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metal&ROCK | Europe

Copper's Ascent

Copper is our top pick in our recent price deck, with the narrative and price gathering momentum. We see a mix of micro and macro factors driving this: MSe ~12% upside ahead.

Key Takeaways

- We see a 700 kt deficit in 2024, as supply issues have accelerated
- The data centre demand narrative is bringing new investors into the space

A perfect storm for copper: Copper is up 10% YTD and 15% since mid-Feb with macro and micro drivers. Non-commercial COMEX net positioning has flipped from 35klots short in mid-Feb to 20k lots long, the highest since Apr'22, but below the 80klot peak seen in late 2020. Our [new balance](#) points to a 700 kt deficit, and we see further upside ahead, with a [Q4 forecast](#) of \$10,500/t (+12%).

Supply continues to squeeze: We now see mined copper output down 0.7% this year, assuming 3.5% remaining disruption allowance. Since our update, [Ivanhoe's Q1](#) production came in much softer on power and heavy rainfall issues in the DRC, and Codelco's Q1 output was the lowest level since at least 2019, while [Zambia's power situation](#) also looks challenging. With TCs collapsing, [China smelters](#) are expected to cut back output during Q2, which should weigh on refined output too.

Demand holding + tailwind from data centres and AI: China's apparent copper demand looks strong in Jan-Feb, with refined imports up 27% and refined output up 13%. End use sectors also look good ([Exhibit 5](#)), partly supported by exports, with Jan-Feb vehicle exports +30%, washing machines +40% and air conditioners +17%. Interest in data centres is growing too - these are a small share of copper demand for now, but are growing fast, attracting new investors to the sector and boosting the needs for grid investment too - see [here](#).

Contango as a negative physical signal is not working: Copper's cash-3m contango is the widest on record, usually a negative signal for commodities. We looked at this [in November](#), and concluded that as a signal, it is mixed at best. Pre-mid 2002, contango falling below <1% was followed by a lower copper price 6m later, but since mid-2002, when China joined the WTO, prices have generally been up 6m later. So far this is playing out again - copper's contango went beyond 1% on 30th October, and the price is up 16%, five months and one week later ([Exhibit 1](#)).

What are we watching? China's copper inventories are not yet showing their usual seasonal drawdown, given strong imports and refined production for now, but the market may start to question China's demand if draws do not emerge soon. For now, positioning is elevated but not overstretched, although absolute longs look more extreme. Copper is also showing an emerging call skew, suggesting a lot of long positioning expressed using options too.

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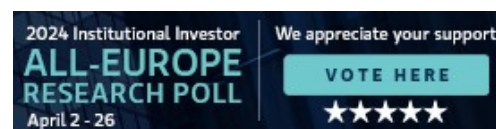
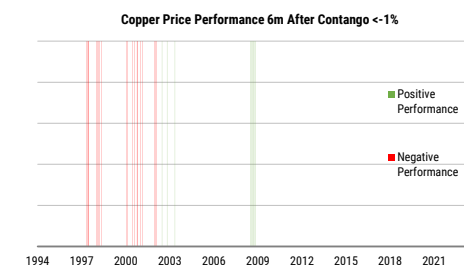


Exhibit 1 : Looking at price action with a widening contango, we saw negative copper price performance dominated in 1998/1998 and 2000/2001, but 2002/3 and 2009 and 2024 are showing positive performance



Source: Bloomberg, Morgan Stanley Research. Last green line shows copper price performance 5 months post copper's contango going beyond 1% on 30th October

Also see:

[metal&ROCK: The Price Deck – 2Q24: All That Glitters ...](#) (27 Mar 2024)

[Theme Trades: Copper, Data Centres and GenAI: Growth Ahead](#) (27 Mar 2024)

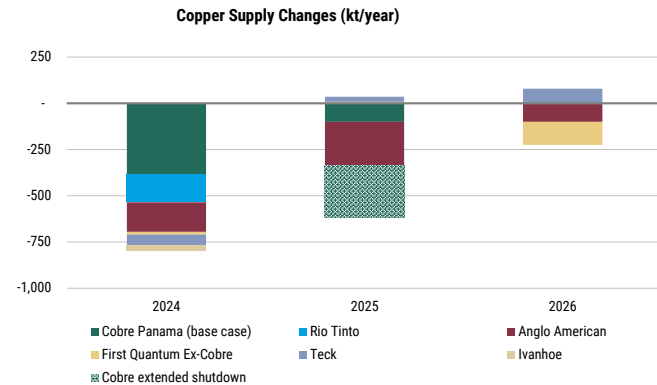
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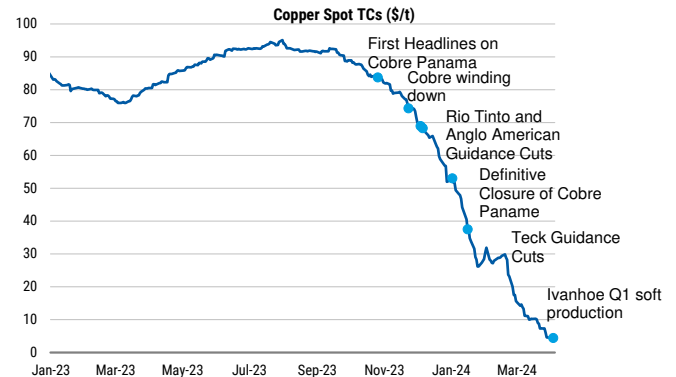
Key Charts

Exhibit 2: Mine supply disruptions have been accelerating



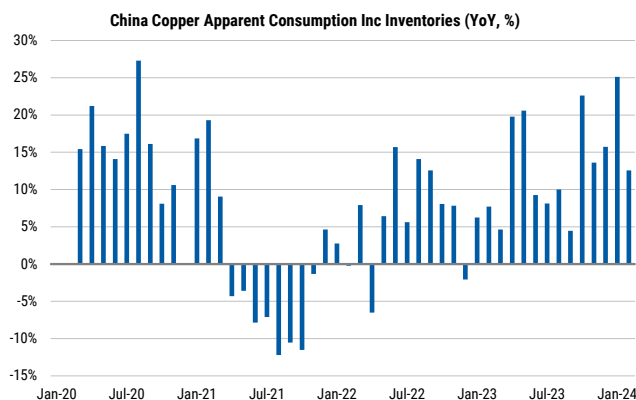
Source: Company guidance, Morgan Stanley Research

Exhibit 3: This has driven down treatment charges



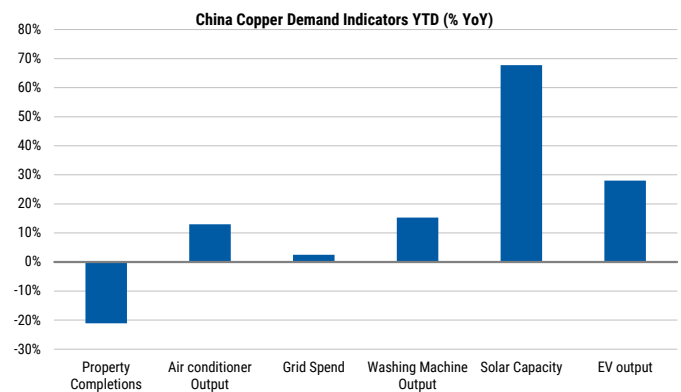
Source: Platts, Morgan Stanley Research

Exhibit 4: China apparent demand is up 18% YoY on average in the last 5 months



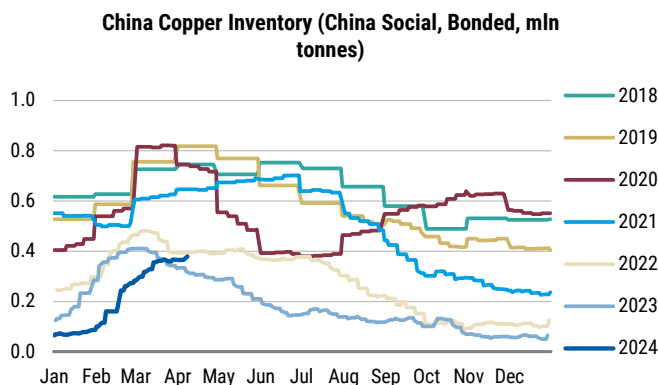
Source: Bloomberg, Morgan Stanley Research

Exhibit 5: China demand indicators are all looking strong apart from property completions



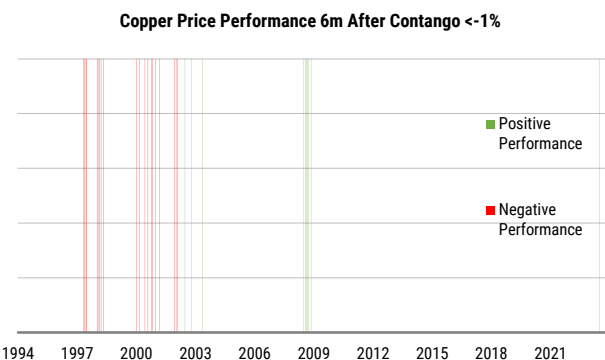
Source: Bloomberg, Morgan Stanley Research

Exhibit 6: China copper inventories are taking longer to roll over than normal



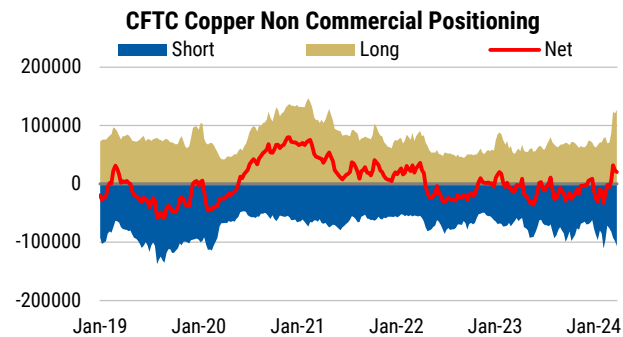
Source: Bloomberg

Exhibit 7: Copper moving into a large contango has not been a consistent negative signal for copper



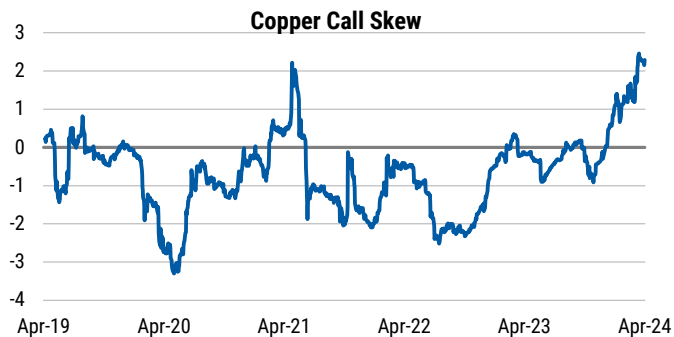
Source: Bloomberg. Last green line shows copper price performance 5 months post copper's contango going beyond 1% on 30th October

Exhibit 8: COMEX Copper positioning has risen sharply but does not look overstretched with both longs and shorts elevated



Source: Bloomberg, Morgan Stanley Research

Exhibit 9: Copper has flipped to call skew, reflecting increased demand for upside price expressions



Source: Bloomberg, Morgan Stanley Research. Based on 25DC versus 25DP.

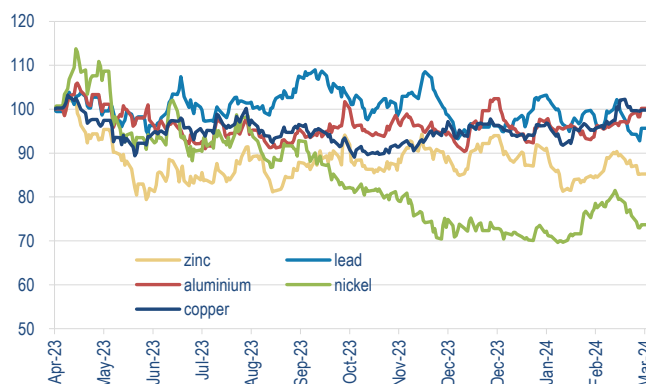
Week in Review

Base Metals: Base metals rallied across the board, driven by stronger China and US macro data. China's manufacturing PMI rose to 50.8 in March from 49.1 in February, rising above the 50-level that separates growth from contraction, and hitting the highest mark since March 2023. Similarly, US manufacturing rose to 50.3 in March from 47.8 in February, increasing confidence of improved demand for this year. Zinc was the best performer last week (+7%), likely driven by short-covering given the extended non-commercial positioning.

Precious Metals: Precious metals rallied last week, with gold reaching a record high of \$2289/oz. This was attributable to a weaker USD, with Fed Chair Powell stating that the recent strong macro data won't materially change the thinking on monetary policy, supporting expectations of a rate-cut in June. Central banks also continued to buy gold in February, led by China, Turkey and India (WGC).

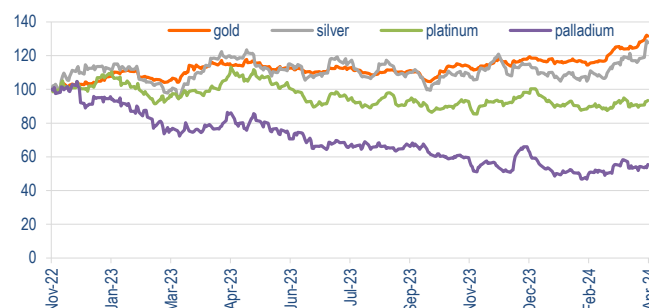
Bulks: Iron ore declined 4% on the week, reaching \$98/t, driven by worsening demand from China. Chinese port inventories continued to rise, up another 1.6mt last week, now at the highest levels since September 2022. Furthermore, demand remains weak; CISA 10-day steel production at the end of March was down 10% YoY, with CISA now calling for production cuts to help stabilise the steel market in China. Elsewhere, Australia hard coking coal fell to \$228/t last week, while the Newcastle thermal coal price fell to \$128/t. The Northwest European (ARA) thermal coal price remained stable at \$117/t.

Exhibit 10: Base metals price indices (12-month rolling)



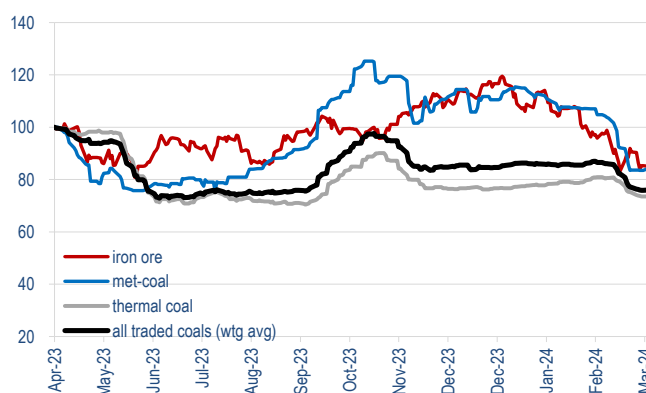
Source: Bloomberg, Morgan Stanley Research

Exhibit 11: Precious metals indices



Source: Bloomberg, Morgan Stanley Research

Exhibit 12: Bulk commodity price indices (12-month rolling)



Source: Platts, Bloomberg, Morgan Stanley Research

Morgan Stanley Price Forecasts

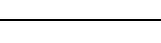
Exhibit13: Summary of Morgan Stanley's commodity price forecasts (set on 27 Mar 2024)

commodity group	unit	4Q 23a	1Q 24e	2Q 24e	3Q 24e	4Q 24e	1Q 25e	2Q 25e	3Q 25e	2023	2024e	2025e	2026e	2027e	2028e	2029e	LT real	LT nom.
Base Metals																		
Aluminium	US\$/lb	1.00	1.00	1.04	1.09	1.09	1.07	1.07	1.07	1.01	1.05	1.07	1.09	1.18	1.32	1.32	1.13	1.28
	US\$/t	2,196	2,200	2,300	2,400	2,400	2,350	2,350	2,350	2,232	2,325	2,350	2,400	2,600	2,900	2,900	2,500	2,820
Copper	US\$/lb	3.71	3.83	4.31	4.63	4.76	4.63	4.40	4.31	3.84	4.38	4.41	4.22	4.08	4.11	4.11	3.58	4.04
	US\$/t	8,176	8,450	9,500	10,200	10,500	10,200	9,700	9,500	8,473	9,663	9,725	9,300	9,000	9,060	9,060	7,900	8,911
Nickel	US\$/lb	7.83	7.38	8.39	8.85	8.39	8.16	8.16	8.16	9.50	8.25	8.16	8.62	9.07	9.39	9.39	8.32	9.39
	US\$/t	17,257	16,270	18,500	19,500	18,500	18,000	18,000	18,000	20,954	18,193	18,000	19,000	20,000	20,700	20,700	18,350	20,699
Zinc	US\$/lb	1.13	1.11	1.18	1.18	1.18	1.22	1.22	1.22	1.19	1.16	1.22	1.27	1.32	1.32	1.32	1.13	1.28
	US\$/t	2,500	2,450	2,600	2,600	2,600	2,700	2,700	2,700	2,616	2,563	2,700	2,800	2,900	2,900	2,900	2,501	2,821
Lead	US\$/lb	0.96	0.93	0.95	0.98	0.95	0.95	0.95	0.95	0.97	0.95	0.95	0.95	1.00	1.07	1.11	0.98	1.11
	US\$/t	2,117	2,060	2,100	2,150	2,100	2,100	2,100	2,100	2,130	2,103	2,100	2,094	2,205	2,350	2,450	2,160	2,436
Precious Metals																		
Gold	US\$/oz	1,976	2,075	2,200	2,350	2,250	2,250	2,200	2,100	1,944	2,219	2,163	2,000	1,800	1,800	1,650	1,430	1,613
Silver	US\$/oz	23.3	23.4	25.3	26.7	27.4	28.1	29.3	28.0	23.2	25.7	28.4	28.6	25.7	25.7	23.6	20.4	23.0
Platinum	US\$/oz	922	915	960	1,000	1,050	1,100	1,200	1,275	966	981	1,225	1,429	1,472	1,499	1,507	1,330	1,500
Palladium	US\$/oz	1,104	984	1,050	1,100	1,100	1,100	1,100	1,100	1,318	1,059	1,100	1,000	1,019	1,113	1,213	1,100	1,241
Bulks																		
Iron Ore (fines 62% Fe, cfr N.China)	US\$/t	128	122	110	120	125	115	100	100	120	119	105	100	100	95	95	85	96
Hard Coking Coal (spot, fob Aus)	US\$/t	333	310	250	255	290	280	250	240	296	276	260	238	220	200	200	175	197
Thermal coal (spot, fob Newc)	US\$/t	135	130	125	120	120	120	100	100	174	124	105	100	105	110	110	112	126
Other																		
Manganese ore (44%)	US\$/mtu	4.2	4.2	4.3	4.4	4.4	5.0	5.0	5.0	4.8	4.3	5.0	5.3	5.5	5.5	5.5	4.8	5.4
Alumina (spot, fob Aus)	US\$/t	333	366	370	360	340	340	340	330	342	359	335	340	370	400	403	348	393
Lithium carbonate (spot China, ex-VAT)	US\$/t	16,930	12,000	13,000	13,500	14,000	15,000	15,000	15,000	32,724	13,125	15,000	15,000	15,000	14,000	14,000	13,350	15,059
Cobalt	US\$/lb	15.6	13.7	13.8	13.8	14.0	15.0	15.0	15.0	16.3	13.8	15.0	18.0	19.0	21.5	23.0	20.0	22.6
Uranium - spot	US\$/lb	82.2	95.0	90.0	80.0	80.0	75.0	65.0	60.0	62.2	86.3	65.0	60.0	60.0	62.0	46.8	42.0	47.4
Exchange Rates																		
1 AUD = USD		0.65	0.66	0.66	0.68	0.70	0.72	0.72	0.72	0.66	0.68	0.72	0.72	0.72	0.71	0.71	0.74	0.71
1 USD = BRL		4.95	5.00	5.02	5.06	5.10	5.15	5.17	5.19	5.09	5.05	5.18	5.26	5.35	5.44	5.52	4.94	5.61
1 USD = CAD		1.36	1.40	1.40	1.37	1.36	1.34	1.33	1.31	1.35	1.38	1.32	1.30	1.29	1.28	1.28	1.26	1.28
1 USD = ZAR		18.73	18.90	19.25	19.50	19.78	19.97	20.17	20.36	18.58	19.36	20.27	21.04	21.82	22.60	23.38	18.50	23.87
1 EUR = USD		1.08	1.09	1.09	1.10	1.10	1.11	1.12	1.12	1.08	1.10	1.12	1.14	1.17	1.19	1.22	1.23	1.23
1 USD = CNY		7.22	7.16	7.14	7.10	6.95	6.90	6.90	6.90	7.10	7.09	6.90	7.07	6.90	6.80	6.80	7.10	6.79

Source: LME, Bloomberg, Platts, Morgan Stanley Research estimates (e). Note: Exchange rate forecasts are the assumptions that are compiled and used by Global Resources Equity Team; all prices are nominal, unless otherwise indicated.

Commodity Thermometer

Exhibit 14: Metals & Mining Commodity Thermometer

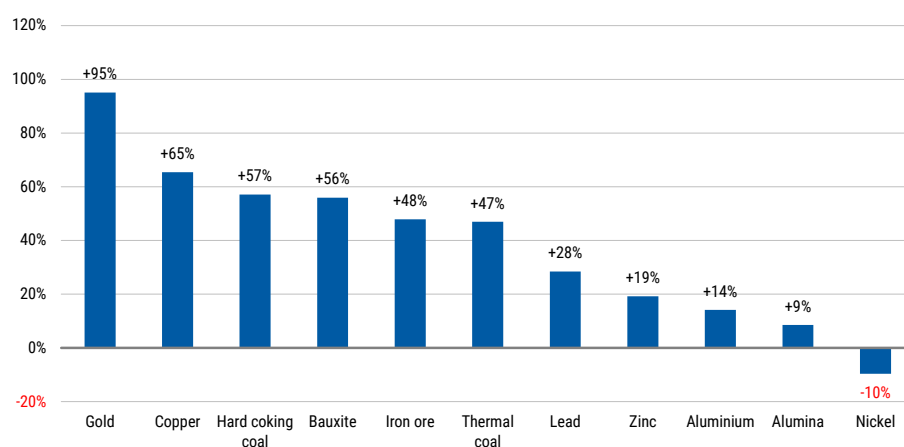
Rating	Commodity	Bearish	Neutral	Bullish	Thesis
5	Copper				We remain bullish on copper as persistent supply challenges widen our deficit for 2024, which looks set to persist into 2025. Demand and narrative tailwinds from data centres/AI should also boost participation, with long positioning rising.
5	Gold				We see further upside in Gold, driven by strong physical demand from central banks and falling real yields. COMEX positioning has rebounded, but still below highs.
5	Silver				We are still bullish on silver as ETF inflows start to come through, while inventories also remain very low.
5	Nickel				We see an improved risk-reward given the eroding surplus due to rapid supply cuts, on top of a pick-up in cathode production.
4	Iron ore				We see iron ore moving higher again by Q3 on firm Chinese manufacturing and infrastructure activity, and limited net additions to low cost supply; market is broadly balanced until Guinea's Simandou ramps up.
4	Platinum				We continue to forecast a deficit, partly offset by large above-ground stocks. We believe macro factors will continue to have an outsized impact on near-term prices.
4	Aluminium				Aluminium has few micro catalysts for now, while cost curve deflation weighs. However, we may see some copper-to-aluminium switching, while rising premiums suggest RoW demand is improving.
4	Manganese ore				We see a balanced market for 2024, underpinned by supply disruption, keeping prices around marginal cost levels.
4	Palladium				We now see a smaller market deficit in 2024, with a swing to a market surplus by 2026. Large short positioning raises the risk of volatility, but the long-term outlook remains weak.
4	Zinc				Zinc's mine cost support remains in place, but we see only modest upside from here as supply tightness may ease, while demand remains challenged.
4	Lead				Lead has been very volatile, but we see limited upside given the market surplus and the rise in LME inventories.
4	Lithium carbonate				Near-term support on supply cuts, environmental disruptions and strong China cathode production. However, if the environmental disruptions prove temporary, and supply ramps up as expected, we expect the market to remain in surplus.
3	Cobalt				We see cobalt remaining subdued given strong supply growth from CMOC and Indonesia, while the growth in cobalt-free batteries will weigh on demand.
3	Alumina				Alumina stays well supported but limited further upside, underpinned by strong China demand, while supply looks tighter than expected. That said, there is room for new supply to come through.
3	Thermal coal				With the northern hemisphere's shoulder season and an expected slowing in China's imports after last year's inventory build, price is lacking near-term catalysts.
3	Hard coking coal				Metallurgical coal moves down our order of preference on improved Australian supply and a seasonal lull in Indian steel; a more stable outlook for price over Q2/Q3.
2	Uranium				Although the 2024 balance looks tight on Kazatomprom's guidance cut, we turn more cautious as supply responds to elevated prices, resulting in 2026 flipping into a small surplus.

Source: Morgan Stanley Research. Note: Order of preference based on MSe 3Q24 vs average prices for two weeks ending 27 March 2024.

Recent Reports

Recent Research	Date
Theme Trades: Copper, Data Centres and GenAI: Growth Ahead	27-Mar-24
metal&ROCK: The Price Deck – 2Q24: All That Glitters ...	27-Mar-24
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metal&ROCK: Gold Bull Case in Play?	15-Mar-24
Commodity Matters: Copper: Tightening Up	14-Mar-24
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metal&ROCK: Iron ore: mini-cycle, not meltdown	04-Mar-24
metal&ROCK: Aluminium's Missing Catalysts	26-Feb-24
metal&ROCK: Iron ore scrap threat fades	09-Feb-24
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Commodity Matters: Uranium: Kazatomprom guidance cuts	01-Feb-24
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metal&ROCK: Iron ore cares little for steel margin pain	15-Jan-24
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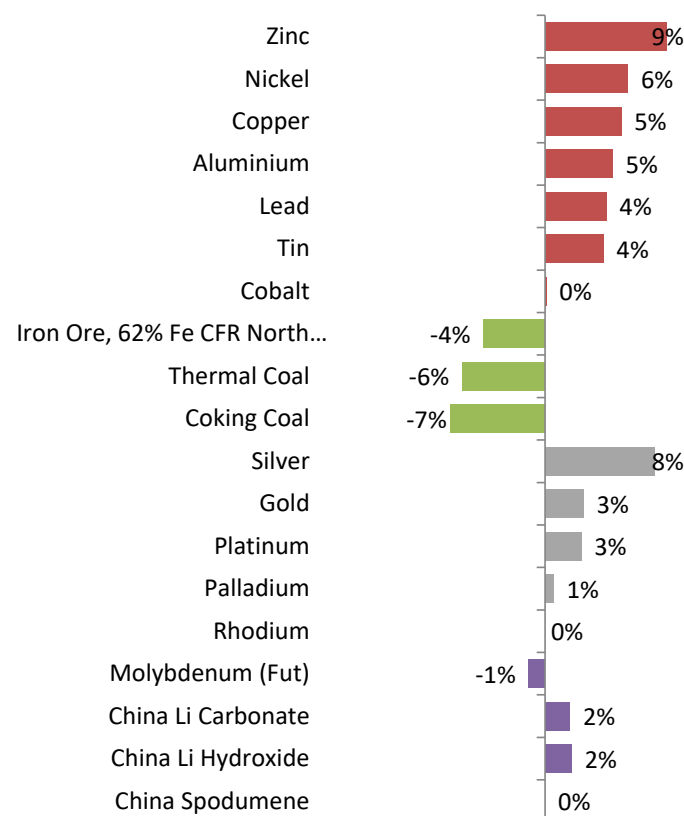
Exhibit 15: Spot commodity prices vs. the marginal cost of production



Source: Wood Mackenzie, Bloomberg, Morgan Stanley Research. Note: Marginal cost (year 2024); dataset Q4 2023; C1 cash costs.

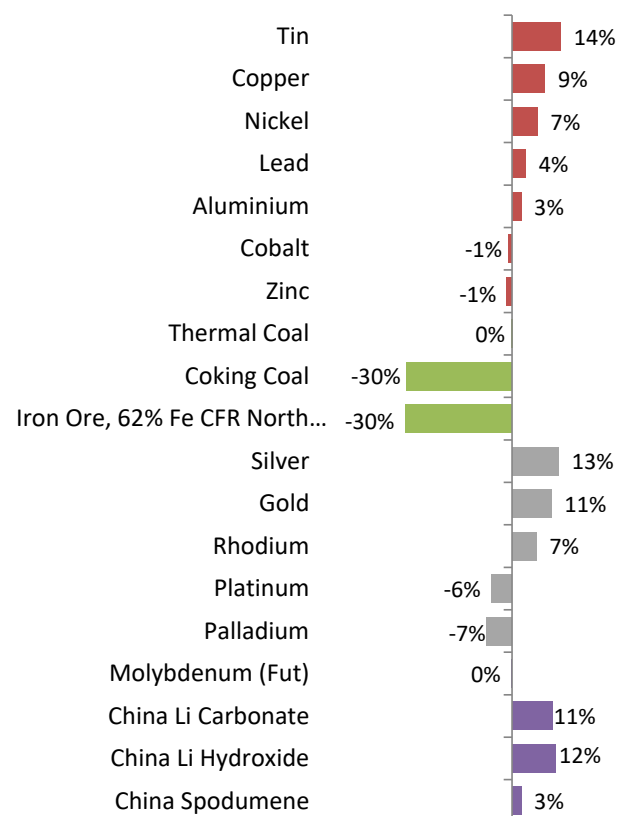
Commodity Price Snapshot

Exhibit 16: Key metals: one-week absolute performance, 28-Mar-24 to 04-Apr-24



Source: Bloomberg, Morgan Stanley Research

Exhibit 17: Key metals: YTD absolute performance, through 04-Apr-24



Source: Bloomberg, Morgan Stanley Research

Exhibit 18:

Base Metals: Price Snapshot

Base Metals	04-Apr-24	28-Mar-24	WoW Change (%)
Copper	4.19	3.98	5.4%
Aluminium	1.09	1.04	4.8%
Zinc	1.18	1.09	8.7%
Nickel	7.96	7.52	5.9%
Lead	0.96	0.92	4.4%
Tin	12.98	12.47	4.2%
Cobalt	12.88	12.87	0.1%

Source: Bloomberg, Morgan Stanley Research; WoW = Week on week

Exhibit 19: Bulks: price snapshot

Bulks	04-Apr-24	28-Mar-24	WoW Change (%)
Iron Ore, 62% Fe CFR North China (US\$/t)	98.3	102.8	-4.4%
Thermal Coal	87.8	93.3	-5.9%
Coking Coal	228.0	244.5	-6.7%

Source: Bloomberg, Morgan Stanley Research; WoW = Week on week

Exhibit 20: Precious Metals and PGMs : price snapshot

Precious Metals and PGMs	04-Apr-24	28-Mar-24	WoW Change (%)
Gold	2,291	2,230	2.7%
Silver	26.91	24.96	7.8%
Platinum	935	911	2.6%
Palladium	1,023	1,017	0.6%
Rhodium	4,725	4,725	0.0%

Source: Bloomberg, Morgan Stanley Research; WoW = Week on week

Exhibit 21: Other Metals : price snapshot

Other	04-Apr-24	28-Mar-24	WoW Change (%)
Molybdenum, LME Cash (US\$/lb)	19.6	19.8	-1.2%
China Lithium Carbonate 99.5% Ex-VAT (US\$/t)	13,050.5	12,823.6	1.8%
China Lithium Hydroxide 56.5% Ex-VAT (US\$/t)	12,335.4	12,107.9	1.9%
China Spodumene 5% min CIF Ex-VAT (US\$/t)	1,043.1	1,043.1	0.0%

Source: Bloomberg, Morgan Stanley Research; WoW = Week on week

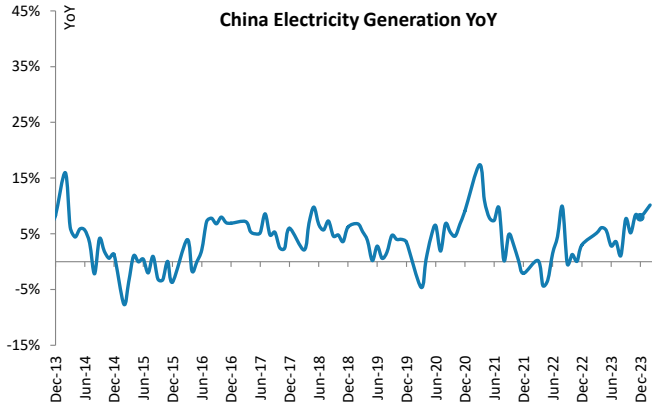
Exhibit 22: Exchange rate snapshot of major metal producing countries

FX Rates of Key Commodity Countries	04-Apr-24	28-Mar-24	WoW Change (%)
1 AUD = USD (Australian \$)	0.66	0.65	1.1%
1 EUR = USD (Euro)	1.08	1.08	0.4%
1 USD = BRL (Brazilian Real)	5.06	5.01	0.8%
1 USD = CAD (Canadian \$)	1.35	1.35	0.0%
1 USD = CLP (Chilean Peso)	942	980	-3.9%
1 USD = CNY (Chinese Renmimbi)	7.23	7.23	0.1%
1 USD = KZT (Kazakh Tenge)	446	448	-0.5%
1 USD = MXN (Mexican Peso)	16.59	16.63	-0.2%
1 USD = NOK (Norwegian Krone)	10.74	10.86	-1.0%
1 USD = PEN (Peruvian New Sol)	3.69	3.72	-1.0%
1 USD = SEK (Swedish Krona)	10.65	10.70	-0.5%
1 USD = ZAR (S. African Rand)	18.71	18.94	-1.2%
1 USD = ZMW (Zambian Kwacha)	24.70	24.94	-1.0%

Source: Bloomberg, Morgan Stanley Research; WoW = Week on week

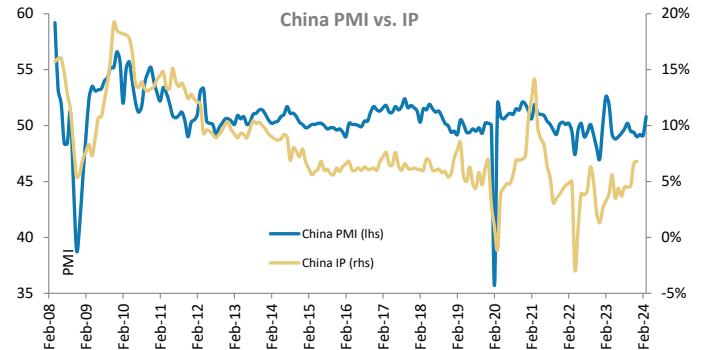
China's Macro Indicators

Exhibit23: China's electricity generation



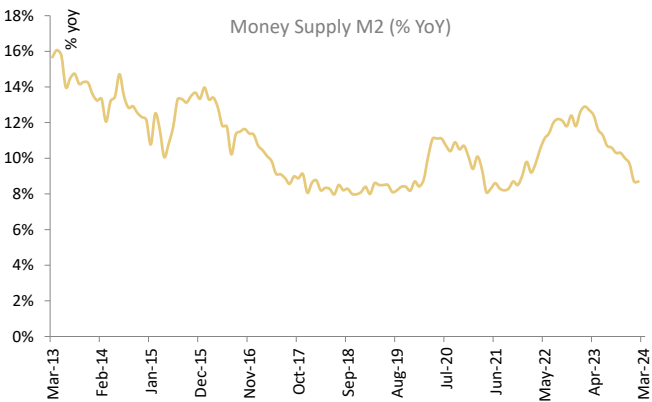
Source: CEIC, Morgan Stanley Research

Exhibit24: China's Purchasing Managers Index and Industrial Production (IP)



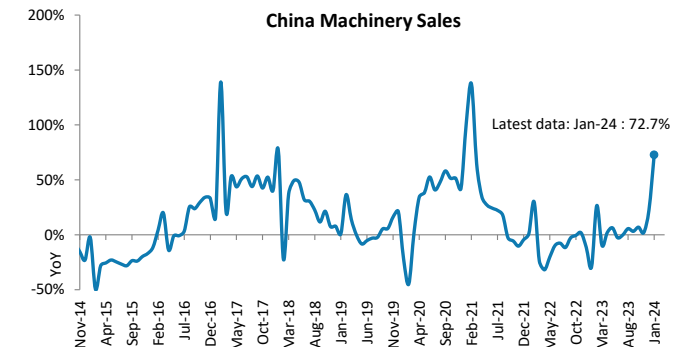
Source: CEIC, Morgan Stanley Research

Exhibit25: China's M2 money supply



Source: CEIC, Morgan Stanley Research

Exhibit26: China's machinery sales



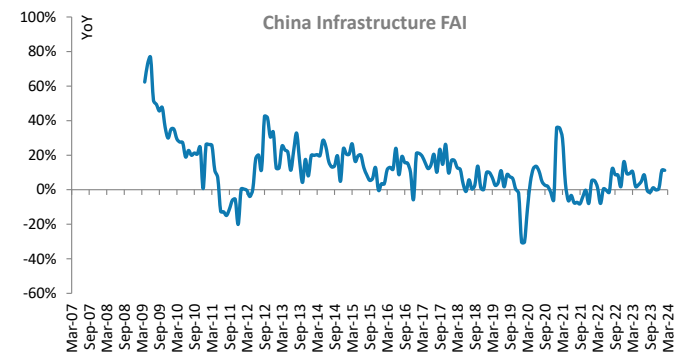
Source: CEIC, Morgan Stanley Research

Exhibit27: China's land sales

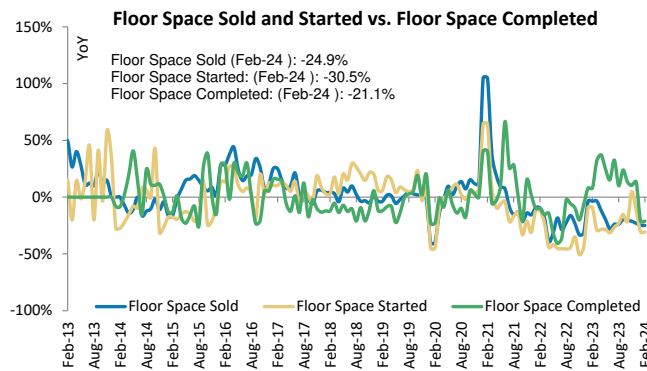


Source: CEIC, Morgan Stanley Research. Note data unavailable since Dec 2022.

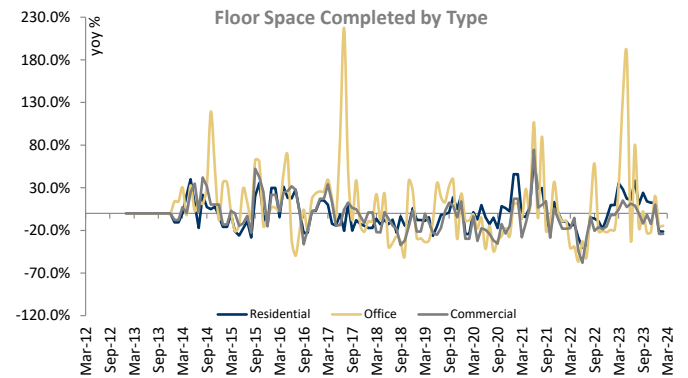
Exhibit 28: China's Infrastructure Fixed Asset Investments (FAI)



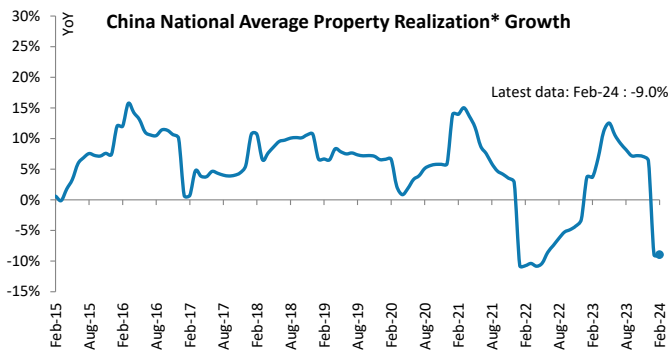
Source: CEIC, Morgan Stanley Research.

Exhibit29: China's floor space started and sold vs floor space completed

Source: CEIC, Morgan Stanley Research

Exhibit 30: Floor space completed by type of establishment

Source: CEIC, Morgan Stanley Research

Exhibit31: China's national average property sales

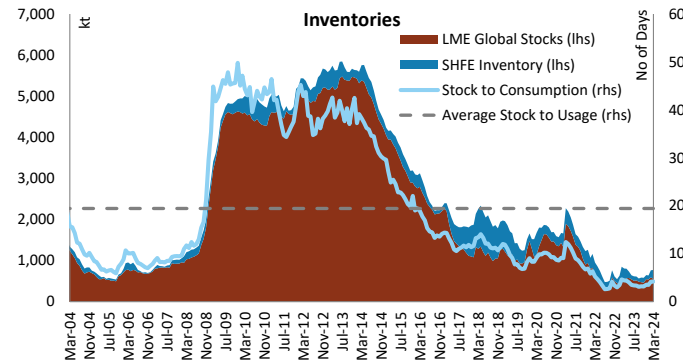
Source: CEIC, Morgan Stanley Research

Exhibit32: MS China Economic Index vs. China IP

Source: Bloomberg, Morgan Stanley Research

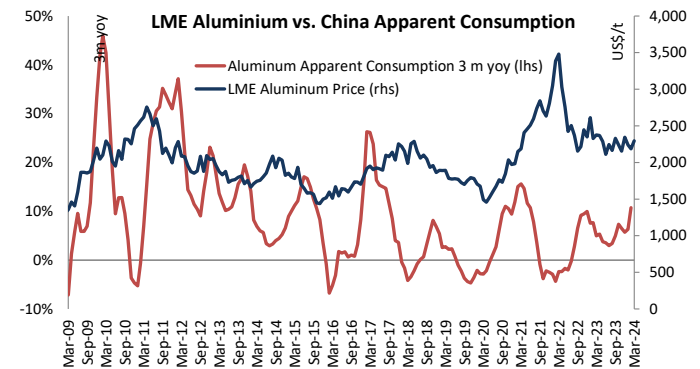
Aluminium

Exhibit33: Aluminium exchange inventories and days of consumption



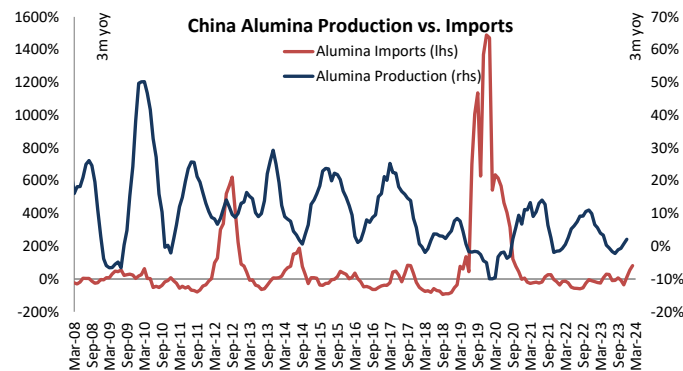
Source: Bloomberg, WBMS, Morgan Stanley Research

Exhibit34: China's apparent consumption vs. price



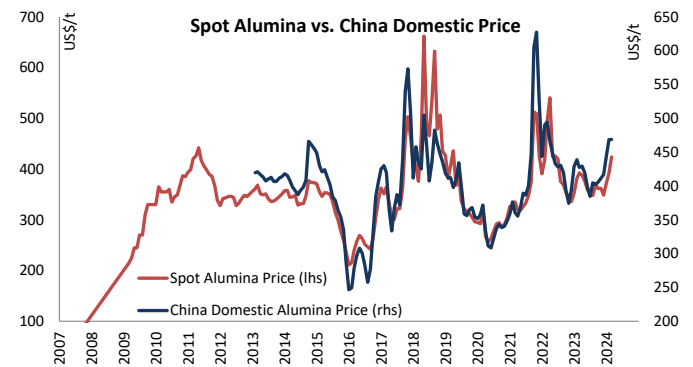
Source: Bloomberg, Morgan Stanley Research

Exhibit35: Raw materials: China's alumina production vs. imports



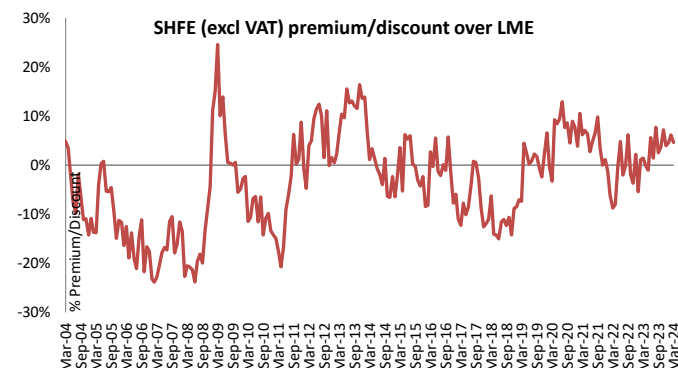
Source: Bloomberg, Morgan Stanley Research

Exhibit36: Raw materials: spot alumina vs. China's domestic price



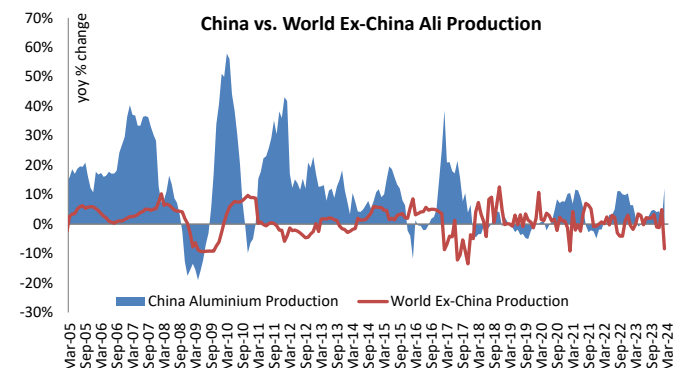
Source: Bloomberg, Morgan Stanley Research

Exhibit37: Price differentials: SHFE vs. LME

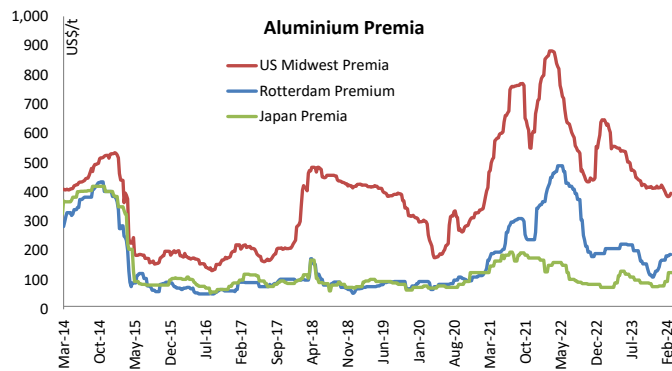


Source: Bloomberg, Morgan Stanley Research

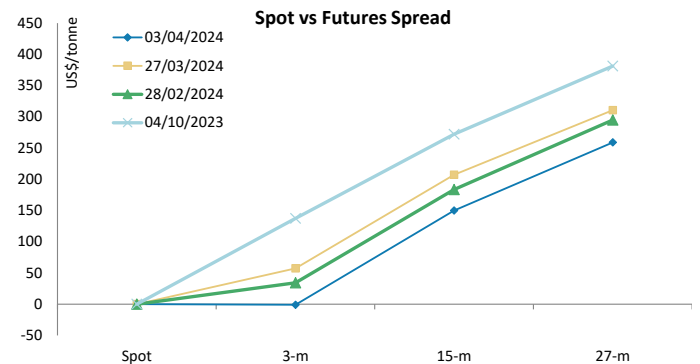
Exhibit38: Aluminium world production ex-China



Source: Bloomberg, Morgan Stanley Research

Exhibit39: Physical demand: aluminium premia, by region

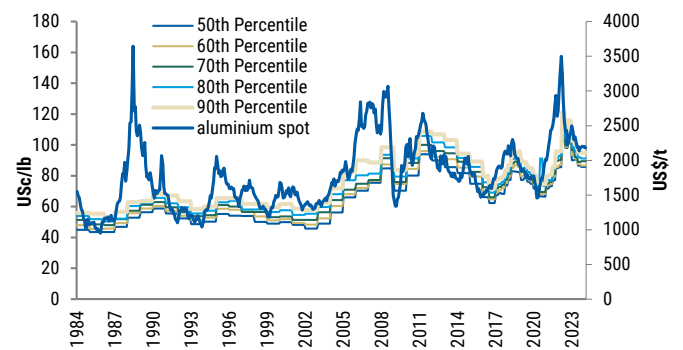
Source: Bloomberg, Morgan Stanley Research

Exhibit40: Contango vs. Backwardation: aluminium futures curve movement

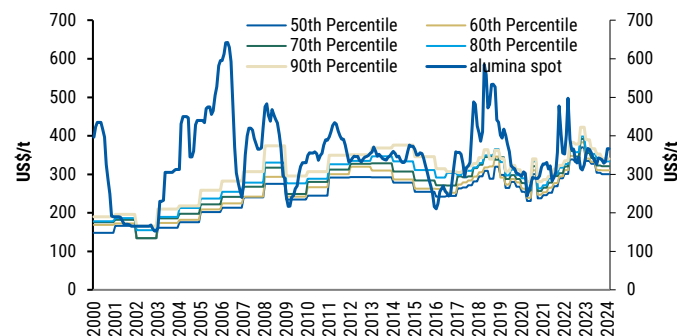
Source: Bloomberg, Morgan Stanley Research

Exhibit41: China's aluminium exports, by product type

Source: Bloomberg, Morgan Stanley Research

Exhibit42: Aluminium cost curve evolution

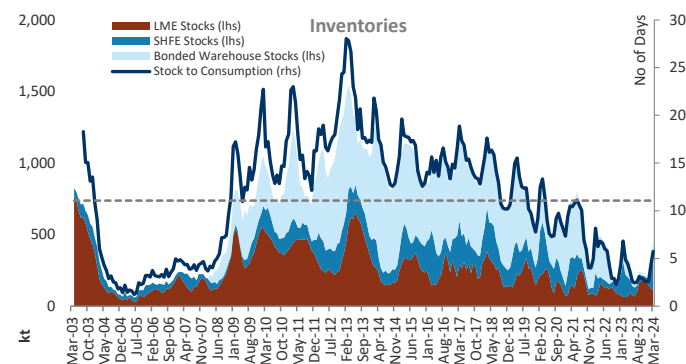
Source: Wood Mackenzie, Morgan Stanley Research

Exhibit 43: Alumina cost curve evolution

Source: Wood Mackenzie, Morgan Stanley Research

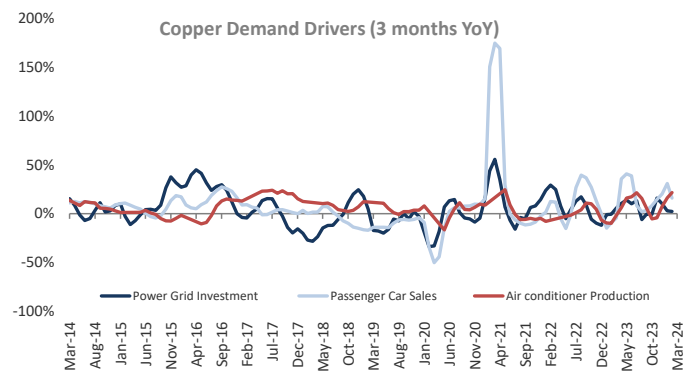
Copper

Exhibit44: Copper exchange and bonded warehouse inventories vs. days of consumption



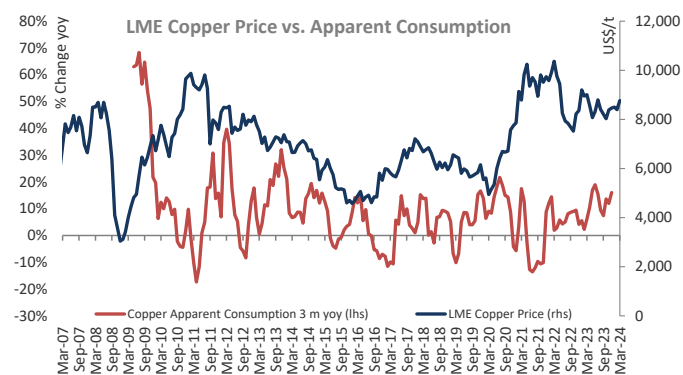
Source: Bloomberg, Morgan Stanley Research

Exhibit 45: Copper demand drivers



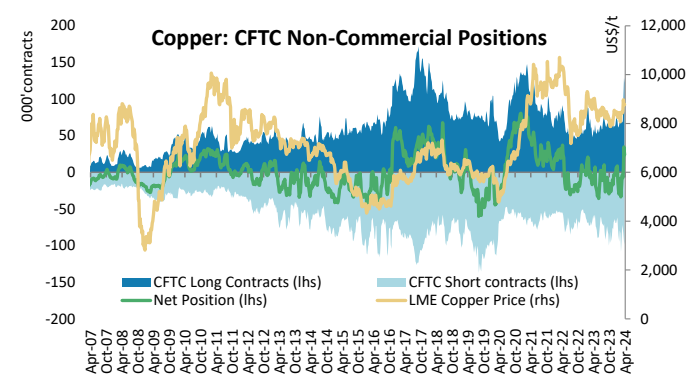
Source: Bloomberg, Morgan Stanley Research

Exhibit46: China's copper price vs. apparent consumption



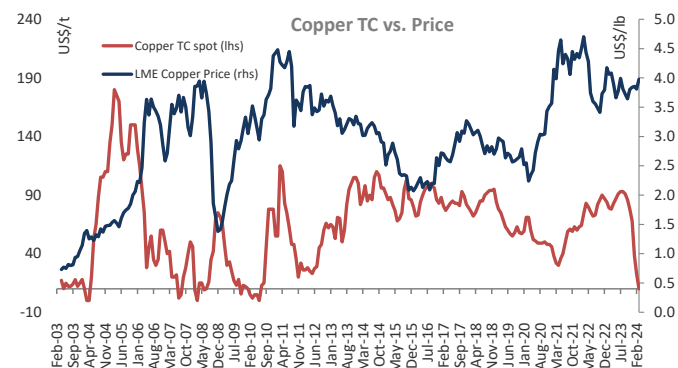
Source: Bloomberg, Morgan Stanley Research, * Apparent Consumption is calculated as refined production less net exports and change in SHFE stocks.

Exhibit47: CFTC speculative net length



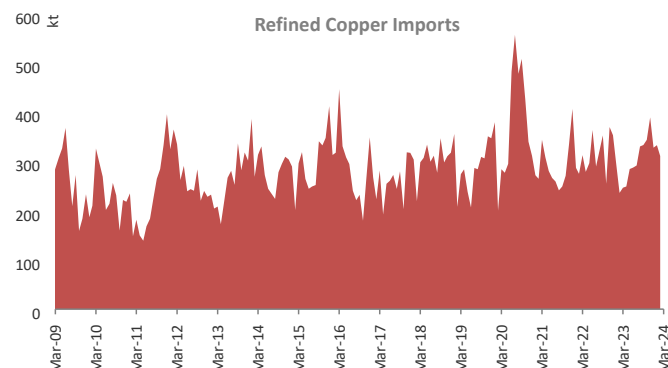
Source: Bloomberg, CFTC, Morgan Stanley Research

Exhibit48: Copper treatment charges (TCs) vs. price

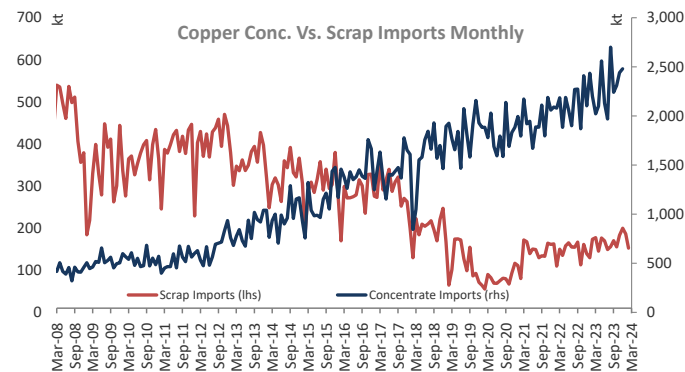


Source: Bloomberg, Wood Mackenzie, Morgan Stanley Research

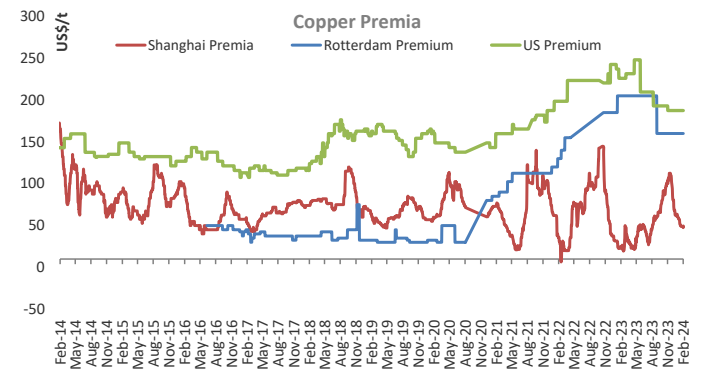
Exhibit49: China's refined copper imports



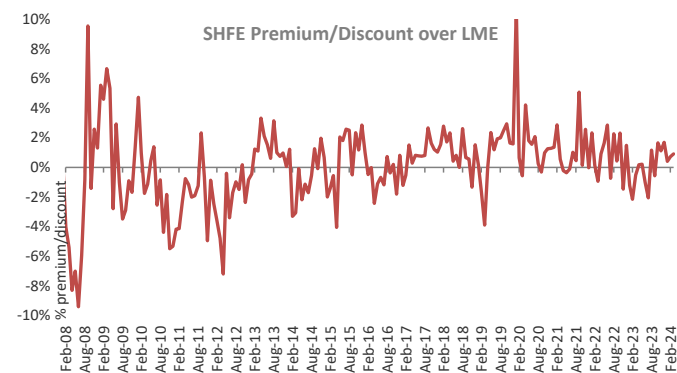
Source: Bloomberg, Wood Mackenzie, Morgan Stanley Research

Exhibit50: Raw materials: China's copper concentrate and scrap monthly imports

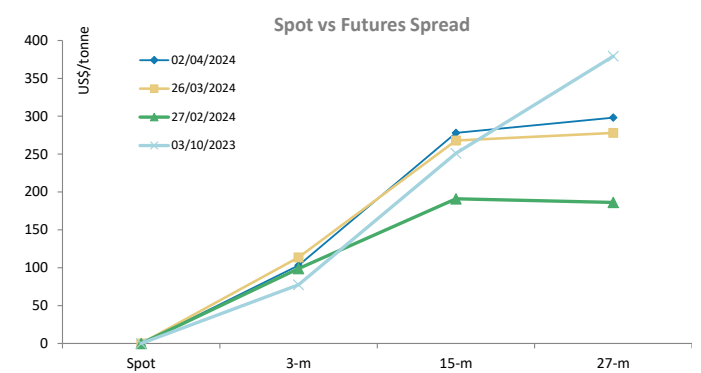
Source: Bloomberg, Morgan Stanley Research

Exhibit51: Physical demand: copper premia by region

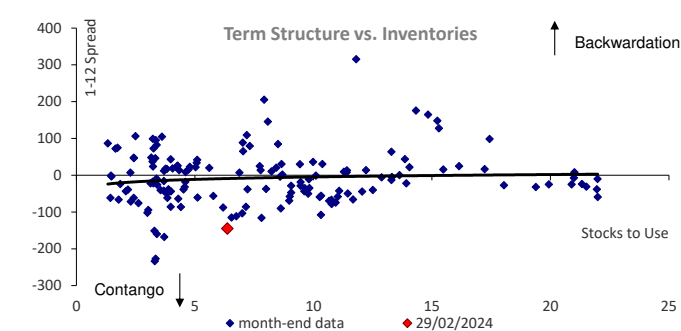
Source: Bloomberg, Morgan Stanley Research

Exhibit52: Price differentials: SHFE vs. LME

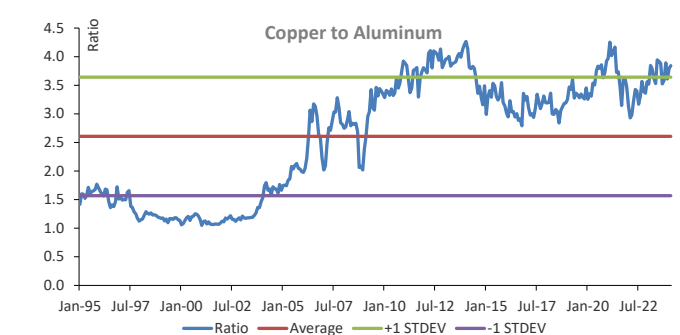
Source: Bloomberg, Morgan Stanley Research

Exhibit53: Contango vs. Backwardation: copper forward curve

Source: Bloomberg, Morgan Stanley Research

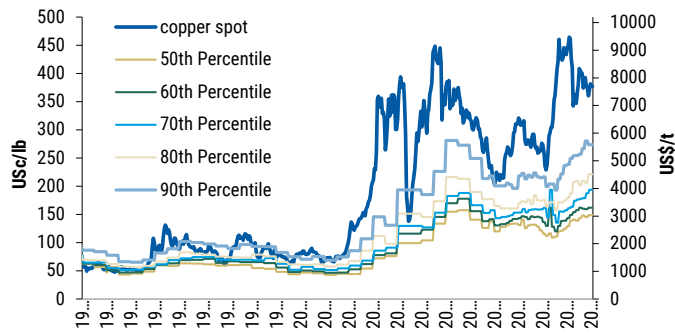
Exhibit54: Copper term structure vs. inventories

Source: Bloomberg, Morgan Stanley Research

Exhibit55: Copper to aluminium ratio

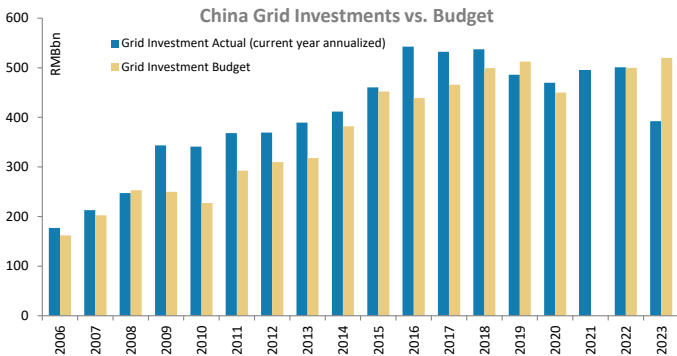
Source: Bloomberg, Morgan Stanley Research

Exhibit56: Copper cost curve evolution



Source: Wood Mackenzie, Morgan Stanley Research

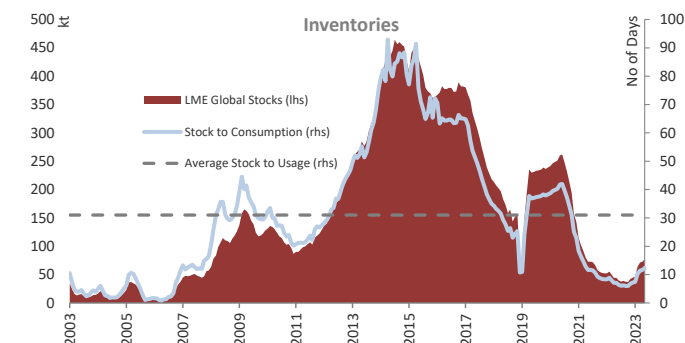
Exhibit57: China grid investments (annualised) vs. government spending budget



Source: China State Grid, Bloomberg, Morgan Stanley Research

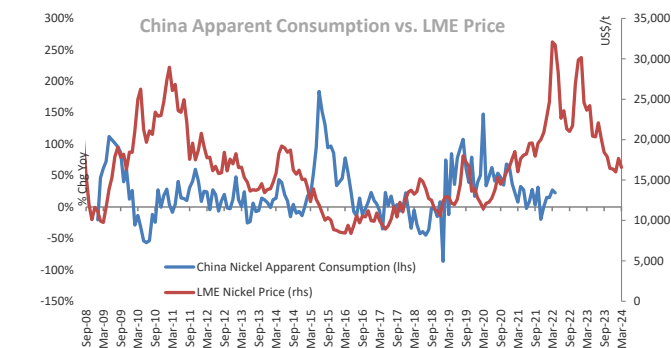
Nickel

Exhibit58: Nickel exchange inventories and days of consumption



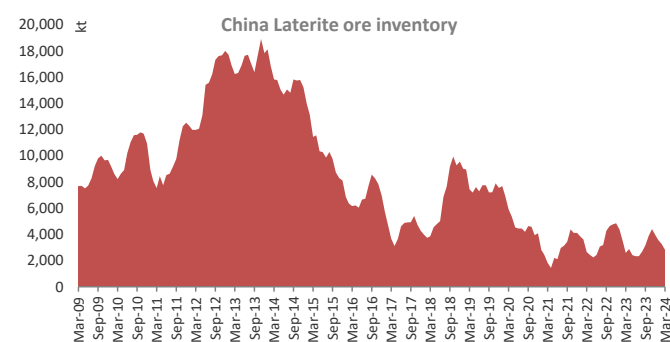
Source: Bloomberg, INSG, Morgan Stanley Research

Exhibit59: China's apparent nickel consumption vs. LME price



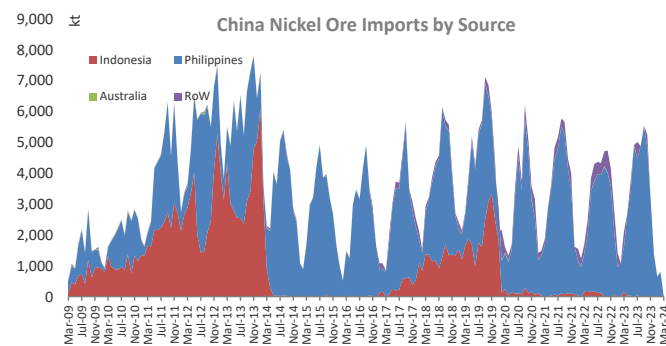
Source: Bloomberg, INSG, Morgan Stanley Research

Exhibit60: Raw materials: nickel laterite ore inventories



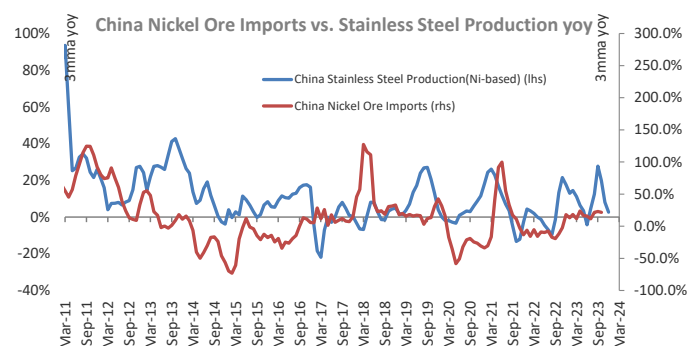
Source: Bloomberg, Morgan Stanley Research

Exhibit61: Raw materials: China's ore imports by source



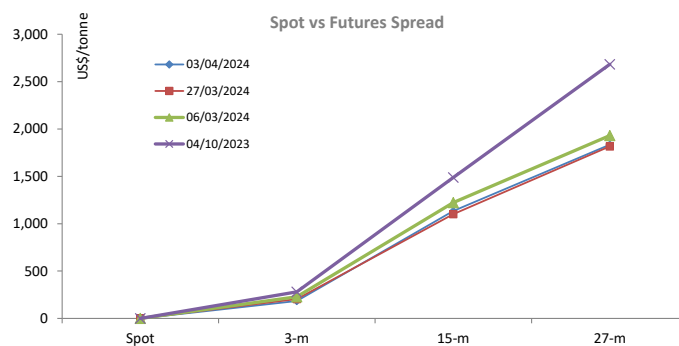
Source: Bloomberg, Morgan Stanley Research

Exhibit62: China's nickel ore imports vs. stainless steel production



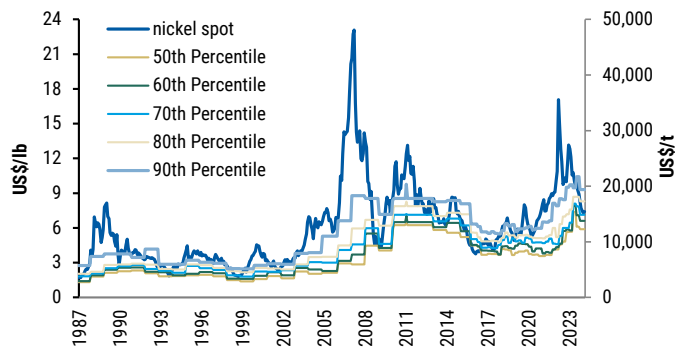
Source: Bloomberg, Morgan Stanley Research

Exhibit63: Contango vs. Backwardation: nickel futures curve movement



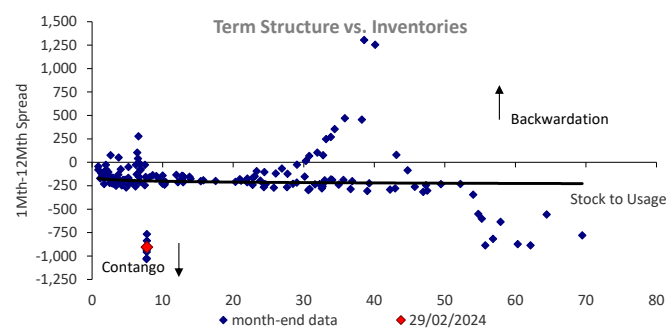
Source: Bloomberg, Morgan Stanley Research

Exhibit64: Nickel cost curve evolution



Source: Wood Mackenzie, Morgan Stanley Research

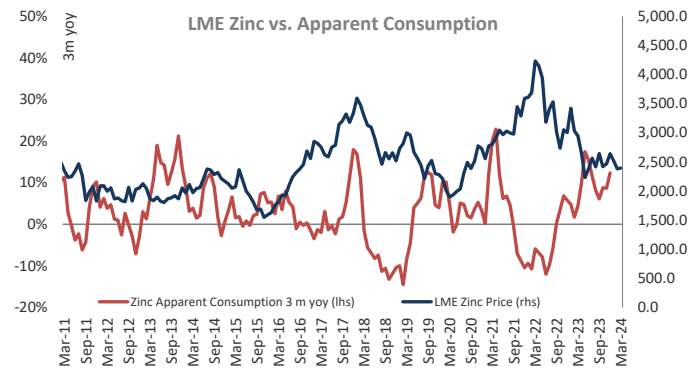
Exhibit 65: Nickel term structure vs. inventories



Source: Bloomberg, Morgan Stanley Research

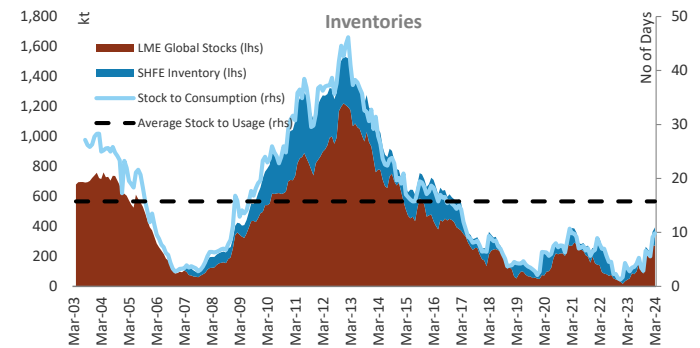
Zinc

Exhibit66: China's apparent zinc consumption vs. LME price



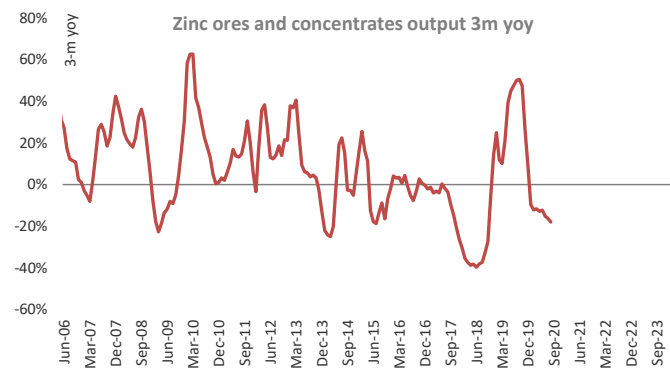
Source: Bloomberg, Morgan Stanley Research

Exhibit67: Zinc exchange inventories and days of consumption



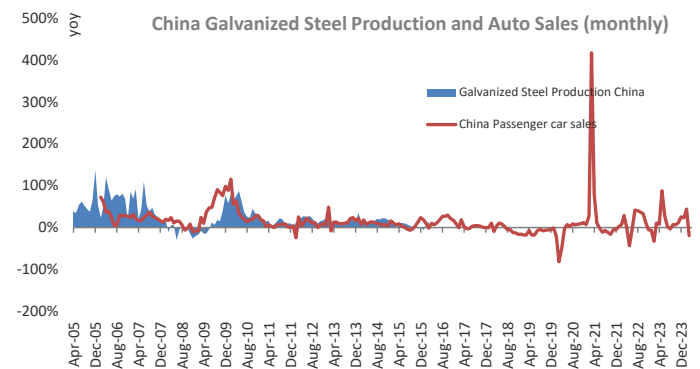
Source: Bloomberg, Morgan Stanley Research

Exhibit68: Supply drivers: China's zinc ore and concentrate output



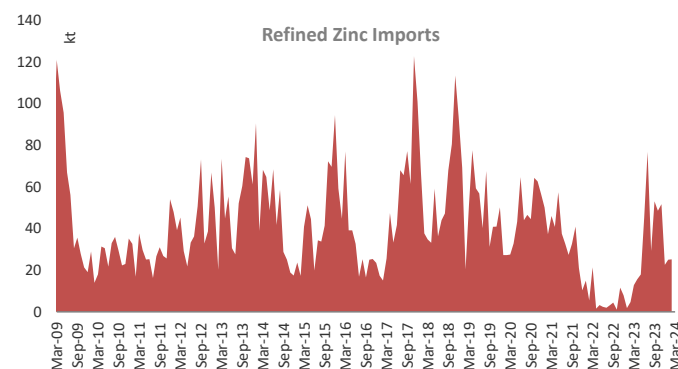
Source: Bloomberg, Morgan Stanley Research

Exhibit69: Demand drivers: China's galvanised steel production and auto sales



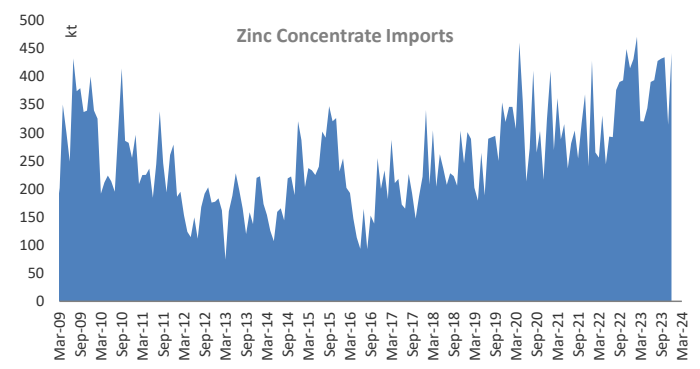
Source: Bloomberg, Morgan Stanley Research

Exhibit70: Finished metal: China's refined zinc imports

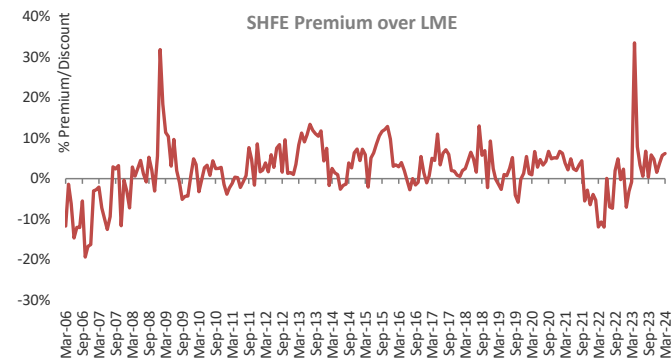


Source: Bloomberg, Morgan Stanley Research

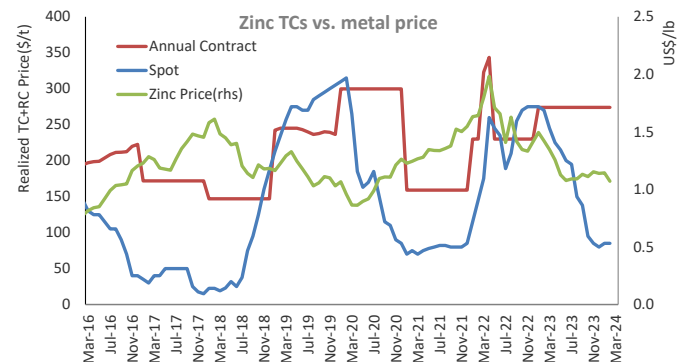
Exhibit71: Raw materials: China's zinc concentrate imports



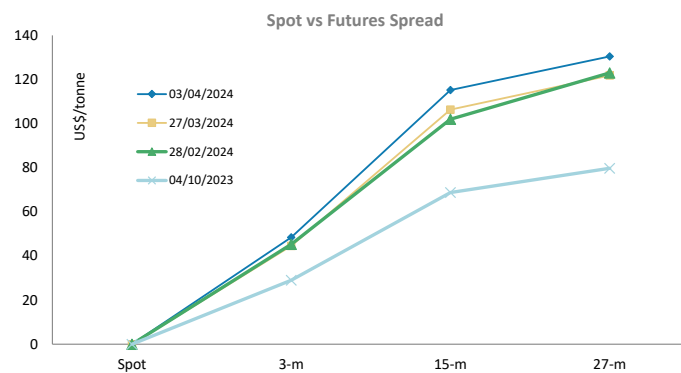
Source: Bloomberg, Morgan Stanley Research

Exhibit72: Zinc price differentials: SHFE vs. LME

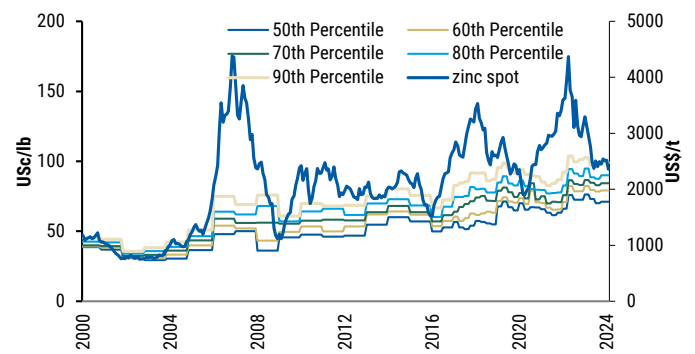
Source: Bloomberg, Morgan Stanley Research

Exhibit 73: Zinc TCs vs. metal price

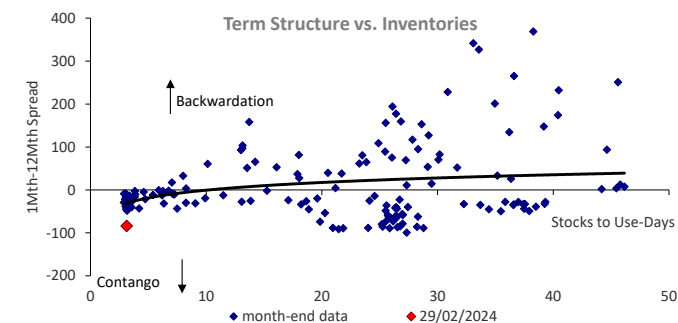
Source: Wood Mackenzie, Morgan Stanley Research

Exhibit 74: Contango vs. Backwardation: zinc futures curve movement

Source: Bloomberg, Morgan Stanley Research

Exhibit75: Zinc cost curve evolution

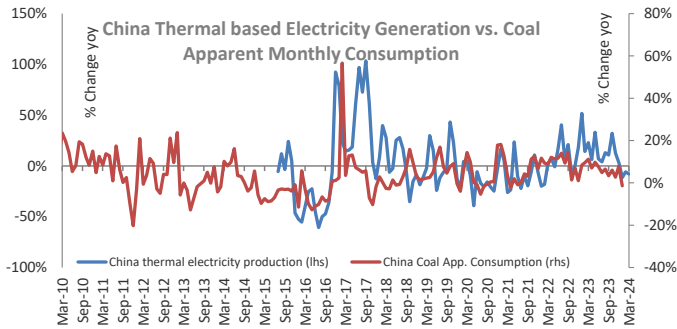
Source: Wood Mackenzie, Morgan Stanley Research

Exhibit76: Zinc term structure vs. inventories

Source: Bloomberg, Morgan Stanley Research

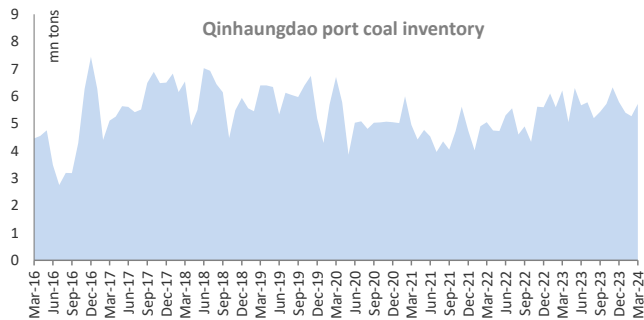
Coal

Exhibit82: China's thermal based power generation vs. coal apparent monthly consumption



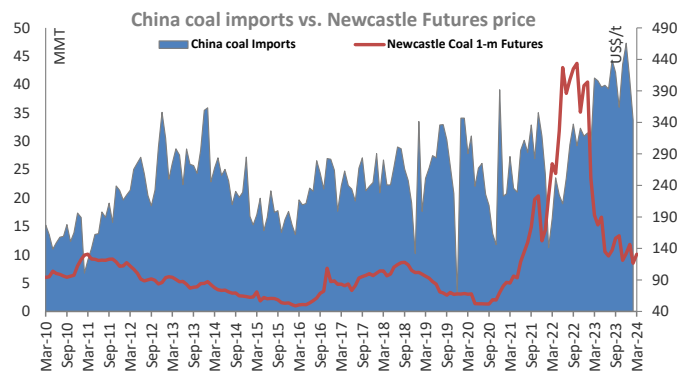
Source: NBS, Bloomberg, Morgan Stanley Research. Apparent Consumption is calculated as Domestic raw coal output less net coal exports

Exhibit83: Coal inventories: Qinhuangdao port



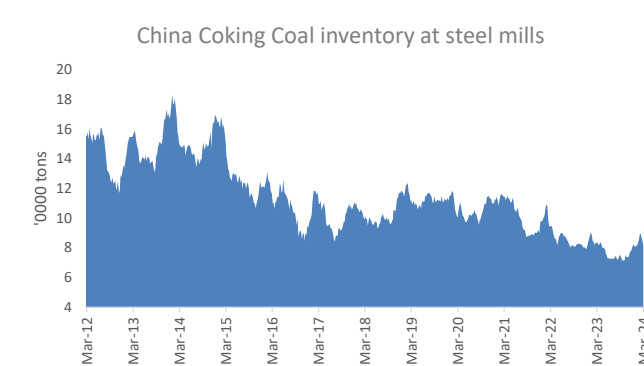
Source: Bloomberg, Morgan Stanley Research

Exhibit84: China's coal imports vs. prices



Source: Bloomberg, Morgan Stanley Research

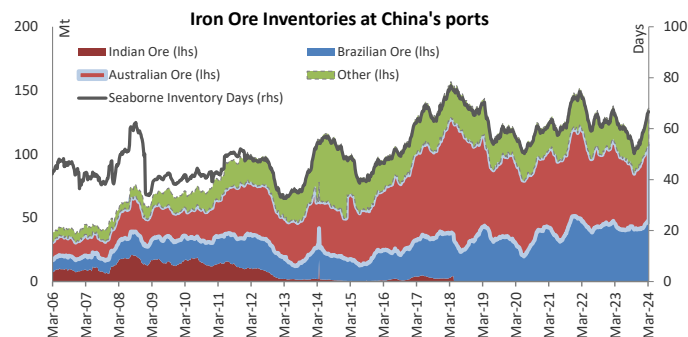
Exhibit85: Inventories: China's coking coal inventories at steel mills



Source: Mysteel, Bloomberg, Morgan Stanley Research

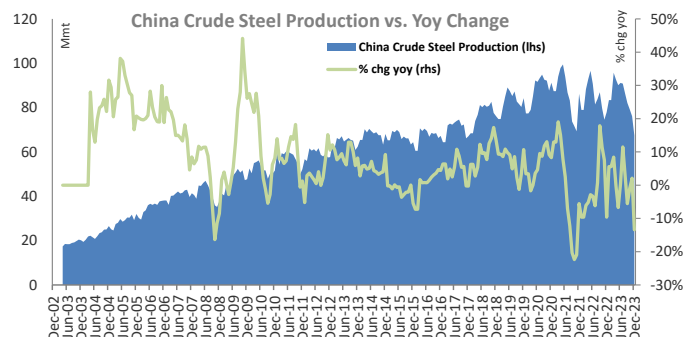
Iron Ore

Exhibit86: Iron ore inventories at China's sea ports and inventory days of consumption



Source: Mysteel, Morgan Stanley Research

Exhibit87: China's crude steel production, absolute and YoY change



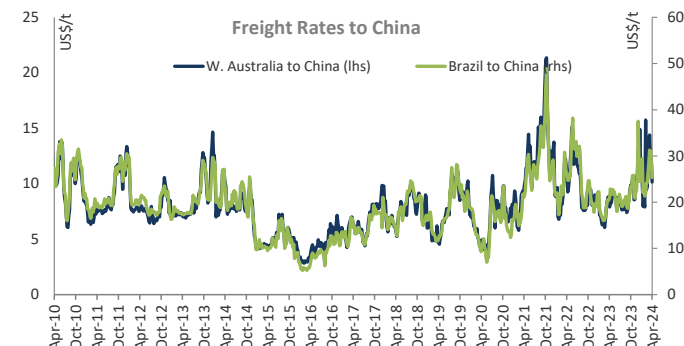
Source: NBS, Bloomberg, Morgan Stanley Research

Exhibit88: China's iron ore prices vs. steel prices



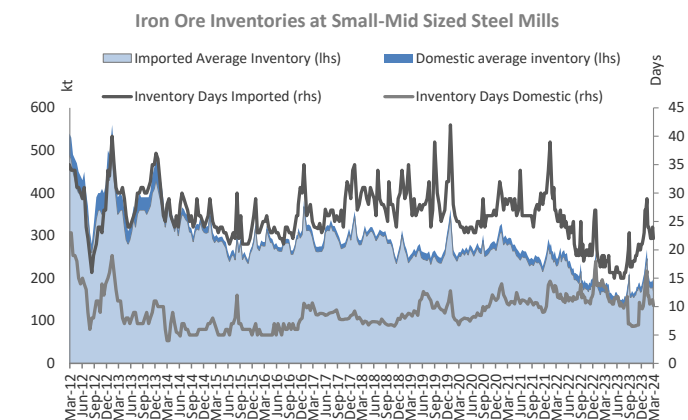
Source: Bloomberg, Morgan Stanley Research

Exhibit89: Freight rates from key shipping regions to China



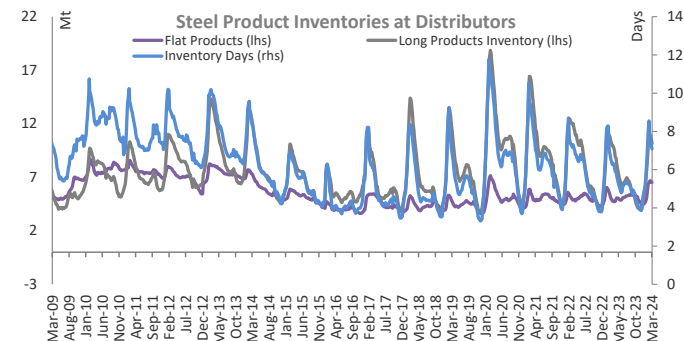
Source: Bloomberg, Morgan Stanley Research

Exhibit90: China's iron ore inventories at small and mid-sized steel mills



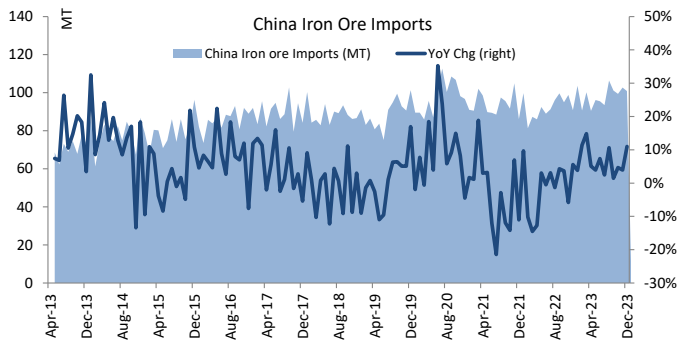
Source: Mysteel, Morgan Stanley Research

Exhibit91: China's steel product inventories at distributor level



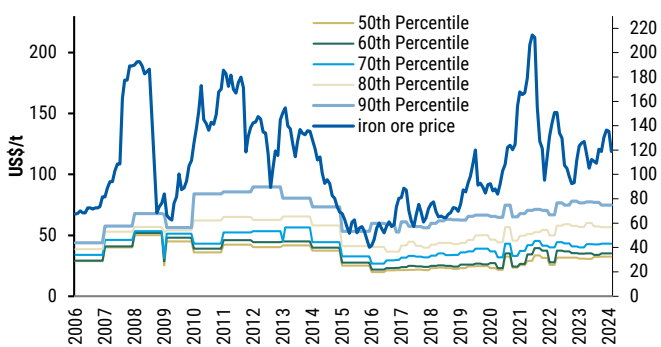
Source: Mysteel, Bloomberg, Morgan Stanley Research

Exhibit92: China's iron ore imports



Source: Bloomberg, Morgan Stanley Research

Exhibit93: Iron ore cost curve evolution

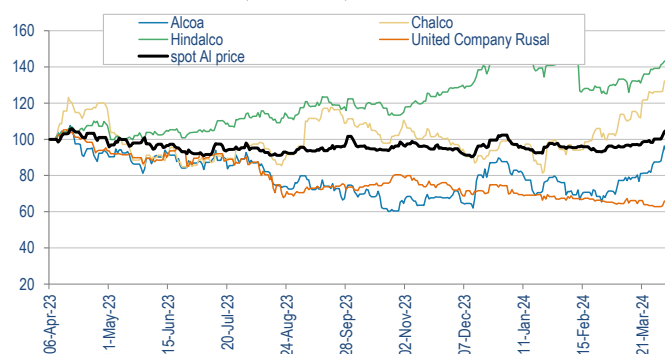


Source: Wood Mackenzie, Bloomberg, Morgan Stanley Research

Equity vs. Commodity – Relative One-Year Performance

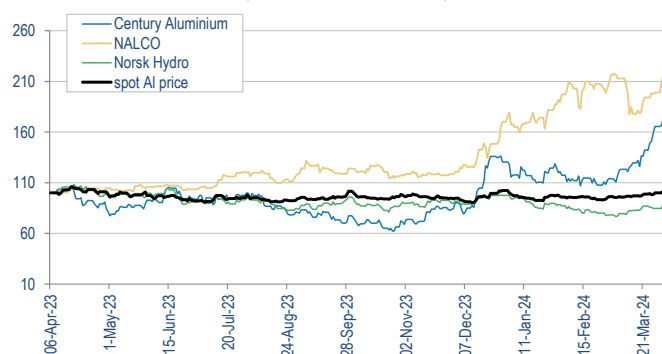
Aluminium, Alumina

Exhibit 94: Aluminium (large cap)



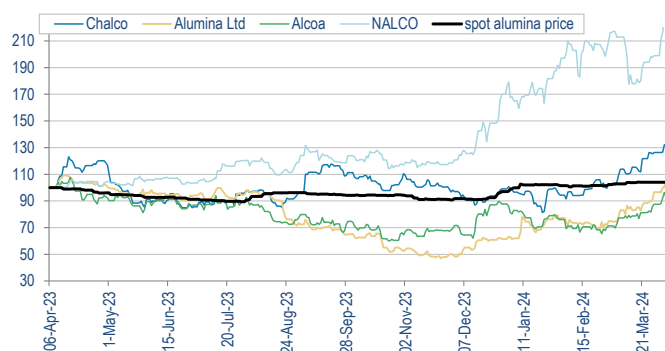
Source: Bloomberg, Morgan Stanley Research

Exhibit95: Aluminium (small-medium cap)



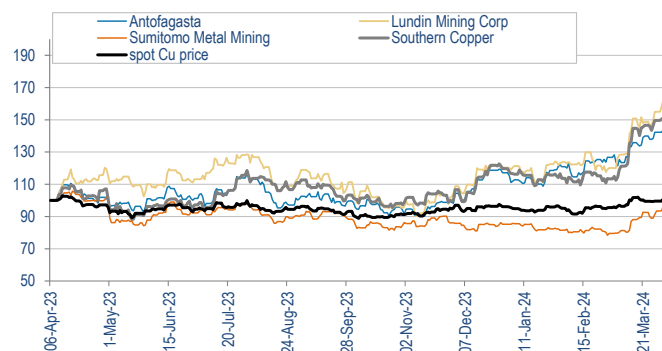
Source: Bloomberg, Morgan Stanley Research

Exhibit96: Alumina



Source: Bloomberg, Morgan Stanley Research

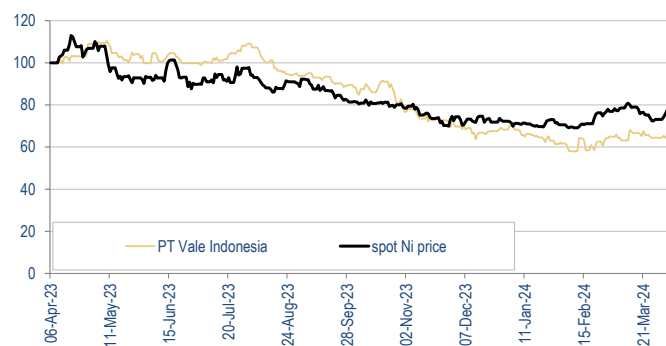
Exhibit 97: Copper



Source: Bloomberg, Morgan Stanley Research

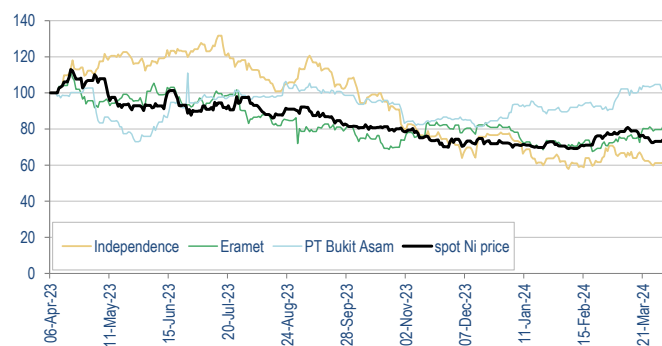
Nickel

Exhibit98: Nickel (large cap)



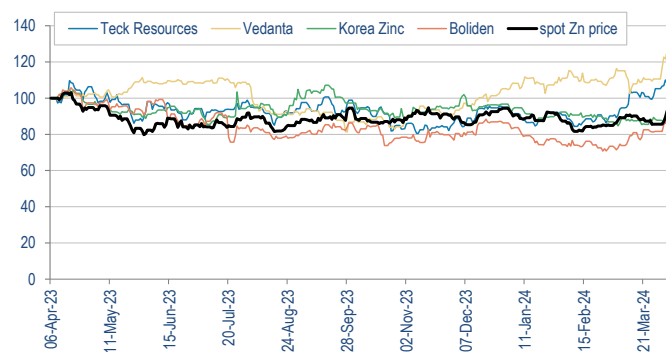
Source: Bloomberg, Morgan Stanley Research

Exhibit 99: Nickel (small-medium cap)



Source: Bloomberg, Morgan Stanley Research

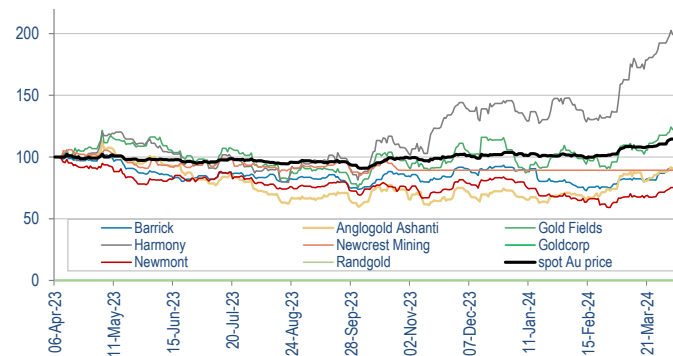
Exhibit 100: Zinc



Source: Bloomberg, Morgan Stanley Research

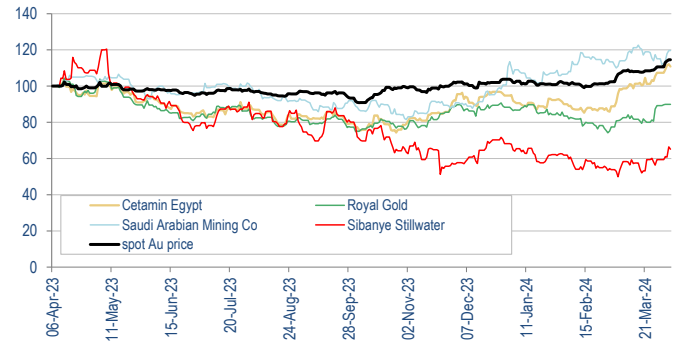
Precious Metals

Exhibit101: Gold (large cap)



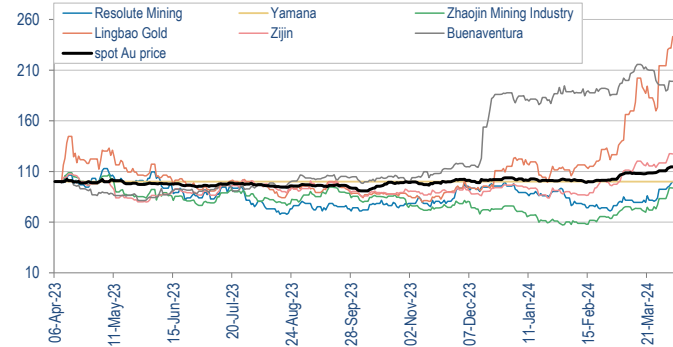
Source: Bloomberg, Morgan Stanley Research

Exhibit102: Gold (small cap)



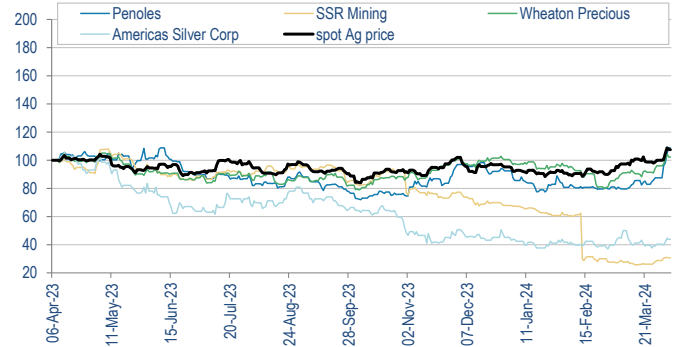
Source: Bloomberg, Morgan Stanley Research

Exhibit103: Gold (small cap)



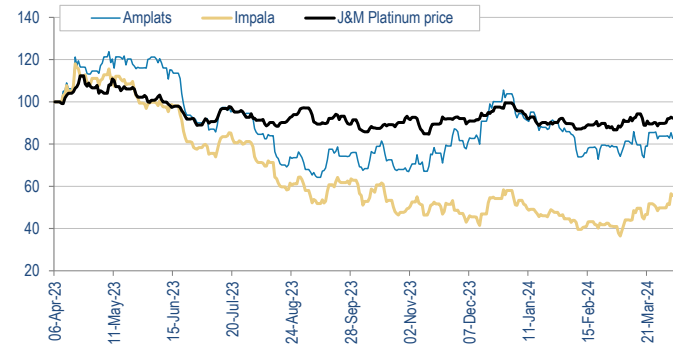
Source: Bloomberg, Morgan Stanley Research

Exhibit104: Silver



Source: Bloomberg, Morgan Stanley Research

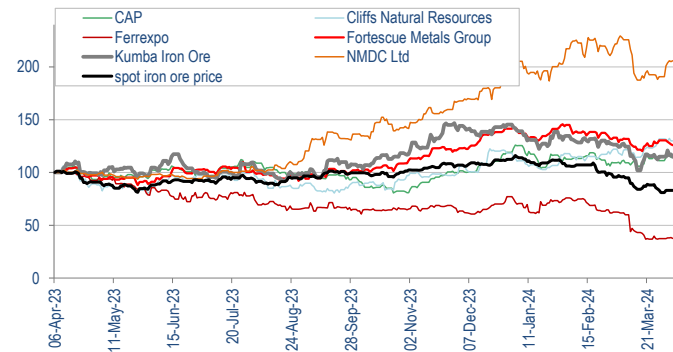
Exhibit105: PGMs



Source: Bloomberg, Morgan Stanley Research

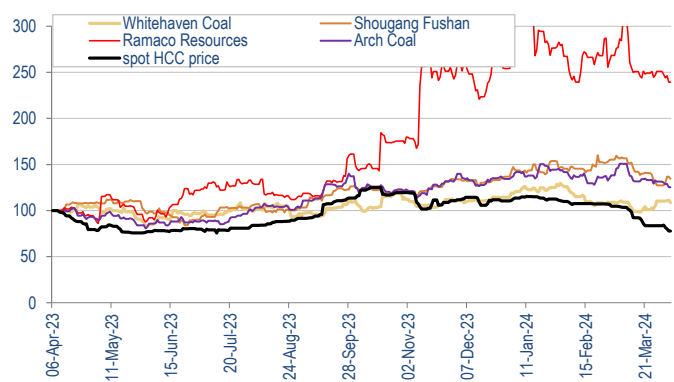
Bulks – Iron Ore, Metallurgical Coal

Exhibit106: Iron ore



Source: Bloomberg, Morgan Stanley Research

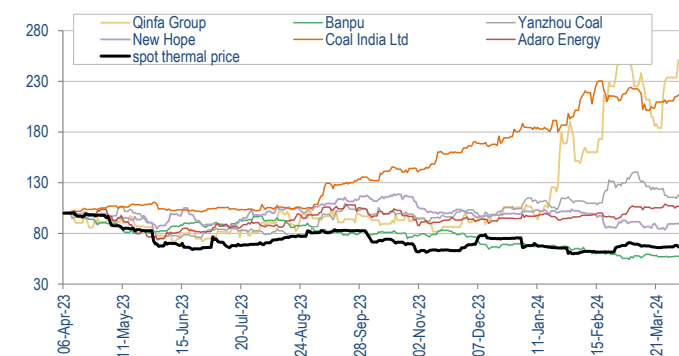
Exhibit107: Metallurgical coal



Source: Bloomberg, Morgan Stanley Research

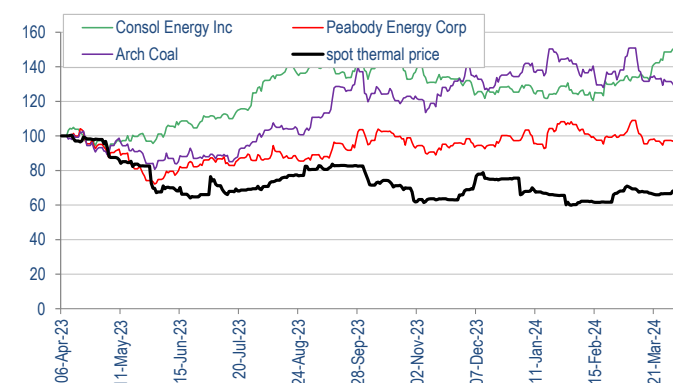
Energy – Thermal Coal, Uranium, Oil

Exhibit108: Thermal coal – Asia



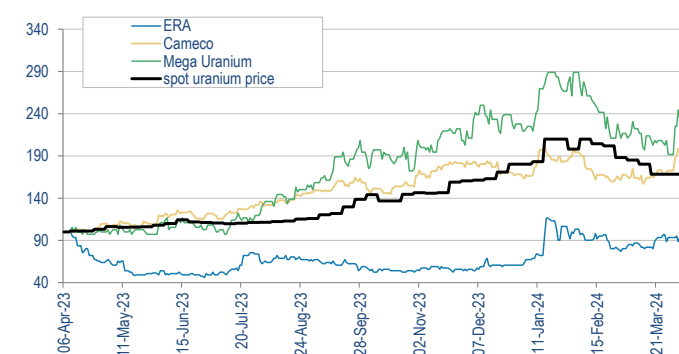
Source: Bloomberg, Morgan Stanley Research

Exhibit 109: Thermal coal – North America



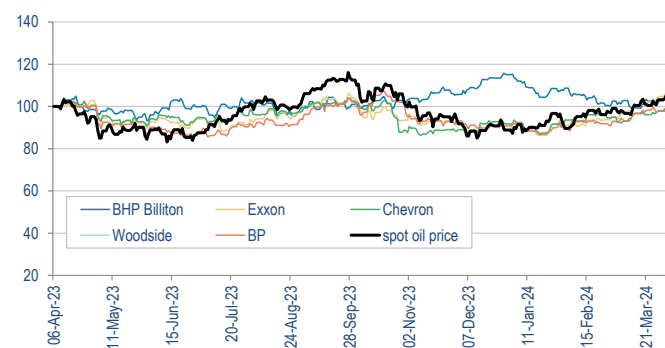
Source: Bloomberg, Morgan Stanley Research

Exhibit110: Uranium



Source: Bloomberg, Morgan Stanley Research

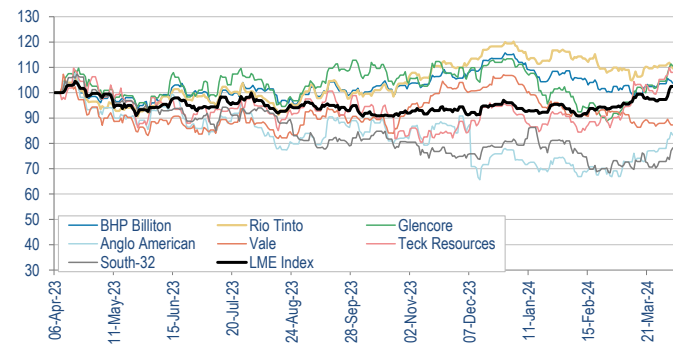
Exhibit111: Oil



Source: Bloomberg, Morgan Stanley Research

Diversifieds

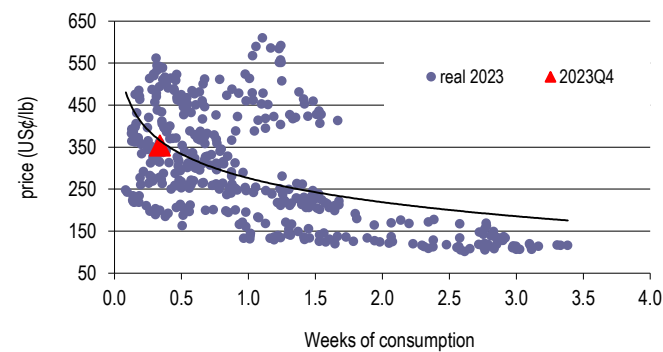
Exhibit112: Diversifieds



Source: Bloomberg, Morgan Stanley Research

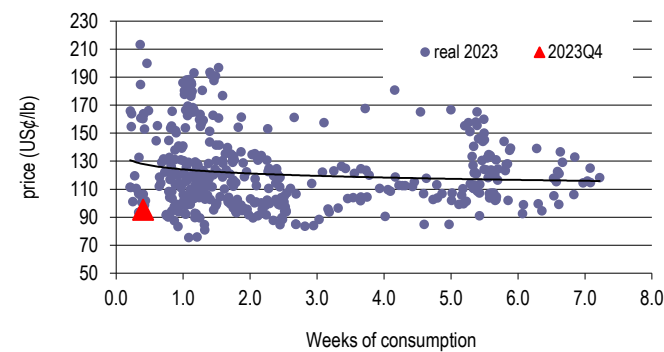
Pinch diagrams

Exhibit 113: Copper



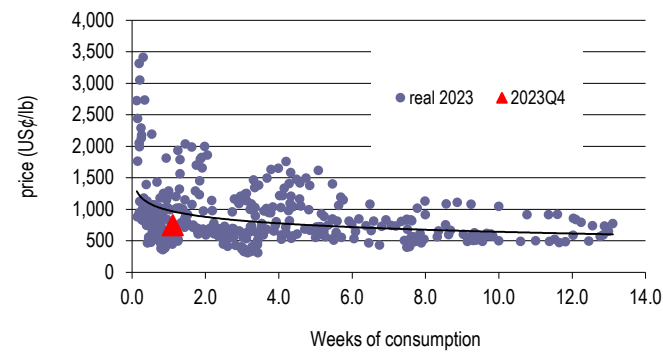
Source: LME, Bloomberg, WBMS, Morgan Stanley Research

Exhibit 114: Aluminium



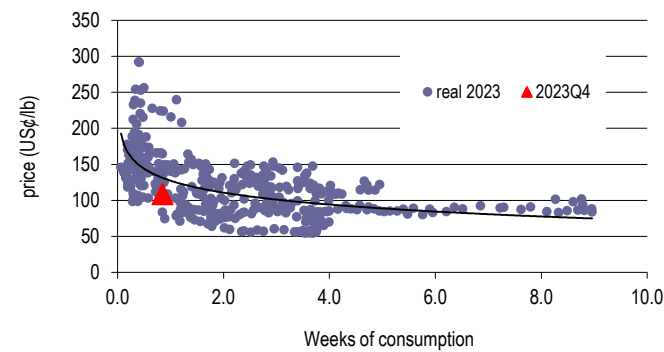
Source: LME, Bloomberg, WBMS, Morgan Stanley Research

Exhibit 115: Nickel



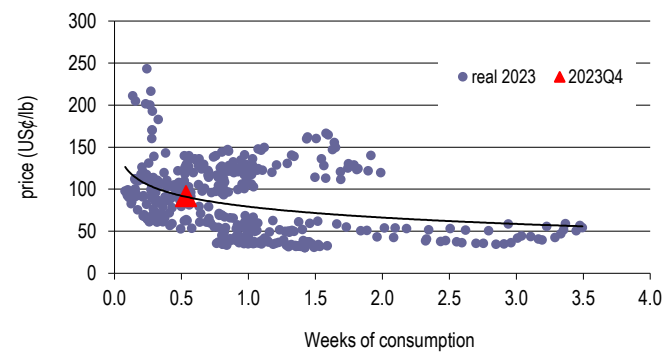
Source: LME, Bloomberg, WBMS, Morgan Stanley Research

Exhibit 116: Zinc



Source: LME, Bloomberg, WBMS, Morgan Stanley Research

Exhibit 117: Lead



Source: LME, Bloomberg, WBMS, Morgan Stanley Research

Key Morgan Stanley Forecasts

Exhibit118: Base metal price forecasts

Period	Aluminium			Copper			Nickel			Zinc		
	Bull	Base US\$/lb	Bear	Bull	Base US\$/lb	Bear	Bull	Base US\$/lb	Bear	Bull	Base US\$/lb	Bear
2024e	1.27	1.05	0.84	5.48	4.38	3.51	11.55	8.25	5.78	1.39	1.16	0.99
2025e	1.28	1.07	0.85	5.29	4.41	3.62	11.02	8.16	5.72	1.47	1.22	1.10
2026e	1.31	1.09	0.89	5.27	4.22	3.59	11.63	8.62	6.03	1.59	1.27	1.14
2027e	1.47	1.18	1.00	5.31	4.08	3.67	12.25	9.07	6.35	1.64	1.32	1.18
2028e	1.64	1.32	1.12	5.55	4.11	3.70	12.21	9.39	6.57	1.64	1.32	1.18
2029e	1.64	1.32	1.12	5.55	4.11	3.70	12.21	9.39	6.57	1.58	1.32	1.12
LT nom.	1.47	1.28	1.15	5.25	4.04	3.44	12.21	9.39	6.57	1.41	1.28	1.02

Source: Morgan Stanley Commodities Research estimates (e)

Exhibit119: Precious metals price forecasts

Period	Gold			Silver			Platinum			Palladium		
	Bull	Base US\$/oz	Bear	Bull	Base US\$/oz	Bear	Bull	Base US\$/oz	Bear	Bull	Base US\$/oz	Bear
2024e	2,663	2,219	1,886	32.13	25.71	19.28	1,178	981	785	1,270	1,059	741
2025e	2,487	2,163	1,946	34.04	28.36	22.69	1,470	1,225	980	1,430	1,100	770
2026e	2,500	2,000	1,800	40.00	28.57	24.29	1,857	1,429	1,286	1,200	1,000	700
2027e	2,340	1,800	1,674	38.57	25.71	23.14	1,913	1,472	1,325	1,223	1,019	713
2028e	2,520	1,800	1,710	37.29	25.71	23.14	1,948	1,499	1,349	1,335	1,113	779
2029e	2,310	1,650	1,568	34.18	23.57	21.21	1,959	1,507	1,356	1,455	1,213	970
LT nom.	2,258	1,613	1,452	29.96	23.04	19.59	1,950	1,500	1,350	1,489	1,241	993

Source: Morgan Stanley Commodities Research estimates (e)

Exhibit 120: Bulks Price Forecasts

Period	Iron Ore (spot)			Hard Coking Coal (spot)			Thermal Coal			Manganese ore (44%)			Lithium (fob LatAm)			Uranium (spot)		
	Bull	Base US\$/t	Bear	Bull	Base US\$/t	Bear	Bull	Base US\$/t	Bear	Bull	Base US\$/lb	Bear	Bull	Base US\$/lb	Bear	Bull	Base US\$/lb	Bear
2024e	179	119	83	414	276	193	223	124	50	4.3	4.3	3.0	42,500	21,250	12,750	112	86	60
2025e	168	105	84	390	260	182	236	105	74	6.0	5.0	4.0	30,000	15,000	9,000	91	65	46
2026e	150	100	80	404	238	166	200	100	70	6.3	5.3	4.2	30,000	15,000	9,000	90	60	45
2027e	150	100	80	385	220	176	210	105	74	6.6	5.5	4.4	30,000	15,000	10,500	90	60	48
2028e	143	95	76	320	200	160	193	110	77	6.6	5.5	4.4	28,000	14,000	9,800	93	62	50
2029e	143	95	76	320	200	160	193	110	77	6.6	5.5	4.4	28,000	14,000	9,800	93	62	50
LT nom.	143	95	67	314	196	157	220	126	88	6.5	5.4	4.3	29,956	14,978	8,987	71	47	38

Source: Morgan Stanley Commodities Research estimates (e)

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GLOBAL METALS & MINING TEAM

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Equal-weight/Hold	1730	45%	328	46%	19%	722	45%
Not-Rated/Hold	2	0%	0	0%	0%	1	0%
Underweight/Sell	625	16%	70	10%	11%	232	15%
Total	3,815		717			1594	

Data include common stock and ADRs currently assigned ratings. Investment Banking Clients are companies from whom Morgan Stanley received investment banking compensation in the

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