and/or limited content in this material as a result of calculations, adjustments, translations to different languages, and/or local regulatory restrictions, as applicable. These discrepancies should not impact the overall investment analysis, views and/or recommendations of the subject company(ies) that may be discussed in the material. J.P. Morgan accepts no liability whatsoever for any loss arising from any use of this material or its contents, and neither J.P. Morgan nor any of its respective directors, officers or employees, shall be in any way responsible for the contents hereof, apart from the liabilities and responsibilities that may be imposed on them by the relevant regulatory authority in the jurisdiction in question, or the regulatory regime thereunder. Opinions, forecasts or projections contained in this material represent J.P. Morgan's current opinions or judgment as of the date of the material only and are therefore subject to change without notice. Periodic updates may be provided on companies/industries based on company-specific developments or announcements, market conditions or any other publicly available information. There can be no assurance that future results or events will be consistent with any such opinions, forecasts or projections, which represent only one possible outcome. Furthermore, such opinions, forecasts or projections are subject to certain risks, uncertainties and assumptions that have not been verified, and future actual results or events could differ materially. The value of, or income from, any investments referred to in this material may fluctuate and/or be affected by changes in exchange rates. All pricing is indicative as of the close of market for the securities discussed, unless otherwise stated. Past performance is not indicative of future results. Accordingly, investors may receive back less than originally invested. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients. This material may include views on structured securities, options, futures and other derivatives. These are complex instruments, may involve a high degree of risk and may be appropriate investments only for sophisticated investors who are capable of understanding and assuming the risks involved. The recipients of this material must make their own independent decisions regarding any securities or financial instruments mentioned herein and should seek advice from such independent financial, legal, tax or other adviser as they deem necessary. J.P. Morgan may trade as a principal on the basis of the Research Analysts' views and research, and it may also engage in transactions for its own account or for its clients' accounts in a manner inconsistent with the views taken in this material, and J.P. Morgan is under no obligation to ensure that such other communication is brought to the attention of any recipient of this material. Others within J.P. Morgan, including Strategists, Sales staff and other Research Analysts, may take views that are inconsistent with those taken in this material. Employees of J.P. Morgan not involved in the preparation of this material may have investments in the securities (or derivatives of such securities) mentioned in this material and may trade them in ways different from those discussed in this material. This material is not an advertisement for or marketing of any issuer, its products or services, or its securities in any jurisdiction.

Confidentiality and Security Notice: This transmission may contain information that is privileged, confidential, legally privileged, and/or exempt from disclosure under applicable law. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or use of the information contained herein (including any reliance thereon) is STRICTLY PROHIBITED. Although this transmission and any attachments are believed to be free of any virus or other defect that might affect any computer system into which it is received and opened, it is the responsibility of the recipient to ensure that it is virus free and no responsibility is accepted by JPMorgan Chase & Co., its subsidiaries and affiliates, as applicable, for any loss or damage arising in any way from its use. If you received this transmission in error, please immediately contact the sender and destroy the material in its entirety, whether in electronic or hard copy format. This message is subject to electronic monitoring: <https://www.jpmorgan.com/disclosures/email>

MSCI: Certain information herein ("Information") is reproduced by permission of MSCI Inc., its affiliates and information providers ("MSCI") ©2024. No reproduction or dissemination of the Information is permitted without an appropriate license. MSCI MAKES NO EXPRESS OR IMPLIED WARRANTIES (INCLUDING MERCHANTABILITY OR FITNESS) AS TO THE INFORMATION AND DISCLAIMS ALL LIABILITY TO THE EXTENT PERMITTED BY LAW. No Information constitutes investment advice, except for any applicable Information from MSCI ESG Research. Subject also to [msci.com/disclaimer](https://www.msci.com/disclaimer)

"Other Disclosures" last revised February 03, 2024.

Copyright 2024 JPMorgan Chase & Co. All rights reserved. This material or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan. It is strictly prohibited to use or share without prior written consent from J.P. Morgan any research material received from J.P. Morgan or an authorized third-party ("J.P. Morgan Data") in any third-party artificial intelligence ("AI") systems or models when such J.P. Morgan Data is accessible by a third-party. It is permissible to use J.P. Morgan Data for internal business purposes only in an AI system or model that protects the confidentiality of J.P. Morgan Data so as to

prevent any and all access to or use of such J.P. Morgan Data by any third-party.

Completed 07 Feb 2024 04:29 PM AEDT

Disseminated 07 Feb 2024 04:29 PM AEDT