

# Pulp & Paper Price Tracker

## Arauco has not joined the hardwood price hike for now

Industry Overview

### Tracking global pulp and paper price variations

Our P&P Price Tracker aims to track variations in P&P prices across the globe as well as regional simplified cash margins. We also provide snippets of news articles discussing prices and market color, as well as industry data updates.

We hope it's useful. Any suggestions on how to improve it are greatly appreciated.

#### Exhibit 1: Snapshot of weekly Pulp & Paper price movements

Pulp prices down \$0.10/t w/w to \$653.39/t for hardwood and down \$0.09/t w/w to \$738.01/t for softwood

Pulp & Paper Price Reference	Unit	Current Price	w/w Change (USD/t)	w/w Change (%)
<b>Market Pulp - Hardwood</b>				
HW China Net	USD/t	653.39	-0.10	-0.02%
HW China Resale Net (Eucalyptus)	USD/t	641.38	12.96	2.06%
HW Europe List	USD/t	1,165.33	21.45	1.88%
HW Europe Net	USD/t	818.21	15.06	1.88%
HW US List	USD/t	1,235.00	0.00	0.00%
<b>Market Pulp - Softwood</b>				
SW China Net	USD/t	738.01	-0.09	-0.01%
SW China Resale Net (NBSK)	USD/t	717.08	-1.96	-0.27%
SW China Futures Net	USD/t	713.12	8.47	1.20%
SW Europe List	USD/t	1,351.03	1.17	0.09%
SW Europe Net	USD/t	967.81	0.84	0.09%
SW US List	USD/t	1,430.00	0.00	0.00%
<b>Printing &amp; Writing - Uncoated</b>				
China Offset Reel	USD/t	934.31	0.97	0.10%
Europe Offset Reel	USD/t	1,322.31	18.85	1.45%
<b>Printing &amp; Writing - Coated</b>				
China Offset Reel	USD/t	850.85	0.89	0.10%
Europe Offset Reel	USD/t	1,193.93	17.02	1.45%
<b>Packaging - Containerboard</b>				
Kraftliner China	USD/t	558.61	0.58	0.10%
Kraftliner Europe	USD/t	729.32	6.21	0.86%
Testliner China	USD/t	472.23	0.49	0.10%
Testliner Europe	USD/t	524.32	4.49	0.86%
White-top Kraftliner China	USD/t	773.37	0.81	0.10%
White-top Kraftliner Europe	USD/t	902.76	5.08	0.57%
<b>Packaging - Boxboard</b>				
Duplex China	USD/t	499.08	0.52	0.10%
Duplex Europe	USD/t	1,251.71	10.88	0.88%
<b>Old Corrugated Cardboard</b>				
OCC China	USD/t	251.48	0.26	0.10%
OCC Europe	USD/t	107.83	0.92	0.86%
OCC US	USD/t	103.00	0.00	0.00%

Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

08 March 2024

Equity  
Latin America  
Pulp & Paper

**Caio Ribeiro**  
Research Analyst  
BofAS  
+1 646 855 4051  
[caio.ribeiro@bofa.com](mailto:caio.ribeiro@bofa.com)

**Leonardo Neratika >>**  
Research Analyst  
Merrill Lynch (Brazil)  
+55 11 2188 4200  
[leonardo.neratika@bofa.com](mailto:leonardo.neratika@bofa.com)

**Guilherme Rosito >>**  
Research Analyst  
Merrill Lynch (Brazil)  
+55 11 2188 4363  
[guilherme.rosito@bofa.com](mailto:guilherme.rosito@bofa.com)

**George L. Staphos**  
Research Analyst  
BofAS  
+1 646 855 4495  
[george.l.staphos@bofa.com](mailto:george.l.staphos@bofa.com)

>> Employed by a non-US affiliate of BofAS and is not registered/qualified as a research analyst under the FINRA rules.

Refer to "Other Important Disclosures" for information on certain BofA Securities entities that take responsibility for the information herein in particular jurisdictions.

**BofA Securities does and seeks to do business with issuers 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.**

Refer to important disclosures on page 11 to 12.

12668867

Timestamp: 08 March 2024 03:50PM EST

## Weekly news flow

### Asia: Arauco keeping their prices for now

FOEX reported pulp prices down w/w in China this week, with imported hardwood (HW) down \$0.10/t to \$653.39/t and imported softwood (SW) down \$0.09/t w/w to \$738.01/t. Resale prices were mixed w/w with hardwood (BEK; Bleached Eucalyptus Kraft) up \$12.96/t w/w to \$641.38/t, while resale softwood (NBSK; Northern Bleached Softwood Kraft) dropped \$1.96/t w/w to \$717.08/t. Shanghai SW future (May 2024 contract) rose \$8.47/t w/w to \$713.12/t (net of value added-tax [VAT] and logistic costs). Arauco commented this week that the Chinese market outlook was unclear and it was unsure about recently announced hikes absorption. According to the company, they will be watching during the Shanghai Pulp Week to see how the increases are received and for now they were keeping their prices at levels they consider good.

### Europe: pulp prices up easily in February

PPI Europe reported that pulp prices in Europe continued to move up during February. According to the publication, the higher prices were driven by the combination of low inventories, logistical issues, paper demand improvement in Europe, a better-than-expected market in China post Lunar New Year and an increase in the size of discounts in 2024 contracts vs 2023. The last hike was absorbed quite quickly, as buyers were requesting additional volumes. As for the March hikes, sellers were optimistic on passing it through; however, some contacts mentioned the level of \$1,300/t and that sellers would attempt to resist this increase. Meanwhile, the Finnish Transport Union (AKT) announced a strike at the Finnish ports to begin on March 11<sup>th</sup> and end by March 26<sup>th</sup>.

### Americas: pulp prices moving up in Latin America

PPI LatAm reported that pulp prices increased in Latin America, following hikes in other regions. As Brazil prices follow prices in Europe, they are increasing as well. Some of PPI contacts mentioned they can't push back on the increases due to prices following Europe, so they were increasing their use of recycled fiber. The situation for non-integrated paper producers was trickier, with the increase in costs happening at the same time that paper imports from China were increasing.

**Exhibit 2: Summary of Pulp & Paper price movements**

Pulp prices down \$0.10/t w/w to \$653.39/t for hardwood and down \$0.09/t w/w to \$738.01/t for softwood

Pulp & Paper Price Reference	Unit	Current Price	w/w Change (USD/t)	w/w Change (%)	y/y Change	y/y Change (%)	Last Change
<b>Market Pulp - Hardwood</b>							
HW China Net	USD/t	653.39	-0.10	-0.02%	-78.63	-10.74%	8-Mar-24
HW China Resale Net (Eucalyptus)	USD/t	641.38	12.96	2.06%	-60.79	-8.66%	8-Mar-24
HW Europe List	USD/t	1,165.33	21.45	1.88%	-133.70	-10.29%	5-Mar-24
HW Europe Net	USD/t	818.21	15.06	1.88%	-93.87	-10.29%	5-Mar-24
HW US List	USD/t	1,235.00	0.00	0.00%	-255.00	-17.11%	28-Feb-24
<b>Market Pulp - Softwood</b>							
SW China Net	USD/t	738.01	-0.09	-0.01%	-172.06	-18.91%	8-Mar-24
SW China Resale Net (NBSK)	USD/t	717.08	-1.96	-0.27%	-170.09	-19.17%	8-Mar-24
SW China Futures Net	USD/t	713.12	8.47	1.20%	n.a.	n.a.	8-Mar-24
SW Europe List	USD/t	1,351.03	1.17	0.09%	-37.63	-2.71%	5-Mar-24
SW Europe Net	USD/t	967.81	0.84	0.09%	-26.96	-2.71%	5-Mar-24
SW US List	USD/t	1,430.00	0.00	0.00%	-222.50	-13.46%	28-Feb-24
<b>Printing &amp; Writing - Uncoated</b>							
China Offset Reel	USD/t	934.31	0.97	0.10%	-101.86	-9.83%	8-Mar-24
Europe Offset Reel	USD/t	1,322.31	18.85	1.45%	-25.21	-1.87%	8-Mar-24
<b>Printing &amp; Writing - Coated</b>							
China Offset Reel	USD/t	850.85	0.89	0.10%	-22.51	-2.58%	8-Mar-24
Europe Offset Reel	USD/t	1,193.93	17.02	1.45%	-58.19	-4.65%	8-Mar-24
<b>Packaging - Containerboard</b>							
Kraftliner China	USD/t	558.61	0.58	0.10%	-59.33	-9.60%	8-Mar-24
Kraftliner Europe	USD/t	729.32	6.21	0.86%	-112.06	-13.32%	8-Mar-24
Testliner China	USD/t	472.23	0.49	0.10%	-9.89	-2.05%	8-Mar-24
Testliner Europe	USD/t	524.32	4.49	0.86%	-113.20	-17.76%	8-Mar-24
White-top Kraftliner China	USD/t	773.37	0.81	0.10%	-66.53	-7.92%	8-Mar-24
White-top Kraftliner Europe	USD/t	902.76	5.08	0.57%	-42.03	-4.45%	8-Mar-24
<b>Packaging - Boxboard</b>							
Duplex China	USD/t	499.08	0.52	0.10%	-54.11	-9.78%	8-Mar-24
Duplex Europe	USD/t	1,251.71	10.88	0.88%	-192.59	-13.33%	8-Mar-24
<b>Old Corrugated Cardboard</b>							
OCC China	USD/t	251.48	0.26	0.10%	-8.10	-3.12%	8-Mar-24
OCC Europe	USD/t	107.83	0.92	0.86%	30.90	40.16%	8-Mar-24
OCC US	USD/t	103.00	0.00	0.00%	70.00	212.12%	1-Mar-24
<b>Margins - China</b>							
Uncoated Paper	USD/t	280.92	1.07	0.38%	-23.23	-7.64%	8-Mar-24
Coated Paper	USD/t	197.46	0.99	0.50%	56.12	39.71%	8-Mar-24
Kraftliner	USD/t	63.86	0.50	0.78%	30.75	92.86%	8-Mar-24
Testliner	USD/t	220.74	0.23	0.10%	-1.79	-0.81%	8-Mar-24
Coated Duplex	USD/t	4.33	0.43	11.15%	35.97	-113.68%	8-Mar-24
White-top Kraftliner	USD/t	77.67	0.90	1.17%	58.81	311.90%	8-Mar-24
<b>Margins - Europe</b>							
Uncoated Paper	USD/t	504.10	3.79	0.76%	68.66	15.77%	8-Mar-24
Coated Paper	USD/t	375.72	1.96	0.52%	35.68	10.49%	8-Mar-24
Kraftliner	USD/t	191.50	5.33	2.86%	-114.03	-37.32%	8-Mar-24
Testliner	USD/t	416.49	3.58	0.87%	-144.09	-25.70%	8-Mar-24
Coated Duplex	USD/t	283.91	10.04	3.67%	-165.64	-36.85%	8-Mar-24
White-top Kraftliner	USD/t	-65.04	4.24	-6.12%	-15.08	30.18%	8-Mar-24
<b>Pulp Spreads</b>							
HW Europe - China (Net)	USD/t	164.82	15.16	40.74%	-15.24	-8.47%	8-Mar-24
SW Europe - China (Net)	USD/t	229.80	0.93	0.41%	145.10	171.33%	8-Mar-24
SW - HW China	USD/t	84.62	0.01	0.01%	-93.43	-52.47%	8-Mar-24
SW - HW Europe	USD/t	149.59	-14.22	-8.68%	66.92	80.94%	5-Mar-24

Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 3: Pulp & Paper prices period comparison**

Evolution of pulp and paper prices

<b>Pulp &amp; Paper Price Reference</b>	<b>Current Price (USD/t)</b>	<b>Last Week Price</b>	<b>Last Month Price</b>	<b>Last Year Price</b>	<b>12M Average</b>	<b>5Y Average</b>	<b>Source</b>
<b>Market Pulp - Hardwood</b>							
HW China Net	653.39	653.49	653.07	732.02	587.87	615.81	FOEX
HW China Resale Net (Eucalyptus)	641.38	628.41	606.19	702.17	581.88	610.76	RISI
HW Europe List	1,165.33	1,143.88	1,096.92	1,299.03	998.39	978.63	FOEX
HW Europe Net	818.21	803.15	770.18	912.08	701.00	688.14	BofA/FOEX
HW US List	1,235.00	1,235.00	1,175.00	1,490.00	1,174.16	1,184.64	RISI
<b>Market Pulp - Softwood</b>							
SW China Net	738.01	738.10	733.51	910.07	731.68	751.90	FOEX
SW China Resale Net (NBSK)	717.08	719.04	701.39	887.17	723.47	749.60	RISI
SW China Futures Net	713.12	704.66	665.12	n.a.	680.42	n.a.	RISI
SW Europe List	1,351.03	1,349.86	1,301.09	1,388.66	1,250.42	1,143.95	FOEX
SW Europe Net	967.81	966.97	932.03	994.76	895.73	820.46	BofA/FOEX
SW US List	1,430.00	1,430.00	1,380.00	1,652.50	1,397.12	1,399.33	RISI
<b>Printing &amp; Writing - Uncoated</b>							
China Offset Reel	934.31	933.33	933.58	1,036.17	937.05	975.92	RISI
Europe Offset Reel	1,322.31	1,303.47	1,300.48	1,347.53	1,319.47	1,147.41	RISI
<b>Printing &amp; Writing - Coated</b>							
China Offset Reel	850.85	849.96	850.19	873.35	837.89	875.54	RISI
Europe Offset Reel	1,193.93	1,176.92	1,174.22	1,252.13	1,202.79	989.34	RISI
<b>Packaging - Containerboard</b>							
Kraftliner China	558.61	558.03	558.17	617.94	578.02	678.72	RISI
Kraftliner Europe	729.32	723.11	719.53	841.38	764.35	796.90	FOEX
Testliner China	472.23	471.74	471.86	482.12	472.20	591.17	RISI
Testliner Europe	524.32	519.83	524.46	637.52	562.36	605.80	FOEX
White-top Kraftliner China	773.37	772.57	772.77	839.90	789.11	869.78	RISI
White-top Kraftliner Europe	902.76	897.68	898.70	944.80	933.89	922.36	FOEX
<b>Packaging - Boxboard</b>							
Duplex China	499.08	498.55	498.69	553.19	514.45	649.99	RISI
Duplex Europe	1,251.71	1,240.84	1,233.39	1,444.31	1,359.38	n.a.	RISI
<b>Old Corrugated Cardboard</b>							
OCC China	251.48	251.22	251.29	259.58	241.56	331.20	RISI
OCC Europe	107.83	106.92	106.07	76.93	101.79	126.64	FOEX
OCC US	103.00	103.00	91.00	33.00	61.13	72.88	RISI
<b>Margins - China</b>							
Uncoated Paper	280.92	279.84	280.51	304.15	349.18	360.12	FOEX/RISI
Coated Paper	197.46	196.47	197.12	141.33	250.02	259.74	FOEX/RISI
Kraftliner	63.86	63.36	65.77	33.11	91.39	137.17	FOEX/RISI
Testliner	220.74	220.51	220.57	222.54	230.64	259.97	FOEX/RISI
Coated Duplex	4.33	3.89	6.29	-31.64	27.83	108.44	FOEX/RISI
White-top Kraftliner	77.67	76.77	79.48	18.86	129.33	185.93	FOEX/RISI
<b>Margins - Europe</b>							
Uncoated Paper	504.10	500.32	530.30	435.44	618.47	459.27	FOEX/RISI
Coated Paper	375.72	373.77	404.04	340.04	501.79	301.20	FOEX/RISI
Kraftliner	191.50	186.17	200.48	305.53	265.59	323.35	FOEX
Testliner	416.49	412.91	418.38	560.58	460.57	479.16	FOEX
Coated Duplex	283.91	273.87	301.36	449.55	463.65	443.38	FOEX/RISI
White-top Kraftliner	-65.04	-69.28	-33.33	-49.96	38.16	101.90	FOEX
<b>Pulp Spreads</b>							
HW Europe - China (Net)	164.82	149.66	117.11	180.06	113.12	72.33	FOEX
SW Europe - China (Net)	229.80	228.87	198.52	84.69	164.05	68.56	FOEX
SW - HW China	84.62	84.61	80.44	178.05	143.81	136.09	FOEX
SW - HW Europe	149.59	163.82	161.85	82.68	194.74	132.32	FOEX

Source: Fastmarkets FOEX, Fastmarkets RISI

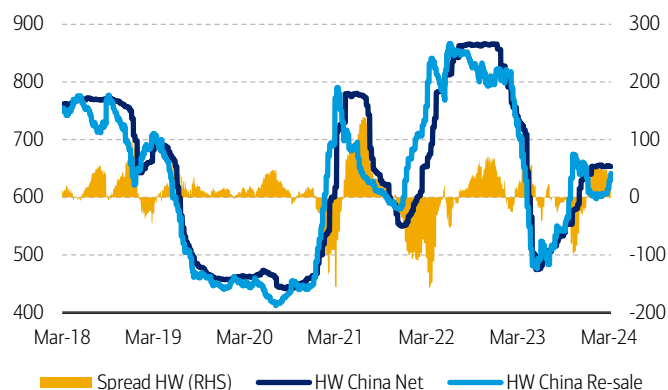
BofA GLOBAL RESEARCH

# Key charts

## Main global pulp price references

### Exhibit 4: China HW net price (US\$/t)

Hardwood prices rebounded from the bottom of ~\$480/t

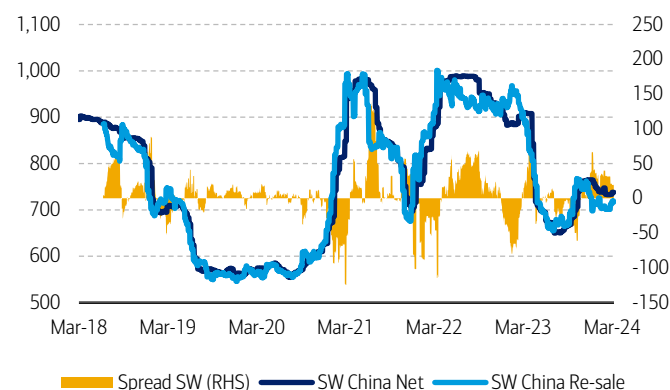


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

### Exhibit 5: China SW net price (US\$/t)

Softwood prices began to drop

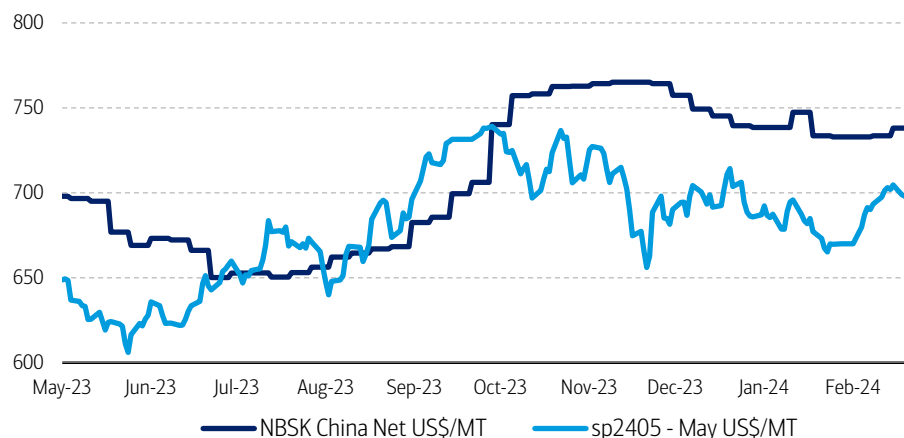


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

### Exhibit 6: Shanghai softwood pulp futures (May 2024 contract [sp2405], US\$/t, net\*) vs. PIX NBSK China net (US\$/t)

The most traded pulp future contract (May 2024; sp2405) has rebounded recently



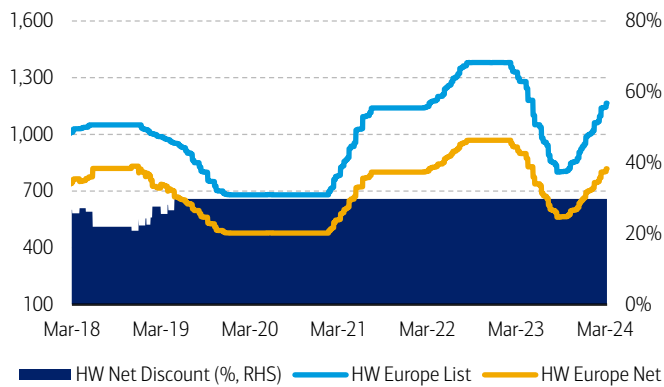
Source: Shanghai Futures Exchange, Fastmarkets FOEX

\*Net of VAT (13%) and logistic costs (estimated at RMB 150/MT)

BofA GLOBAL RESEARCH

**Exhibit 7: Europe HW list vs. net price (US\$/t)**

Europe Hardwood list prices are still rebounding

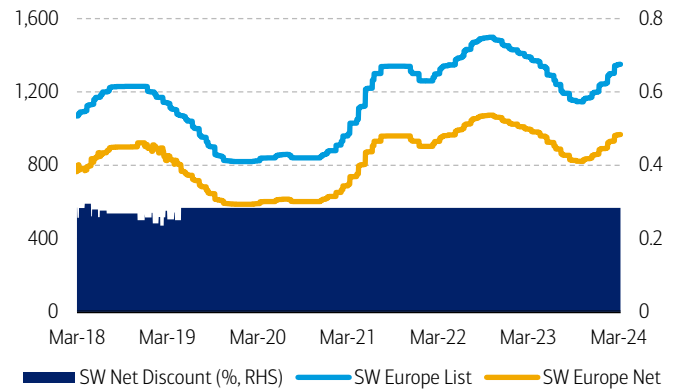


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 8: Europe SW list vs. net price (US\$/t)**

As for Softwood, list prices are rebounding slightly

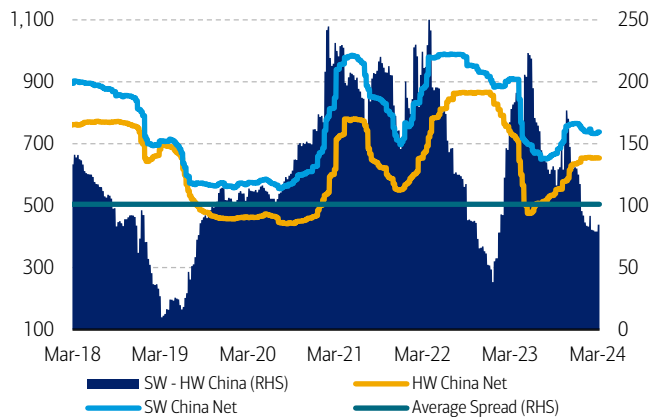


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 9: China SW – HW spread (US\$/t)**

SW-HW spreads in China are below the historical average

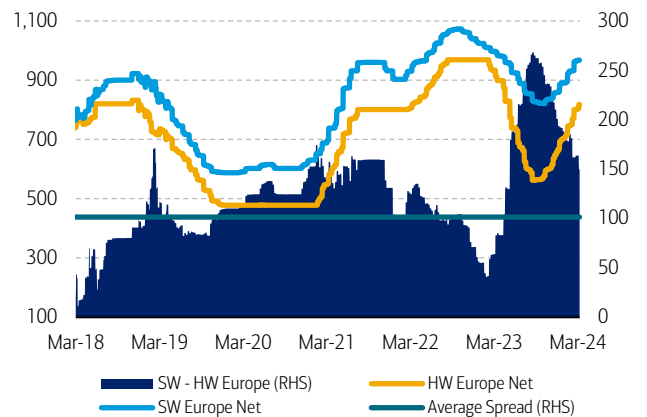


Source: BofA Global Research, Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 10: Europe SW – HW spread (US\$/t)**

SW-HW spreads in Europe have been trading above its historical avg

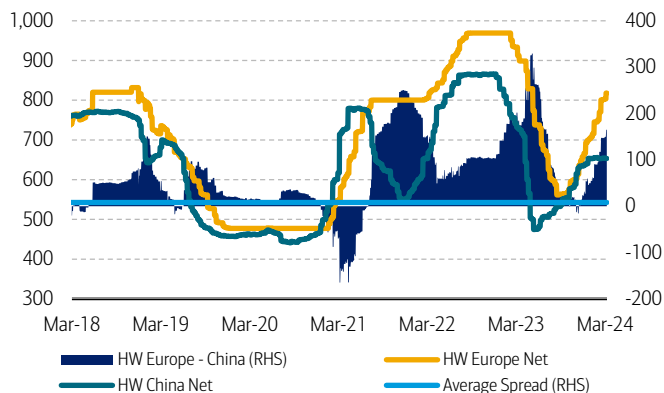


Source: BofA Global Research, Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 11: Europe HW vs. China HW price (US\$/t)**

Europe prices are at a premium to prices in China

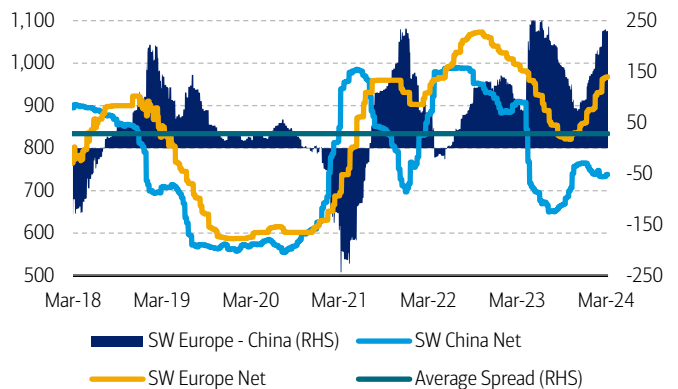


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 12: Europe SW vs. China SW price (US\$/t)**

As for Softwood, EU-CH spread has been increasing

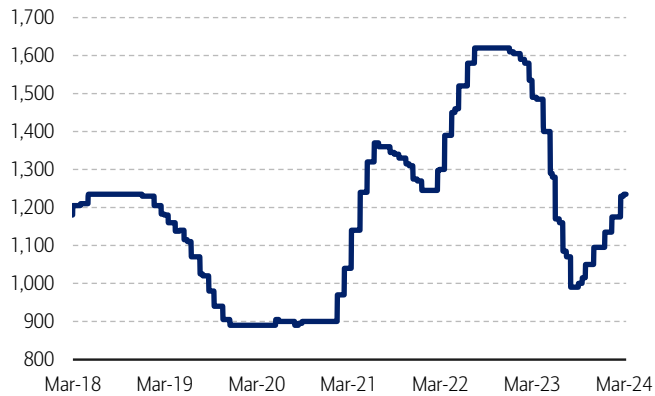


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 13: US HW list price (US\$/t)**

US hardwood prices increased from the bottom

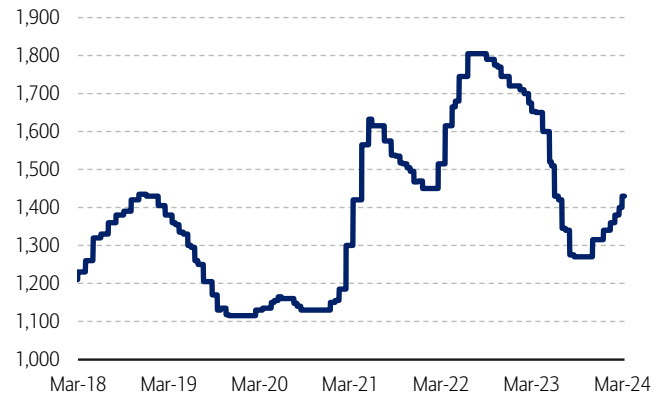


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 14: US SW list price (US\$/t)**

US softwood prices have remained close to the bottom

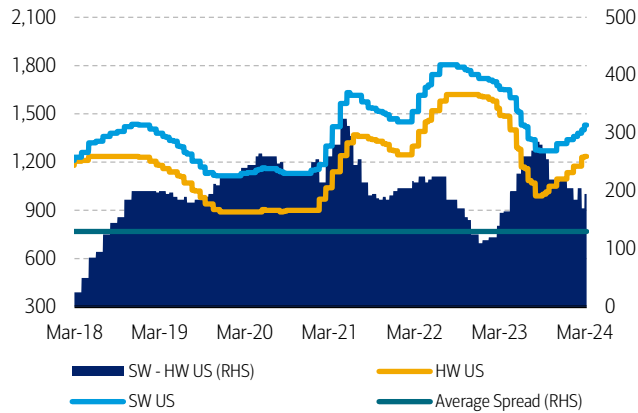


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 15: US SW-HW spread (US\$/t)**

Even after the increase in spreads from 2020 and early 2021, current value is still well above historical avg of ~US\$124/t



Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 16: US OCC (US\$/t)**

OCC prices have recovered from the recent bottom



Source: Fastmarkets FOEX, Fastmarkets RISI

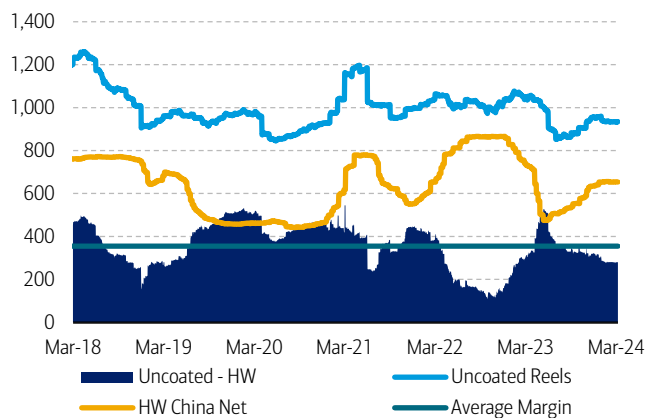
BofA GLOBAL RESEARCH

# Key charts

## Main global paper price references

### Exhibit 17: China uncoated reels price and margin (US\$/t)

China uncoated margins trading close to the historical avg of ~US\$360/t

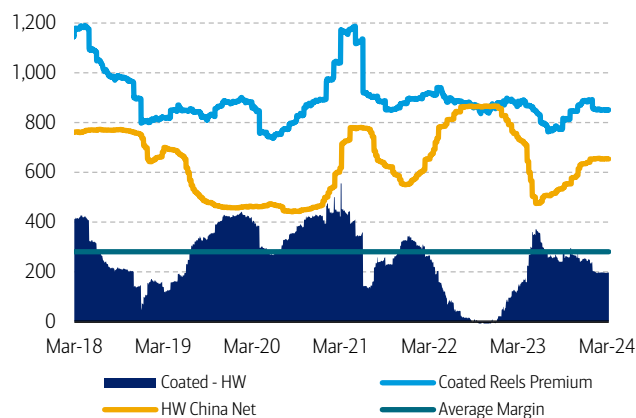


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

### Exhibit 18: China coated reels price and margin (US\$/t)

China coated margins are close to the historical avg of ~US\$280/t

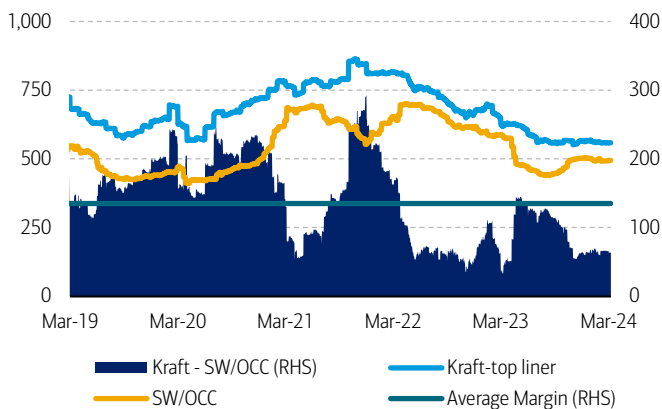


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

### Exhibit 19: China kraftliner (US\$/t)

After peak in October 2021, kraftliner margins in China dropped and are now below to avg. of ~US\$150/t

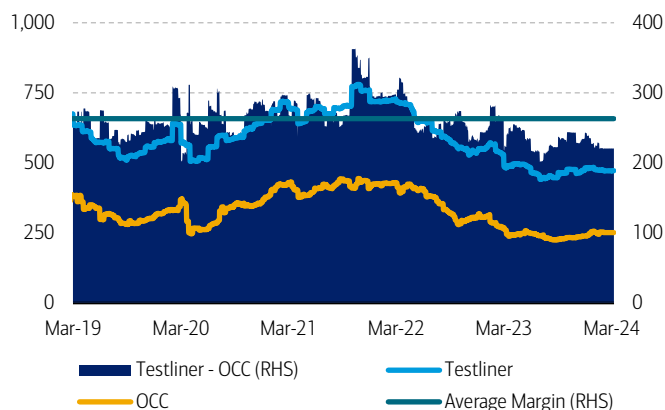


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

### Exhibit 20: China testliner (US\$/t)

Testliner margins are below the historical margin



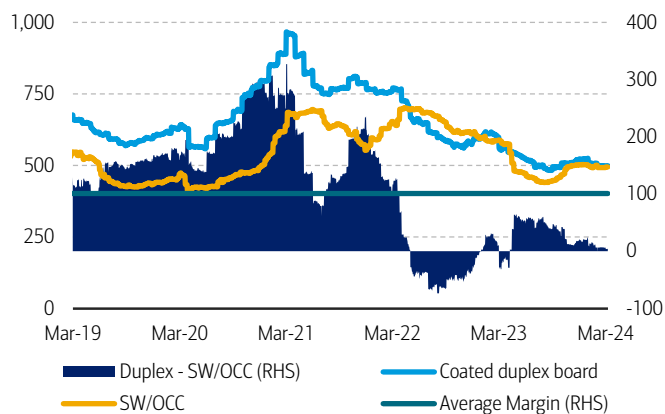
Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH



**Exhibit 21: China duplex (US\$/t)**

After recent peak in November, duplex margins in China started to drop and are now below the avg of ~US\$130/t

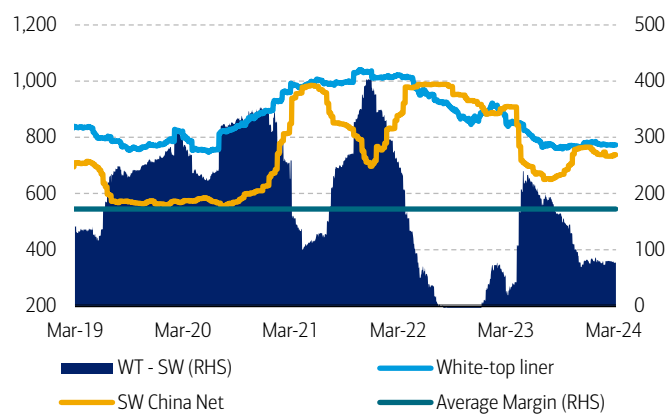


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 22: China white-top liner (US\$/t)**

White-top liner also suffered pressure in margins by April 2021, and now returned to levels below avg

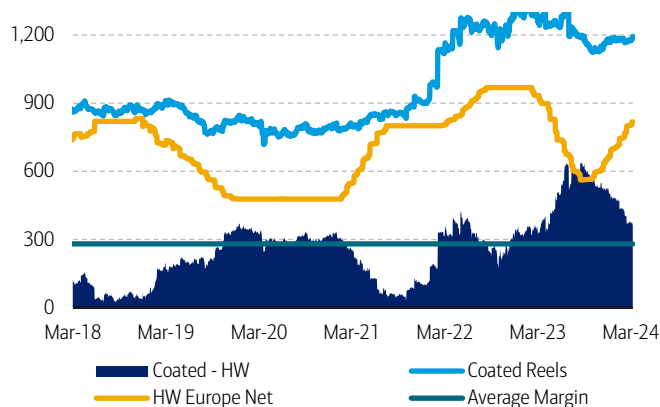


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 23: China ivory board (US\$/t)**

Ivory board margin in China is now above the average of ~US\$260/t

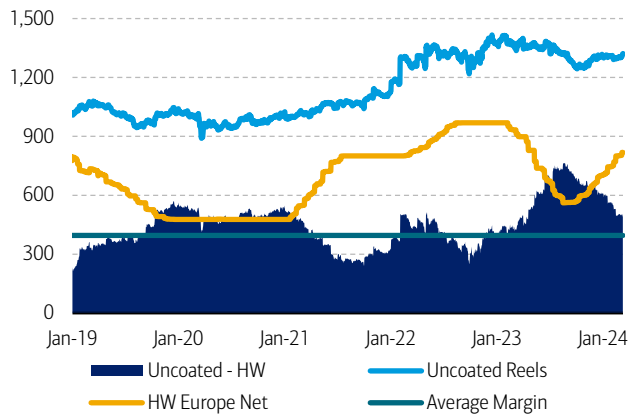


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 24: Europe uncoated reels (US\$/t)**

For uncoated in Europe, margins are recently high, and trading above its historical avg of ~US\$380/t

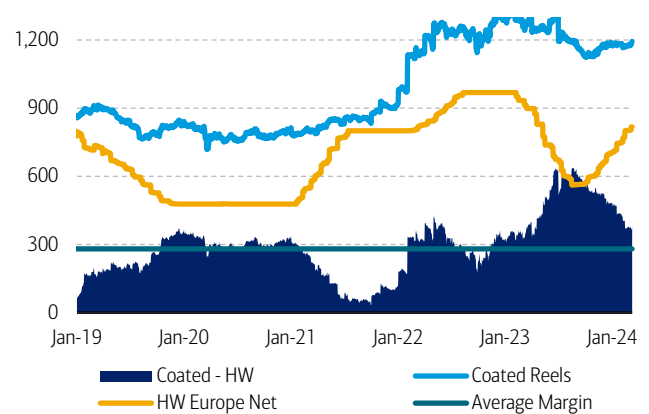


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 25: Europe coated reels (US\$/t)**

Margins for coated in Europe recovered from low level reached after peak in 2020 and early 2021

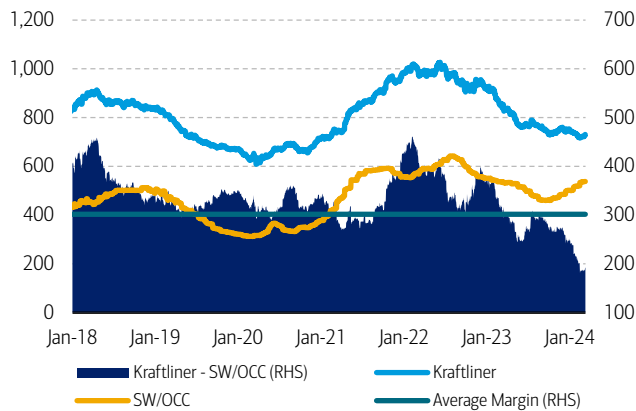


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 26: Europe kraftliner (US\$/t)**

Kraftliner margins are currently below the historical average

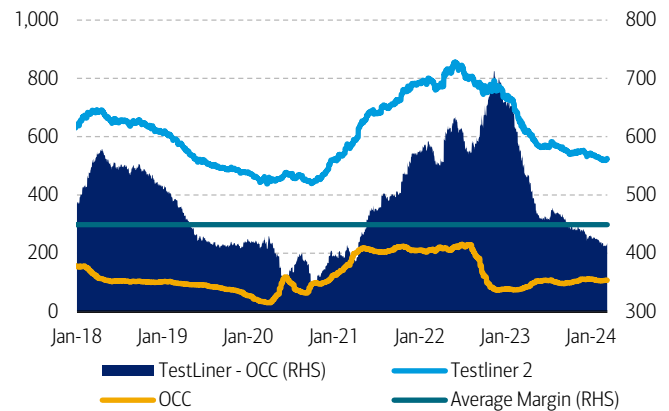


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 27: Europe testliner (US\$/t)**

Testliner margins are currently below the historical average

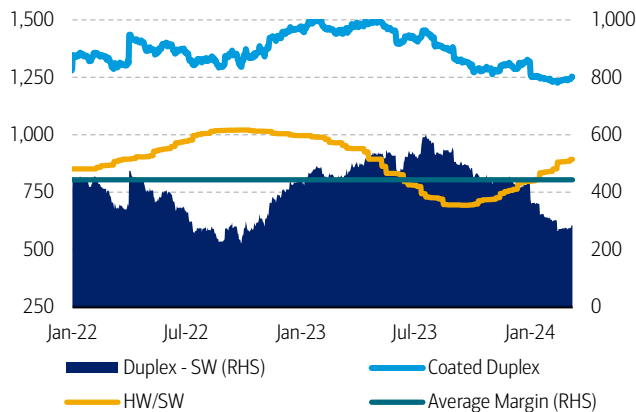


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 28: Europe duplex (US\$/t)**

Margins for duplex in Europe are close to the historical average

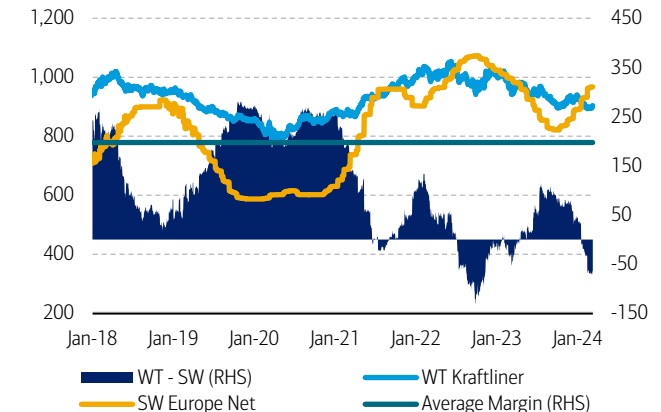


Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

**Exhibit 29: Europe white-top liner (US\$/t)**

WT kraftliner margins are currently low



Source: Fastmarkets FOEX, Fastmarkets RISI

BofA GLOBAL RESEARCH

# Disclosures

## Important Disclosures

BofA Global Research personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

## Other Important Disclosures

From time to time research analysts conduct site visits of covered issuers. BofA Global Research policies prohibit research analysts from accepting payment or reimbursement for travel expenses from the issuer for such visits.

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for any recommendation in relation to an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report and in relation to a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including BofA Securities trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

Recipients who are not institutional investors or market professionals should seek the advice of their independent financial advisor before considering information in this report in connection with any investment decision, or for a necessary explanation of its contents.

Officers of BofAS or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

Refer to [BofA Global Research policies relating to conflicts of interest](#).

**"BofA Securities" includes BofA Securities, Inc. ("BofAS") and its affiliates. Investors should contact their BofA Securities representative or Merrill Global Wealth Management financial advisor if they have questions concerning this report or concerning the appropriateness of any investment idea described herein for such investor. "BofA Securities" is a global brand for BofA Global Research.**

### Information relating to Non-US affiliates of BofA Securities and Distribution of Affiliate Research Reports:

BofAS and/or Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") may in the future distribute, information of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); BofASE (France): BofA Securities Europe SA is authorized by the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers (AMF). BofA Securities Europe SA ("BofASE") with registered address at 51, rue La Boétie, 75008 Paris is registered under no 842 602 690 RCS Paris. In accordance with the provisions of French Code Monétaire et Financier (Monetary and Financial Code), BofASE is an établissement de crédit et d'investissement (credit and investment institution) that is authorised and supervised by the European Central Bank and the Autorité de Contrôle Prudentiel et de Résolution (ACPR) and regulated by the ACPR and the Autorité des Marchés Financiers. BofASE's share capital can be found at [www.bofam.com/BofASEdisclaimer](http://www.bofam.com/BofASEdisclaimer); BofA Europe (Milan): Bank of America Europe Designated Activity Company, Milan Branch, regulated by the Bank of Italy, the European Central Bank (ECB) and the Central Bank of Ireland (CBI); BofA Europe (Frankfurt): Bank of America Europe Designated Activity Company, Frankfurt Branch regulated by BaFin, the ECB and the CBI; BofA Europe (Madrid): Bank of America Europe Designated Activity Company, Sucursal en España, regulated by the Bank of Spain, the ECB and the CBI; Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSF); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Canadian Investment Regulatory Organization; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; BofAS Japan: BofA Securities Japan Co., Ltd., regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International, LLC Seoul Branch, regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; BofAS India: BofA Securities India Limited, regulated by the Securities and Exchange Board of India (SEBI); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Brazil): Merrill Lynch S.A. Corretora de Títulos e Valores Mobiliários, regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company: Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This information has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK), which is authorized by the PRA and regulated by the FCA and the PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been approved for publication and is distributed in the European Economic Area (EEA) by BofASE (France), which is authorized by the ACPR and regulated by the ACPR and the AMF; has been considered and distributed in Japan by BofAS Japan, a registered securities dealer under the Financial Instruments and Exchange Act in Japan, or its permitted affiliates; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSF; is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by BofAS India; and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch (Singapore) (Company Registration No 198602883D). Merrill Lynch (Singapore) is regulated by MAS. Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distributes this information in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of Bank of America N.A., Australia Branch, neither MLEA nor any of its affiliates involved in preparing this information is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this information in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Information prepared and issued by Merrill Lynch (DIFC) is done so in accordance with the requirements of the DFSA conduct of business rules. BofA Europe (Frankfurt) distributes this information in Germany and is regulated by BaFin, the ECB and the CBI. BofA Securities entities, including BofA Europe and BofASE (France), may outsource/delegate the marketing and/or provision of certain research services or aspects of research services to other branches or members of the BofA Securities group. You may be contacted by a different BofA Securities entity acting for and on behalf of your service provider where permitted by applicable law. This does not change your service provider. Please refer to the [Electronic Communications Disclaimers](#) for further information.

This information has been prepared and issued by BofAS and/or one or more of its non-US affiliates. The author(s) of this information 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. BofAS and/or MLPF&S is the distributor of this information in the US and accepts full responsibility for information distributed to BofAS and/or MLPF&S clients in the US by its non-US affiliates. Any US person receiving this information and wishing to effect any transaction in any security discussed herein should do so through BofAS and/or MLPF&S and not such foreign affiliates. Hong Kong recipients of this information should contact Merrill Lynch (Asia Pacific) Limited in respect of any matters relating to dealing in securities or provision of specific advice on securities or any other matters arising from, or in connection with, this information. Singapore recipients of this information should contact Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this information. For clients that are not accredited investors, expert investors or institutional investors Merrill Lynch (Singapore) Pte Ltd accepts full responsibility for the contents of this information distributed to such clients in Singapore.

### General Investment Related Disclosures:

Taiwan Readers: Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Securities. This document provides general information only, and has been prepared for, and is intended for general distribution to, BofA Securities clients. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This document is not intended to provide personal investment advice and it does not take into account the specific investment objectives,



financial situation and the particular needs of, and is not directed to, any specific person(s). This document and its content do not constitute, and should not be considered to constitute, investment advice for purposes of ERISA, the US tax code, the Investment Advisers Act or otherwise. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this document and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this document.

Securities and other financial instruments referred to herein, or recommended, offered or sold by BofA Securities, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. Digital assets are extremely speculative, volatile and are largely unregulated. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Securities is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned herein. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

BofAS or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. BofAS or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Securities, through business units other than BofA Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented herein. Such ideas or recommendations may reflect different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Securities is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this information.

In the event that the recipient received this information pursuant to a contract between the recipient and BofAS for the provision of research services for a separate fee, and in connection therewith BofAS may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom BofAS has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by BofAS). If such recipient uses the services of BofAS in connection with the sale or purchase of a security referred to herein, BofAS may act as principal for its own account or as agent for another person. BofAS is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities referred to herein.

#### Copyright and General Information:

Copyright 2024 Bank of America Corporation. All rights reserved. iQdatabase® is a registered service mark of Bank of America Corporation. This information is prepared for the use of BofA Securities clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Securities. BofA Global Research information is distributed simultaneously to internal and client websites and other portals by BofA Securities and is not publicly-available material. Any unauthorized use or disclosure is prohibited. Receipt and review of this information constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained herein (including any investment recommendations, estimates or price targets) without first obtaining express permission from an authorized officer of BofA Securities.

Materials prepared by BofA Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Securities, including investment banking personnel. BofA Securities has established information barriers between BofA Global Research and certain business groups. As a result, BofA Securities does not disclose certain client relationships with, or compensation received from, such issuers. To the extent this material discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this material. BofA Global Research personnel's knowledge of legal proceedings in which any BofA Securities entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this material is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Securities in connection with the legal proceedings or matters relevant to such proceedings.

This information has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of BofAS any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Securities and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This information may contain links to third-party websites. BofA Securities is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this information and is not incorporated by reference. The inclusion of a link does not imply any endorsement by or any affiliation with BofA Securities. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Securities is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

All opinions, projections and estimates constitute the judgment of the author as of the date of publication and are subject to change without notice. Prices also are subject to change without notice. BofA Securities is under no obligation to update this information and BofA Securities ability to publish information on the subject issuer(s) in the future is subject to applicable quiet periods. You should therefore assume that BofA Securities will not update any fact, circumstance or opinion contained herein.

Certain outstanding reports or investment opinions relating to securities, financial instruments and/or issuers may no longer be current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with BofAS or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Securities nor any officer or employee of BofA Securities accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this information.