

02 May 2024 13:34:37 ET | 22 pages

Global Commodities

ICE Softs Monthly: Peak cocoa and sugar, with strong-ish coffee?

CITI'S TAKE

The 'low liquidity' c32% technical price unwind across cocoa terminal markets gives us more confidence that bean prices peaked this cycle just shy of our 0-3m [tactical bullish target of \\$12,500/t](#) which we now m-t-m to \$8,500/t. For the first time this calendar year, we leave our mean [cocoa price forecast unchanged](#) for 2024E and 2025E at \$7,000/t and \$5,000/t. We remain bearish new-crop cocoa forwards. For ICE sugar, the price peaks of 4Q'23 seem distant and trading is likely to stabilize in a \$0.19-0.22/lb band through 2024/25. Adverse CS Brazil weather could damp export flows and short spec positioning suggests premiums might be a bit too light here, but fundamental supply/demand also looks looser than physical balances implied this past winter. We upgrade our Arabica coffee [price forecast](#) in part due to tightness in Robusta grades. Markets holding ~\$2/lb levels could sustain, on average, over the next 6-9m.

As of the COT reporting period ending 23rd April, the money manager (MM) gross long/short (l/s) ratio for NY cocoa fell about 0.1x to 1.8x, continuing its thinly traded downtrend since the start of 2024, and in line with its 2Y average of 1.8x. Overall, ICE cocoa positioning has deteriorated and, although still net long at 14k lots, sits at its lowest level YTD. The MM l/s ratio for ICE coffee made a YTD high last month, although it was slightly lower in latest data at 8.1x, which is significantly above the 2Y average of 3.0x. Some ICE funds may have rotated out of cocoa and into Arabica coffee, in our view. Indeed, net long positioning for coffee was at a 5Y high in mid-April. Our short-term momentum model reads neutral pricing for both ICE coffee and NY cocoa, as prices should consolidate in the next 5-10 days. **Meanwhile, the MM l/s ratio for sugar weakened to its lowest level since 2022, at 1.1x which is well below the 2Y average of 3.7x.** Funds decreased their net longs to just 11k lots for raw sugar, coming well off the level of 89k lots at the beginning of April and setting up for a potential flip to net short positioning. Momentum signals are neutral-bearish pricing for sugar, led by lower relative strength index ranking in the historical lookback period. **Commercial long activity has been weak throughout the softs, likely due to margin pressure and volatility.** For NY cocoa and raw sugar, consumers have been decreasing their gross long positions YTD, while coffee has remained range bound for merchants. Producers remain net short across all the softs which has been consistent since the beginning of the year.

Significant bear-spreading across the NY cocoa strip for both old-crop/new-crop curves (e.g. Jul-Dec) and new-crop calendar spreads (e.g. Mar-May) suggests the market could be gearing up for: A. Deeper demand destruction in 2Q'24 versus 1Q'24; and/or B. 2024/25 physical markets are likely to be in balance or surplus. This is a volatile and unprecedented cocoa market, but [Bloomberg News](#) (4/29) reports indicating that the industry was deferring bean purchases and were faced with margin pressure puts downside risk to processing demand, in our view. That said, exchange stocks continue to draw in the US and Europe, suggesting curve backwardation for cocoa is unlikely to revert to contango. On the raw sugar side, the massive curve flattening to slight carry reflects looser trade flow balances. For Arabica coffee, flat price is well-off the peaks, but timespreads (e.g. Jul-Dec) have been strong, suggesting healthy demand and roaster switching.

See Appendix A-1 for Analyst Certification, Important Disclosures and Research Analyst Affiliations.

Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that the Firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision. Certain products (not inconsistent with the author's published research) are available only on Citi's portals.

Aakash Doshi^{AC}

+1-212-723-3872

aakash.doshi@citi.com
Kenny Xunyuan Hu, CFA^{AC}

+65-6657-3873

kenny.x.hu@citi.com
Maggie Xueting Lin^{AC}

+852-2501-2796

maggie.x.lin@citi.com
Arkady Gevorkyan^{AC}

+1-212-723-1051

arkady.gevorkyan@citi.com
With thanks to

Asim Rahim

ICE Softs Monthly

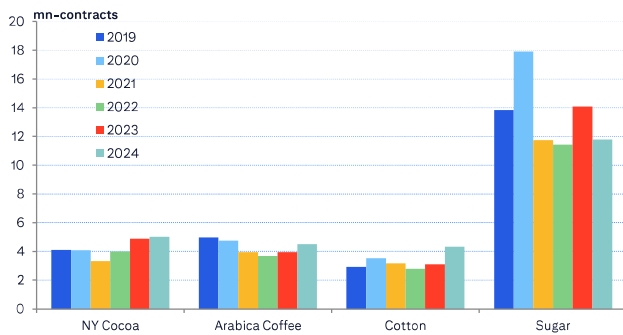
Figure 1. Citi soft commodities price forecasts*

		Price Targets													
		0-3M	6-12M	Q1 2024E	Q2 2024E	Q3 2024E	Q4 2024E	Q1 2025E	Q2 2025E	Q3 2025E	Q4 2025E	2022	2023	2024E	2025E
ICE Sugar	USd/lb	21.0	22.0	22.6	20.0	20.5	21.0	20.0	20.0	20.0	20.5	18.8	24.1	21.0	20.3
ICE Coffee	USd/lb	225	205	185	225	215	205	200	190	185	185	220	171	208	190
ICE Cocoa	USD/MT	8,500	5,800	6,130	8,800	7,025	6,000	5,500	5,000	5,000	4,500	2,450	3,306	7,000	5,000
Changes since last forecast															
ICE Sugar	USd/lb				(3.0)	(2.5)	(1.5)	(2.0)	(1.0)	(1.0)	(0.5)			(1.8)	0.3
ICE Coffee	USd/lb				20	25	15	30	20	25	25			18	25
ICE Cocoa	USD/MT														

© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

Source: Citi Research, *subject to revision; some figures may round for quarterly and annual averages

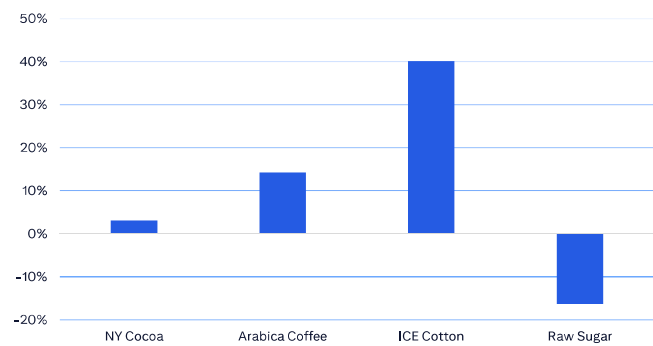
Figure 2. Softs futures trading volumes (seasonal comp)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

Source: ICE, Citi Research

Figure 3. Softs futures turnover (y/y% change)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

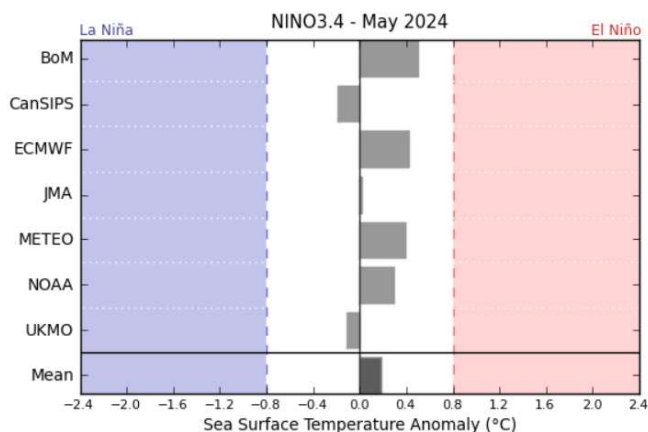
Source: ICE, Citi Research

Global Weather - dry weather retreated in West Africa, but lingering in Brazil

ENSO¹ Update

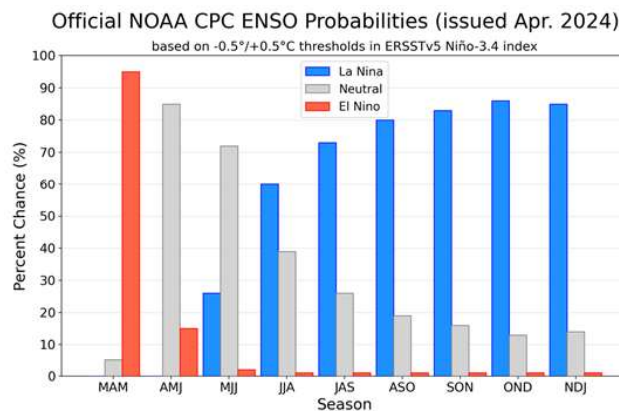
The world is back from El Niño to ENSO-neutral now, according to both the Australia Bureau of Meteorology (BOM) and international climate models it tracks (Figure 4). According to BOM, we will likely stay ENSO-neutral until at least July 2024, with rising probabilities that La Niña could occur later this year. Meanwhile, US NOAA issued both El Niño Advisory and La Niña Watch in its [April update](#), and put a 60% chance on La Niña developing before August 2024. Note that climate models tend to have low accuracy during spring of Northern Hemisphere, so BOM cautioned on using current ENSO forecasts beyond July. La Niña typically brings drier than normal weather to Center South (CS) Brazil, but wetter than normal weather to South and Southeast Asia and Australia.

Figure 4. A summary of climate outlooks for the month of May 2024 across international climate models



Source: Australian Bureau of Meteorology

Figure 5. ENSO probabilities by US NOAA



Note: "MAM" stands for the 3-month period of "March, April, and May", so on and so forth.

Source: NOAA

Brazil Weather Update

After some much-needed heavy rains during late March, weather turned dry and hot again in April for most of Center South Brazil (CS Brazil). Forecasts point to such dry weather to spread further north in May and across the country during June (Figure 10 and Figure 11).

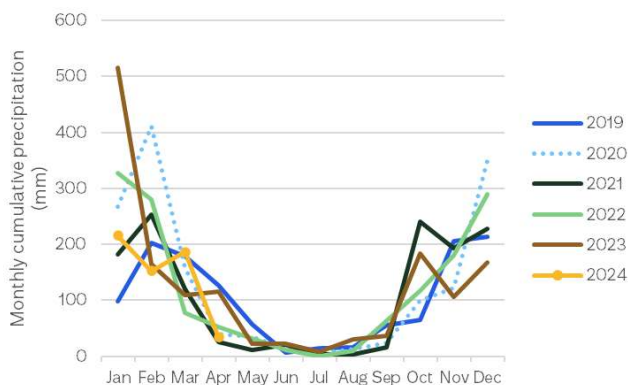
- Coffee:** In the state of Minas Gerais, home to 30% of Brazil's arabica coffee production, total precipitation recorded only 34mm in April, down about 70% y/y and also ~50% below the 5Y avg (Figure 6). Along with the sustained dryness, average temperature during April was also more than 2°C hotter than the 5Y avg. Such dry weather has led to concerns about arabica coffee yields ([April 29, Barchart](#)). In the neighboring state Espirito Santo, key to the production of Robusta coffee, dry weather was less of a concern, with total

¹ ENSO stands for El Niño-Southern Oscillation. It is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean. El Niño and La Niña are the warm and cool phases of ENSO.

monthly precipitation at 62mm, 40% higher than the 5Y mean, even though still below levels last year.

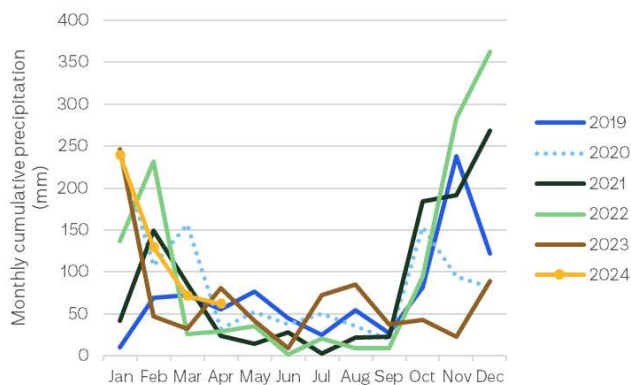
- **Sugar:** Across Sao Paulo state, April's cumulative precipitation recorded 62mm, 44% lower y/y and 7% below the 5Y average, after the second half of March brought above-average rainfall (Figure 9). Further to the south, weather has been wetter throughout April, with the state of Parana receiving a total of 95mm of rains, better than the 5Y mean of 74mm (Figure 8).

Figure 6. Monthly precipitation in the State of Minas Gerais



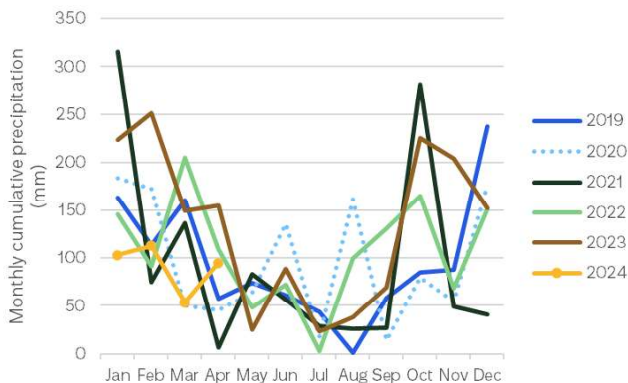
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

Figure 7. Monthly precipitation in the State of Espirito Santo



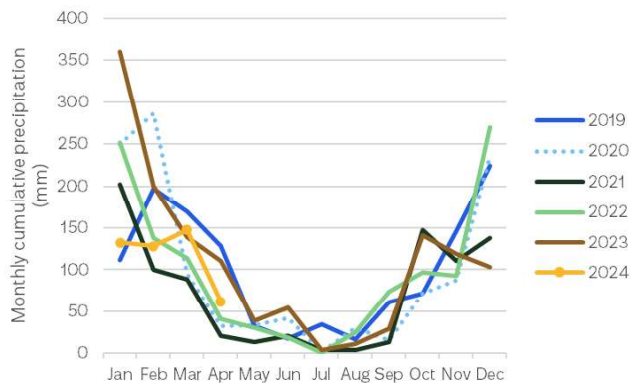
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

Figure 8. Monthly precipitation in the State of Parana



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

Figure 9. Monthly precipitation in the State of Sao Paulo

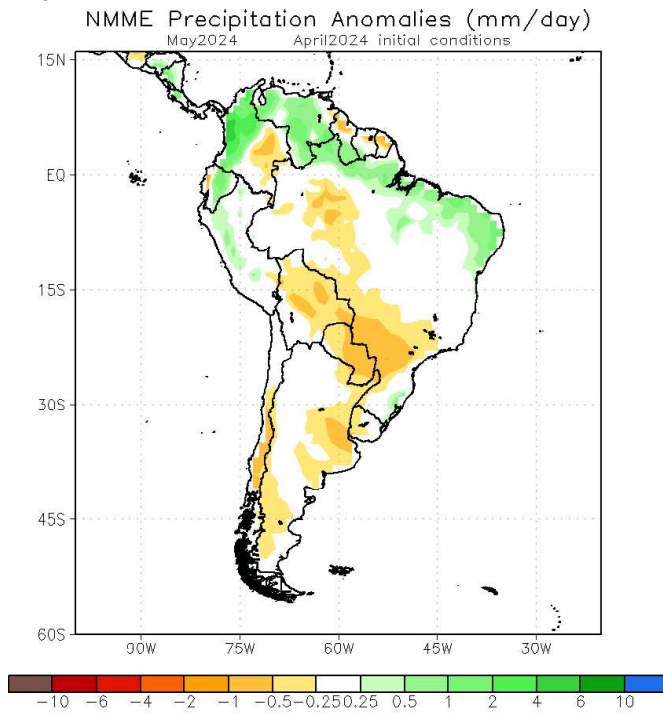


© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

West Africa Weather Update

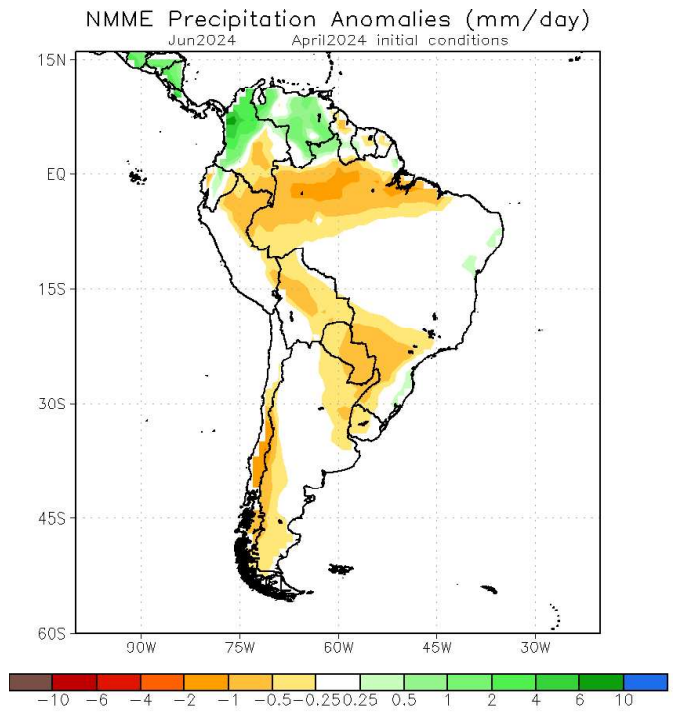
The extreme dryness that had plagued both Ivory Coast and Ghana for the past several months may finally give way to normal to wetter than normal weather in the coming months, according to US NOAA (Figure 13). This is critical in improving 2024/25 WAF crop prospects. The amount of rainfall in both countries appears to rise to normal levels towards late April, and high temperatures have also moderated. While NOAA's forecast suggests weather may still be relatively dry during May in the northwestern parts of Ivory Coast, June is likely to bring above-normal rainfall across both countries.

Figure 10. US NOAA forecast of precipitation anomaly in May 2024 for South America



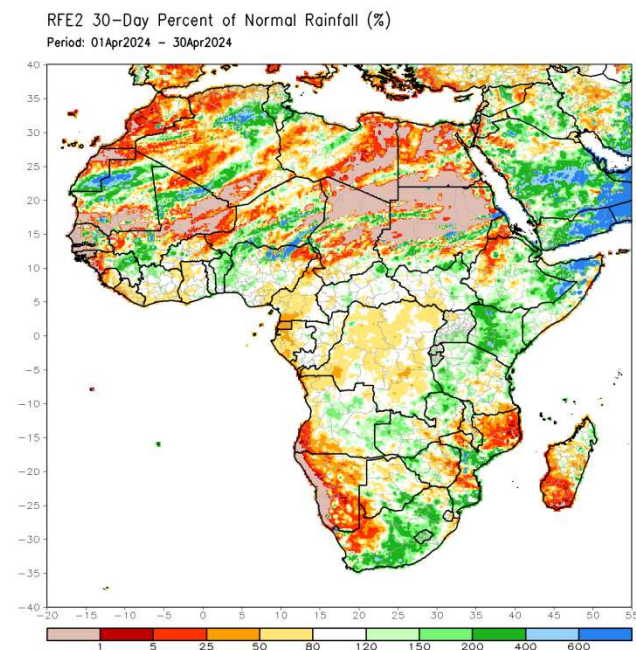
Source: NOAA

Figure 11. US NOAA forecast of precipitation anomaly in June 2024 for South America



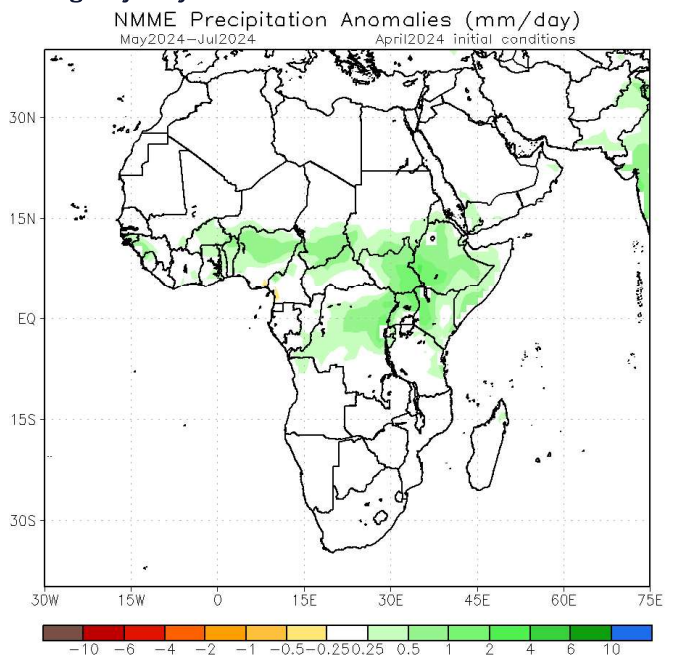
Source: NOAA

Figure 12. Apr'24 total precipitation anomaly (% of normal)



Source: NOAA

Figure 13. US NOAA forecast of precipitation anomaly during May-July 2024 for Africa



Source: NOAA

Fundamentals – Sugar, Cocoa, Coffee

Sugar – Recent unwind looks overdone – ‘buy the dip’ at \$0.19/lb

- **Prompt ICE #11 raw sugar futures sold-off ~12% in April on an improved global supply outlook, more than reversing all the earlier 1Q gains.** We revise down our 0-3m price target by \$0.02/lb to \$0.21/lb but remain directionally bullish in advance of New York sugar week (May 6-8) which will help set the industry tone. Since our previous March update, we see the global sugar s/d balance loosening by a significant ~1mmt in total for 2023/24 and 2024/25, driven by better-than-expected final 2023/24 output levels from top Asia producers including India, Thailand, China and Pakistan, as well as a strong start of the 2024/25 CS Brazil season. That said, we still see a sizable global deficit of ~3.7mmt for 2024/25 and trade flow deficits if indeed India sugar exports largely remain out of the global market. This tightness should support still-high sugar prices >\$0.20/lb.

Figure 14. Global sugar S&D balances*

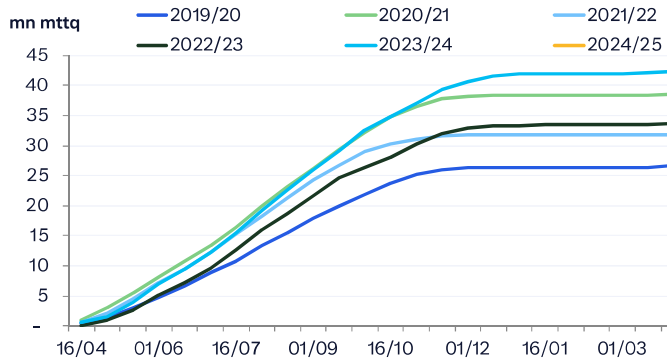
Production – Key Players	2020/21	2021/22	2022/23	2023/24e	2024/25e	Change (%)	Change (mt)
CS Brazil	34.7	28.4	38.9	42.2	40.4	-4%	-1.8
India	31.1	35.8	32.8	32.0	27.0	-16%	-5.0
EU	13.9	15.7	13.8	14.9	15.4	3%	0.4
China	10.6	9.5	9.0	10.0	10.5	5%	0.5
Thailand	7.3	9.8	10.7	8.7	10.2	18%	1.5
Russia	5.0	5.8	6.1	6.7	6.5	-3%	-0.2
USA	7.8	7.7	7.7	7.6	7.8	2%	0.2
Mexico	5.6	6.1	5.2	4.6	5.0	9%	0.4
Australia	4.1	3.6	4.2	4.0	4.1	2%	0.1
Pakistan	5.7	8.0	6.7	6.7	6.8	1%	0.1
Others	41.1	41.2	40.5	40.6	42.8	5%	2.2
Global Production	166.5	171.2	175.2	177.8	176.1	1%	2.6
Global Consumption	170.2	173.3	175.8	177.7	179.8	1%	1.9
World Surplus/(Deficit)	(3.8)	(2.2)	(0.6)	0.1	(3.7)		

© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

Source: Citi Research, European Commission, GP, ISMA, TRS, UNICA, USDA, Industry Sources, *subject to revision

- **CS Brazil 2024/25 peak crushing season started on a strong note, but the dry preseason weather remains a downside risk.** Despite above-normal rainfall in 1H April weighing on crushing activity, total cane crushing was up 14% y/y during the period while sugar production was up 31% y/y thanks to the 43.6% sugar mix, which is the highest level on record for the first fortnight of any crop year. Strong production should have continued in 2H April as weather improved. However, the recently processed cane could contain leftover from the previous crop year and thus not representative of the new crop situation. We continue to highlight the below-normal cumulative preseason rainfall which could take a toll on the agricultural yield, likely evident later as the crop year goes on.

Figure 15. CS Brazil crop year cumulative sugar production



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, UNICA

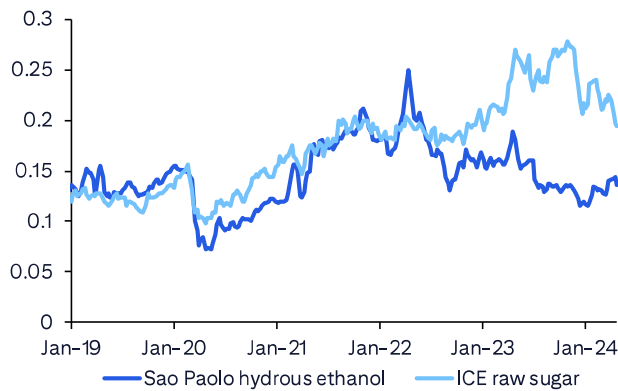
Figure 16. Brazil monthly sugar exports



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, UNICA

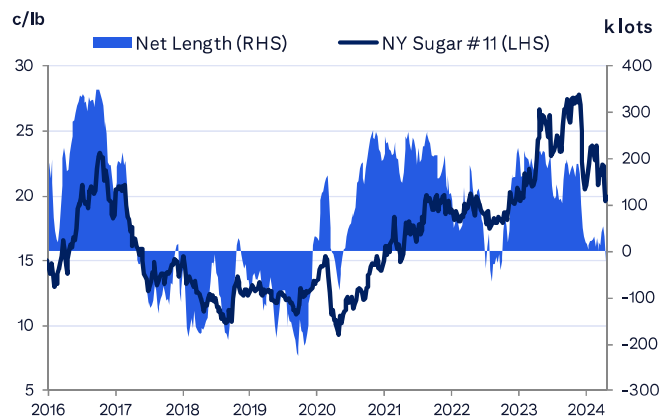
■ **Global sugar trade flows also remain overly dependent on Brazil, with India sugar expected to be largely out of the market for the time being due to domestic inflation and stockpiling.** Cumulative ethanol blending rate in India edged slightly higher in 2023/24 to ~12% and should continue to expand given the ambitious goal of 20% by 2025. The government would likely prioritize ethanol blending to sugar exports, leading to likely zero sugar exports well beyond the ongoing general elections. A potential rebound in sugar production in Thailand, the next biggest exporter, also remains uncertain as it could continue to face the past problems including lost acreage to competing crops and hot and dry weather. With output/export levels remaining weak in India and Thailand, global trade flows remain heavily dependent on Brazil export availability. Despite the record pace of Brazil exports over the past months, any logistical disruption (e.g. terminal maintenance, strikes, weather disruption, etc.) could lead to tightening in trade flows and spike in sugar prices. We also expect some sugar substitution for cocoa butter/liquor in the coming quarters.

Figure 17. Sao Paulo hydrous ethanol vs ICE sugar prices (\$/lb, in sugar equivalent terms)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

Figure 18. ICE Sugar spec net length (ex-index) vs price



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

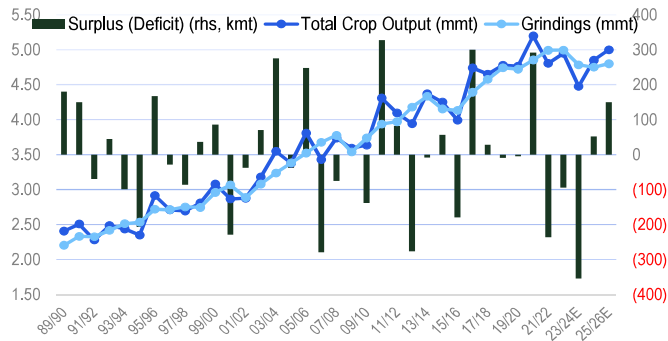
- **Overall, NY sugar price risks look skewed towards the upside following the recent sell-off.** Further downside should be limited by marginal production cost support (at ~\$0.17/lb) and pent-up buying demand from importers. For example, China has restarted sugar imports in the past few weeks after reporting nearly zero imports in March. Spec positioning also flipped to net short in 2H'April after staying net long since 2022, implying plenty of room to add long positions and potential short squeeze risks when prices rebound. On end-user demand, cocoa price inflation could potentially help sugar demand through substitution effect.

Cocoa – Another price spike is possible, but the market seems fatigued by the bull run...we maintain the longstanding view of a 2Q'24 cyclical price peak and prices normalizing to \$4,500–6,000/t area in 2025

- **We believe 2023/24 cocoa balances have seen 'peak tightness' and now it is the 2024/25 outlook that will drive investor and commercial sentiment for terminal prices. We are neutral in the short-term and remain bearish outright and versus the forwards in a 6-12m context.** Against a 355kt global deficit in 2023/24 (unch.) and a cumulative post-COVID worldwide shortfall of 685kt, we see a balanced 2024/25 with a high probability of a 125kt-200kt surplus emerging by 2025/26. As such, we believe global cocoa stocks-to-grind will trough at 26.5-27.5% this season and rebound above 30% to 32-33% by 2025/26, allowing prices to stabilize at \$4,000-5,000/t. The likelihood of end-user demand destruction and cocoa substitution effects will increase over the next several quarters, in our view, with some permanence in econometric terms if there is adequate consumer uptake. We see global processing contracting 4.2% in 2023/24, down 0.7% in 2024/25, and reverting to below trend growth at 1.1% in 2025/26. CSSV disease remains a risk for WAF tree crop yields and production growth normalizing to long-term upward trend—but its spread is more like a cancer than a heart attack—and better weather, historically high prices, and improved husbandry/pruning leave us confident, for the time being, that WAF production will rebound 250-300kt next season. In addition, there is a robust incentive curve for RoW production to take WAF market share into 2025/26 with good prospects for growth in Brazil and Ecuador. Trade reports suggest old-crop cocoa smuggling out of IVC into Guinea and other neighboring port destinations is happening, despite higher farmgate prices, so there should be a large variance between the actual tree crop and statistical crop estimated from IVC arrivals. A collapse in futures prices might slow smuggling into the NH summer season. The market is not without bullish tails, and we cannot completely rule-out a return to our previous upside tactical target of \$12,500/t. But we would need to see a surprise weather event or demand catalyst here, with so much tightness priced-in for 2023/24 earlier in the campaign.
- **First quarter cocoa grindings data were not bearish, although the picture was mixed.** Terminal prices failing to structurally break out higher—in an environment where 2Q and 3Q grindings are likely to fall further in our view (outright and seasonally)—might concern the cocoa bulls. To be sure, Northern Hemisphere consumer grindings surprised to the upside with Europe and Asia down slightly and North America processing even expanding in a surprise print. Yet the plunge in 1Q origin grindings (e.g. Brazil -6%, IVC -12%) on the back of lower bean supply suggests some of the shift to consumer regions (where carryover stockpiles are held) was just a function of geography and product draws. We expect end-user demand destruction to manifest through 2H, as chocolate prices are poised to keep rising, and core inflation remains sticky for essential services (e.g. rents, insurance premiums, etc). Since it is not just bean

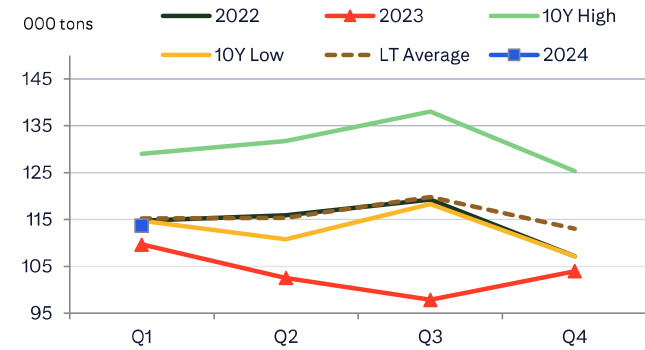
prices, but also cocoa butter prices that have collapsed from EUR40,000/t to below EUR30,000/t in the past few weeks, the industry is likely rationing.

Figure 19. World cocoa s/d balances (subject to revision)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: ICCO, Industry Reports, Citi Research

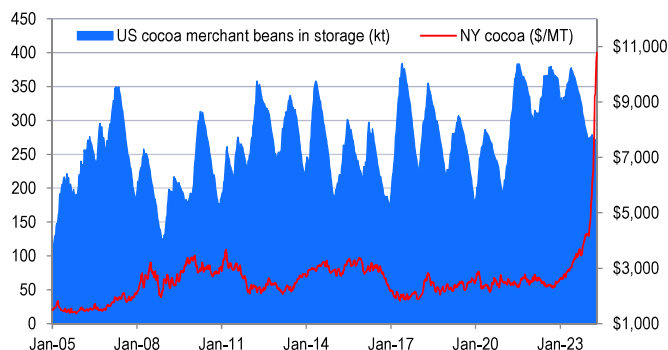
Figure 20. NAM cocoa grindings surprise in 1Q but upside risk is unlikely to sustain into year-end



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: NCA, Citi Research

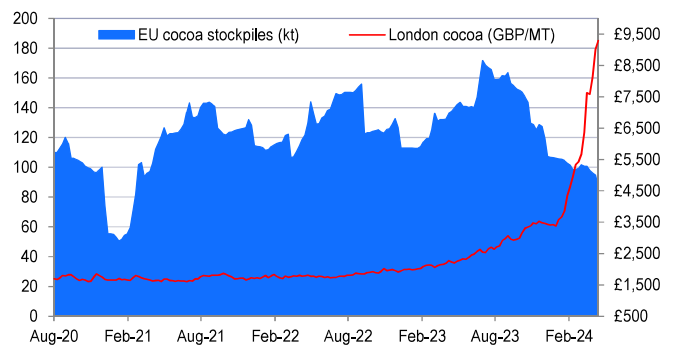
- There is no single explanation for the c32% NY cocoa market unwind that began in late April and sent terminal prices down from \$11,800/t to \$8,000/t. A technical break in a low liquidity environment seems plausible, given limited fund and commercial participation to 'buy the dip'. While the timing of the price move occurred in-line with our published outlook (e.g. post-1Q grindings and confectioner earnings), the follow-through and speed is a bit of a puzzle. Combined futures/options open interest for ICE cocoa has collapsed more than 40% since late January to below 288k lots, despite contract prices more than doubling during that period. In our view, the 'VaR' profile for cocoa has kept investors on the sidelines and it could continue to have an impact. Of note, consumer hedges also pulled back significantly in the first 3-4 weeks of April, with gross longs declining by one-third from 93k lots to 63k lots. The lack of commercial activity in the cocoa unwind – coupled with a massive \$700-800/t flattening of short-dated calendar spreads – suggests to us the price peaks at \$12,000/t (near [our published price target prior to 1Q grindings data reports](#)) might be the high point this cycle.

Figure 21. US cocoa exchange/warehouse stocks



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: ICE, Citi Research

Figure 22. Europe cocoa exchange/warehouse stocks



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: ICE, Citi Research

- **Low exchange stocks in the US and Europe remain a risk if demand processor demand picks-up steam. They can also support cocoa curves staying in backwardation for the remainder of the old-crop campaign.** Since early 4Q'23, US cocoa stocks have drawn ~60kt and in Europe by some ~65kt, putting certified warehouse inventories at just 330kt (amid a drop in 2023/24 crop output of 9-10% to below 4,500mmt. That said, ongoing demand destruction and new-crop supply should leave sufficient cocoa. Hidden and unreported cocoa stocks, particularly in Europe, are likely also available. When we called for [\\$7,000-10,000/t cocoa](#) trading levels back in 1H February, it seemed that momentum and old-crop tightness could still buttress the market. At least some of that impetus seems to have reversed. Now that the industry and funds have absorbed 1Q grindings, confectioners are rebalancing product suites and continuing to hike prices (while shrinking volumes), and there is a strong incentive curve to increase output within and outside of WAF, it may require further catalysts to structurally support the market here. With MM likely net short at the start of May and some commercial hedging likely for cal'25, it is unlikely that prices should further recede to \$5,000/t in the short-term. But that seems to be the direction of travel in a 6-12m context. Bullish market participants, some that were quite loud in March and April, are likely being stopped-out at this point and may have a higher bar to reengage unless commercial buying and further tightness emerges on the physical side.

Coffee – Arabica cools off from its hot espresso shot as prices ease-off recent highs, for now, as commercials likely took off short hedges and CTAs hit the sell button

- **Arabica coffee prices had shot past our previous upgrade but have simmered back down to \$2.05-2.15/lb as the velocity of the move was not sustained.** Meanwhile, Robusta has stayed elevated, last week marking a 47 year high. The gap up in both can largely be attributed to two bullish factors, namely, adverse weather in Vietnam and Brazil as well as subsequent large fund buying as highlighted by the COT reported gross long positioning for coffee reaching a 5y high in mid-April. **Base case:** We upgrade our Arabica 0-3m price target ~0.15/lb to \$2.25/lb and the 6-12m target to \$2.05/lb. Bearish factors seem to be tempering the recent run up for now, such as record exports in Brazil, the cocoa unwind filtering through the CTA channel, and surveys in Vietnam suggesting a high yielding crop for next season, COT data coming off the recent high, and improved ICE gradings leading to larger stocks. **Bull case:** If adverse weather and production issues prevail in Brazil and Vietnam, as well as another buying spree by money managers, then prices could retest the recent highs, potentially breaching the previous two year high of \$2.60/lb. However, data still suggests a surplus for next season, and stocks are continuing to build so we would expect prices to still come off later in the year, albeit higher levels than in the base case. Our bull case 0-3m price target would then be \$2.55/lb and a bull case 6-12m target of \$2.25/lb.
- **Large producing coffee regions such as Brazil and Vietnam are on track to provide a healthy surplus.** The 24/25 crop grew into a further surplus and is now projected to be around 6mn bags. The higher prices for coffee recently have allowed farmers to improve fertilizer and increase farm care levels, though improved weather in the form of a robust amount of rain for early May into June is necessary for the crop to reach its full potential. The 2023/24 crop season notably flipped from a deficit of 0.3mn to a surplus of 0.9mn since our last update, in part due to a buildup in certified stocks. ICE gradings for April came in at just above a 70% pass rate, a moderate improvement from the beginning of the year when January pass rates were averaging 48%. Stocks have built

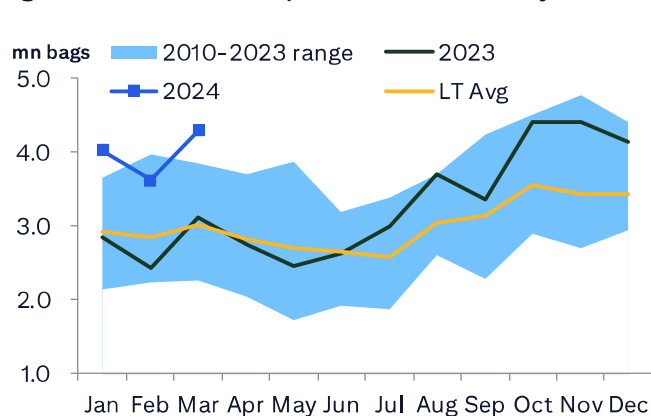
significantly in this same period, more than doubling from January at 251k bags to April at ~660k bags. Third-party surveys in Vietnam also detail the potential for a record crop in 2024/25 but the risk to this is increasing due to excessive dryness seen in April. Even with the inventory build, the impact of cumulative deficits post-Covid is tangible, with a heavy reliance upon Brazil to provide the majority of the surplus. It may even take multiple years of surpluses to replenish the balance sheet. And if Brazil falters, it may serve as a driver to push risk skew even more in favor of higher prices. However, even with Brazil's recent dry weather, the amount of rainfall so far in 2024 seems sufficient for the harvest. Drier conditions may even speed up blooming and improve quality.

- **Record March exports in both Brazil and Vietnam led the way for trade flows recently, while China imports also outperformed to end the first quarter, with all three economies' respective March data coming in at record 10Y highs.** The strong export data from the two major coffee producing countries signals a much-needed building block in replenishing stocks. The first quarter China coffee imports was on average up 2x y/y, signaling a continuation of the strong trend since the beginning of the year. A Chinese coffee culture boom remains to be seen but initial signs are indeed positive. Additionally, there is the new EUDR regulation which will ban the import of agricultural products such as coffee whose production process originates on land that resulted from deforestation. It goes into effect for large companies in December 2024 and smaller companies June 2025. Roasters are attempting to build reserves before then as they will undergo a much heavier regulated process to prove origins of imported beans after the deadline.
- **In similar fashion to the flat price rally, the Arabica-Robusta spread widened to the mid-50 cents range in the middle of April, before narrowing once again to the high-20 cents level in recent trading sessions.** The differential narrowed due to the recent retracement in Arabica prices and the sustained rally in Robusta, which we pointed out as a buying opportunity in our last publication. We reiterate our recommendation to buy cheap spread/diff levels as volatility persists, with the 5Y average of ~72 cents indicating any future widening from current levels as likely from financial flows and roaster switching.

Figure 23. Global coffee balances

(In mn 60 kg bags)	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24E	2024/25E
Production - Key Players									
Brazil	54.4	59.6	63.3	61.8	63.6	56.5	63.2	68.0	67.4
Colombia	14.2	13.8	13.7	13.8	13.1	12.5	10.9	12.2	13.2
Vietnam	28.6	31.9	30.6	29.4	29.1	31.4	28.3	28.4	29.9
Indonesia	11.0	10.7	10.0	11.2	11.7	12.0	11.6	9.9	11.1
Ethiopia	7.1	7.3	7.1	7.0	7.5	7.1	6.9	7.6	7.6
India	5.7	5.6	5.3	5.3	5.8	6.4	3.2	6.2	6.1
Honduras	7.5	7.3	6.2	6.2	5.5	5.4	5.5	6.5	5.9
Uganda	4.8	4.6	4.9	5.9	6.1	5.5	5.8	6.7	6.9
Mexico	3.8	4.0	4.0	3.8	3.9	3.7	3.5	4.1	3.7
Others	23.8	24.8	25.4	27.5	24.7	24.6	26.9	25.0	28.6
Global Production (Oct/Sep)	160.9	169.8	170.5	171.8	171.0	165.0	165.6	174.5	180.3
Global Consumption (Oct/Sep)	157.3	161.8	168.3	166.5	167.3	172.1	172.1	173.6	174.5
World Surplus/(Deficit)	3.6	8.0	2.1	5.4	3.7	-7.1	-6.5	0.9	5.8

Figure 24. Brazil coffee export volume seasonality



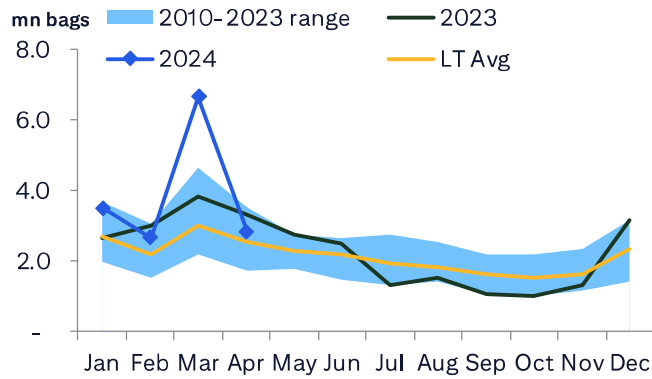
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

Source: Citi Research, ICO, TRS, USDA, Industry reports

© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.

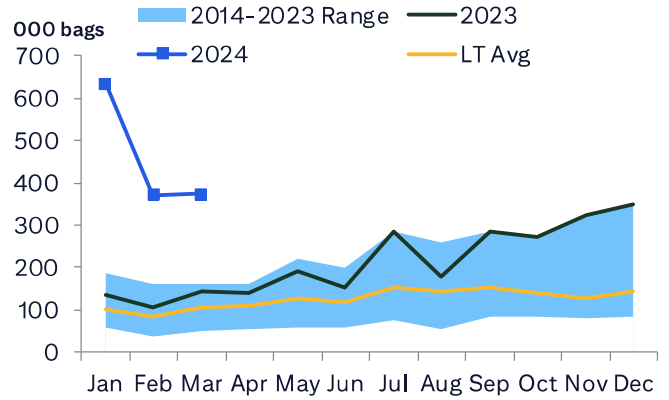
Source: Citi Research, Brazil Ministry of Agriculture

Figure 25. Vietnam coffee export volume seasonality



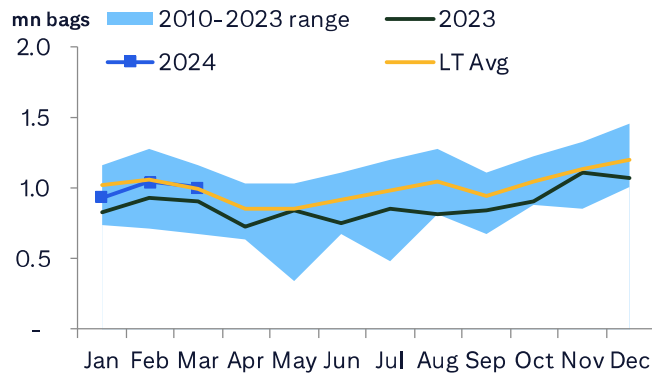
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Vietnamese Govt

Figure 26. China coffee import volume seasonality



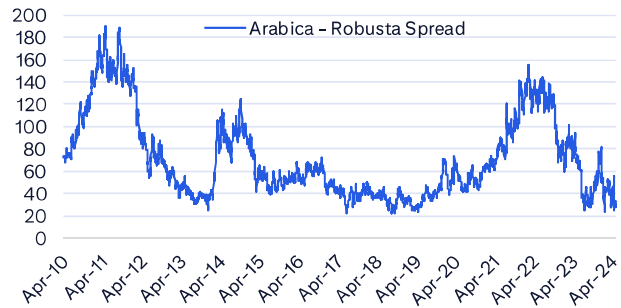
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Chinese Govt

Figure 27. Colombia coffee export volume seasonality



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Colombian Govt

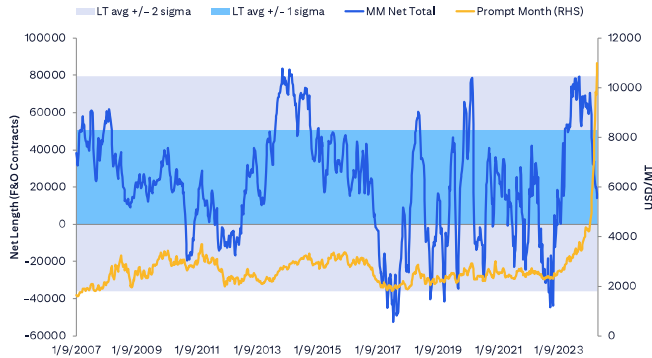
Figure 28. Arabica-Robusta spread (USD/lb)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, Bloomberg

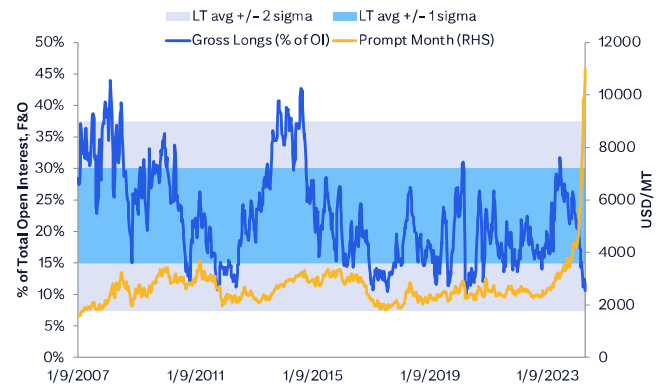
ICE softs positioning chartpack

Figure 29. ICE NY cocoa MM net length, prices



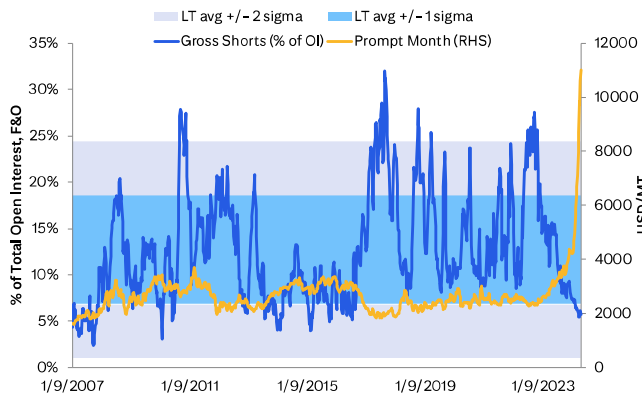
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 30. ICE NY cocoa MM gross long (%)



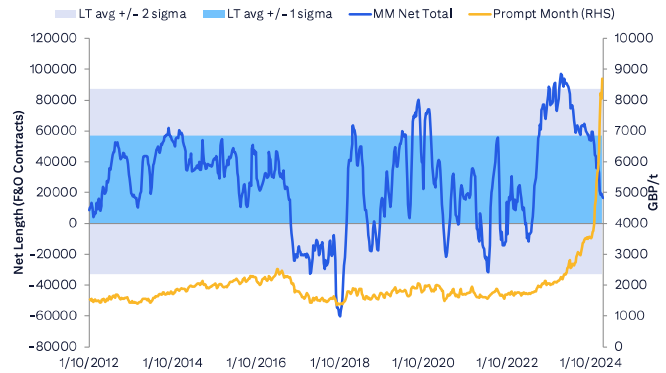
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 31. ICE NY cocoa MM gross short (%)



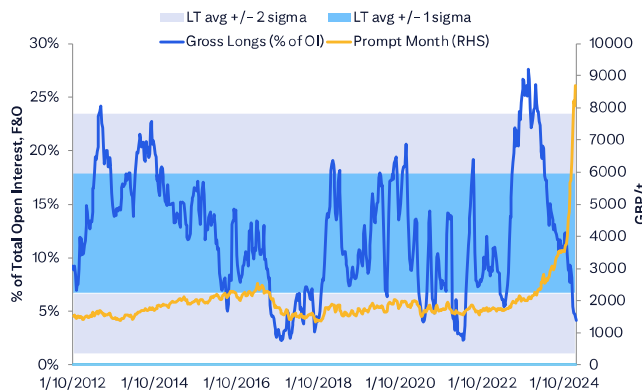
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 32. ICE London cocoa MM net length, prices



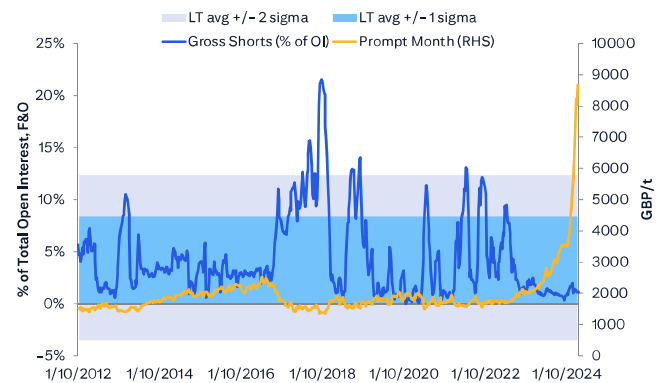
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 33. ICE London cocoa MM gross long (%)



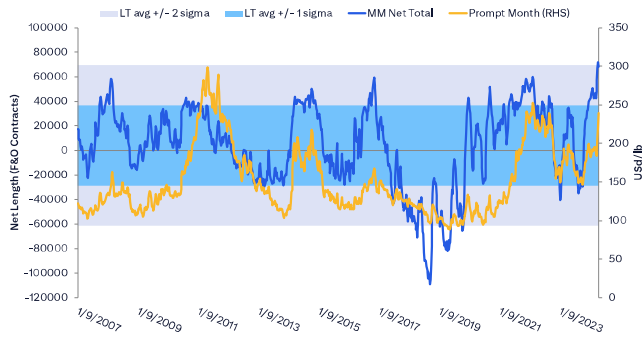
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 34. ICE London cocoa MM gross short (%)



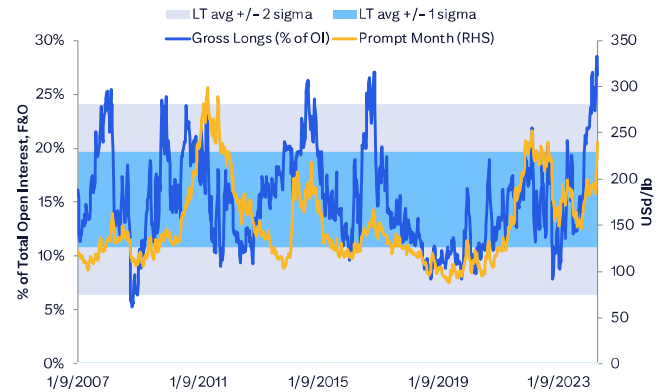
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 35. ICE Arabica coffee MM net length, prices



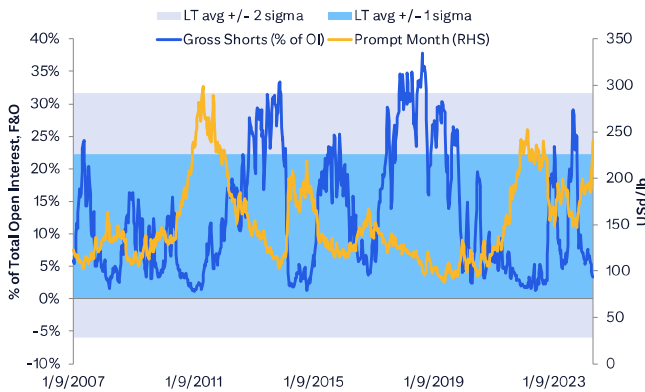
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 36. ICE Arabica coffee MM gross long (%)



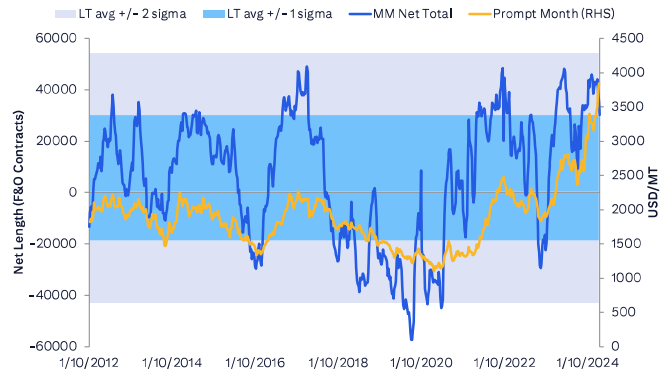
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research, CFTC, ICE

Figure 37. ICE Arabica coffee MM gross short (%)



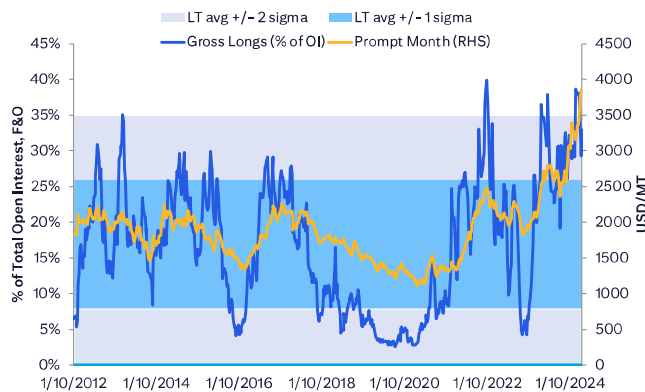
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 38. ICE Robusta coffee MM net length, prices



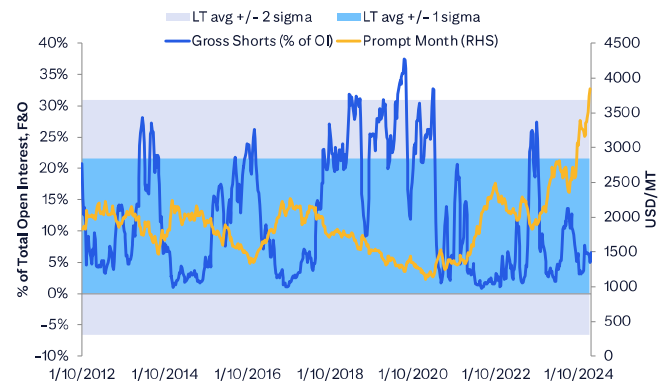
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 39. ICE Robusta coffee MM gross long (%)



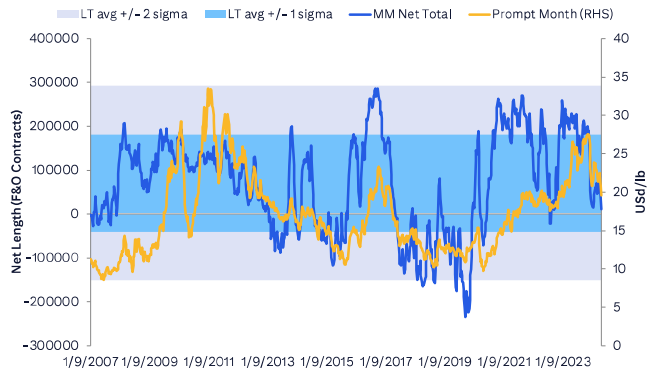
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 40. ICE Robusta coffee MM gross short (%)



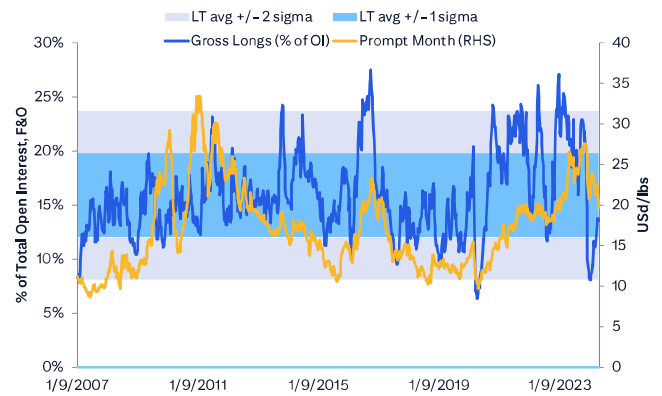
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 41. ICE sugar MM net length, prices



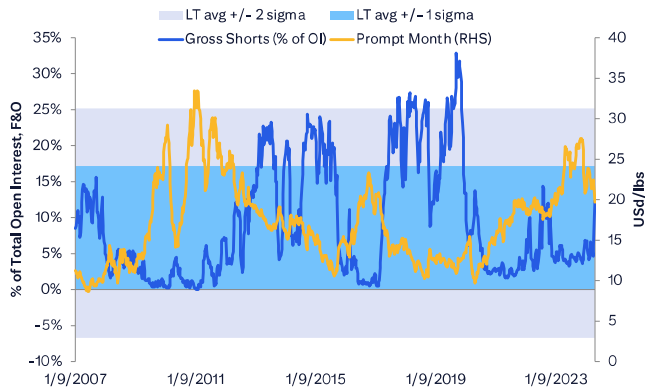
© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 42. ICE sugar MM gross long (%)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

Figure 43. ICE sugar MM gross short (%)



© 2024 Citigroup Inc. No redistribution without Citigroup's written permission.
Source: Citi Research

If you are visually impaired and would like to speak to a Citi representative regarding the details of the graphics in this document, please call USA 1-888-800-5008 (TTY: 711), from outside the US +1-210-677-3788

Appendix A-1

ANALYST CERTIFICATION

The research analysts primarily responsible for the preparation and content of this research report are either (i) designated by "AC" in the author block or (ii) listed in bold alongside content which is attributable to that analyst. If multiple AC analysts are designated in the author block, each analyst is certifying with respect to the entire research report other than (a) content attributable to another AC certifying analyst listed in bold alongside the content and (b) views expressed solely with respect to a specific issuer which are attributable to another AC certifying analyst identified in the price charts or rating history tables for that issuer shown below. Each of these analysts certify, with respect to the sections of the report for which they are responsible: (1) that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc. and its affiliates; and (2) no part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by that research analyst in this report.

IMPORTANT DISCLOSURES

Analysts' compensation is determined by Citi Research management and Citigroup's senior management and is based upon activities and services intended to benefit the investor clients of Citigroup Global Markets Inc. and its affiliates (the "Firm"). Compensation is not linked to specific transactions or recommendations. Like all Firm employees, analysts receive compensation that is impacted by overall Firm profitability which includes investment banking, sales and trading, and principal trading revenues. One factor in equity research analyst compensation is arranging corporate access events between institutional clients and the management teams of covered companies. Typically, company management is more likely to participate when the analyst has a positive view of the company.

For financial instruments recommended in the Product in which the Firm is not a market maker, the Firm is a liquidity provider in such financial instruments (and any underlying instruments) and may act as principal in connection with transactions in such instruments. The Firm is a regular issuer of traded financial instruments linked to securities that may have been recommended in the Product. The Firm regularly trades in the securities of the issuer(s) discussed in the Product. The Firm may engage in securities transactions in a manner inconsistent with the Product and, with respect to securities covered by the Product, will buy or sell from customers on a principal basis.

Unless stated otherwise neither the Research Analyst nor any member of their team has viewed the material operations of the Companies for which an investment view has been provided within the past 12 months.

For important disclosures (including copies of historical disclosures) regarding the companies that are the subject of this Citi Research product ("the Product"), please contact Citi Research, 388 Greenwich Street, 6th Floor, New York, NY, 10013, Attention: Legal/Compliance [E6WYB6412478]. In addition, the same important disclosures, with the exception of the Valuation and Risk assessments and historical disclosures, are contained on the Firm's disclosure website at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. Valuation and Risk assessments can be found in the text of the most recent research note/report regarding the subject company. Pursuant to the Market Abuse Regulation a history of all Citi Research recommendations published during the preceding 12-month period can be accessed via Citi Velocity (<https://www.citivelocity.com/cv2>) or your standard distribution portal. Historical disclosures (for up to the past three years) will be provided upon request.

RESEARCH ANALYST AFFILIATIONS / NON-US RESEARCH ANALYST DISCLOSURES

The legal entities employing the authors of this report are listed below (and their regulators are listed further herein). Non-US research analysts who have prepared this report (i.e., all research analysts listed below other than those identified as employed by Citigroup Global Markets Inc.) are not registered/qualified as research analysts with FINRA. Such research analysts may not be associated persons of the member organization (but are employed by an affiliate of the member organization) and therefore may not be subject to the FINRA Rule 2241 restrictions on communications with a subject company, public appearances and trading securities held by a research analyst account.

Citigroup Global Markets Inc.	Aakash Doshi; Arkady Gevorkyan
Citigroup Global Markets Asia Limited	Maggie Xueting Lin
Citigroup Global Markets Singapore Pte. Ltd.	Kenny Xunyuhan Hu, CFA

OTHER DISCLOSURES

Any price(s) of instruments mentioned in recommendations are as of the prior day's market close on the primary market for the instrument, unless otherwise stated.

The completion and first dissemination of any recommendations made within this research report are as of the Eastern date-time displayed at the top of the Product. If the Product references views of other analysts then please refer to the price chart or rating history table for the date/time of completion and first dissemination with respect to that view.

European regulations require that where a recommendation differs from any of the author's previous recommendations concerning the same financial instrument or issuer that has been published during the preceding 12-month period that the change(s) and the date of that previous recommendation are indicated. Please refer to the trade history in the published research or contact the research analyst.

Citi Research has implemented policies for identifying, considering and managing potential conflicts of interest arising as a result of publication or distribution of investment research. A description of these policies can be found at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures.

The proportion of all Citi Research research recommendations that were the equivalent to "Buy", "Hold", "Sell" at the end of each quarter over the prior 12 months (with the % of these that had received investment firm services from Citi in the prior 12 months shown in brackets) is as follows: Q1 2024 Buy 32% (62%), Hold 44% (52%), Sell 23% (48%), RV 0.5% (88%); Q4 2023 Buy 33% (62%), Hold 43% (53%), Sell 23% (44%), RV 0.5% (89%); Q3 2023 Buy 32% (64%), Hold 44% (54%), Sell 23% (47%), RV 0.5% (89%); Q2 2023 Buy 33% (66%), Hold 43% (56%), Sell 23% (48%), RV 0.5% (88%). For the purposes of disclosing recommendations other than for equity (whose definitions can be found in the corresponding disclosure sections), "Buy" means a positive directional trade idea; "Sell" means a negative directional trade idea; and "Relative Value" means any trade idea which does not have a clear direction to the investment strategy.

European regulations require a 5 year price history when past performance of a security is referenced. CitiVelocity's Charting Tool (https://www.citivelocity.com/cv2/#go/CHARTING_3_Equities) provides the facility to create customisable price charts including a five year option. This tool can be found in the Data & Analytics section under any of the asset class menus in CitiVelocity (<https://www.citivelocity.com/>). For further information contact CitiVelocity support (https://www.citivelocity.com/cv2/go/CLIENT_SUPPORT). The source for all referenced prices, unless otherwise stated, is DataCentral, which sources price information from Thomson Reuters. Past performance is not a guarantee or reliable indicator of future results. Forecasts are not a guarantee or reliable indicator of future performance.

Investors should always consider the investment objectives, risks, and charges and expenses of an ETF carefully before investing. The applicable prospectus and key investor information document (as applicable) for an ETF should contain this and other information about such ETF. It is important to read carefully any such prospectus before investing. Clients may obtain prospectuses and key investor information documents for ETFs from the applicable distributor or authorized participant, the exchange upon which an ETF is listed and/or from the applicable website of the applicable ETF issuer. The value of the investments and any accruing income may fall or rise. Any past performance, prediction or forecast is not indicative of future or likely performance. Any information on ETFs contained herein is provided strictly for illustrative purposes and should not be deemed an offer to sell or a solicitation of an offer to purchase units of any ETF either explicitly or implicitly. The opinions expressed are those of the authors and do not necessarily reflect the views of ETF issuers, any of their agents or their affiliates. Citigroup Global Markets India Private Limited and/or its affiliates may have, from time to time, actual or beneficial ownership of 1% or more in the debt securities of the subject issuer.

Please be advised that pursuant to Executive Order 13959 as amended (the "Order"), U.S. persons are prohibited from investing in securities of any company determined by the United States Government to be the subject of the Order. This research is not intended to be used or relied upon in any way that could result in a violation of the Order. Investors are encouraged to rely upon their own legal counsel for advice on compliance with the Order and other economic sanctions programs administered and enforced by the Office of Foreign Assets Control of the U.S. Treasury Department.

This communication is directed at persons who are "Eligible Clients" as such term is defined in the Israeli Regulation of Investment Advice, Investment Marketing and Investment Portfolio Management law, 1995 (the "Advisory Law"). Within Israel, this communication is not intended for retail clients and Citi will not make such products or transactions available to retail clients or to non-Eligible Clients. The presenter is not licensed as investment advisor or investment marketer by the Israeli Securities Authority ("ISA") and this communication does not constitute investment or marketing advice. The information contained herein may relate to matters that are not regulated by the ISA. Any securities which are the subject of this communication may not be offered or sold to any Israeli person except pursuant to a security offering exemption according to the Israeli Securities Law, 1968 and the public offering rules provided thereunder.

Citi Research broadly and simultaneously disseminates its research content to the Firm's institutional and retail clients via the Firm's proprietary electronic distribution platforms (e.g., Citi Velocity and various Global Wealth platforms). As a convenience, certain, but not all, research content may be distributed through third party aggregators. Clients may receive published research reports by email, on a discretionary basis, and only after such research content has been broadly disseminated. Certain research is made available only to institutional investors to satisfy regulatory requirements. The level and types of services provided by Citi Research analysts to clients may vary depending on various factors such as the client's individual preferences as to the frequency and manner of receiving communications from analysts, the client's risk profile and investment focus and perspective (e.g. market-wide, sector specific, long term, short-term etc.), the size and scope of the overall client relationship with the Firm and legal and regulatory constraints.

Pursuant to Comissão de Valores Mobiliários Resolução 20 and ASIC Regulatory Guide 264, Citi is required to disclose whether a Citi related company or business has a commercial relationship with the subject company. Considering that Citi operates multiple businesses in more than 100 countries around the world, it is likely that Citi has a commercial relationship with the subject company.

Disclosure for investors in the Republic of Turkey: Under Capital Markets Law of Turkey (Law No: 6362), the investment information, comments and recommendations stated here, are not within the scope of investment advisory activity. Investment advisory service is provided in accordance with a contract of engagement on investment advisory concluded between brokerage houses, portfolio management companies, non-deposit banks and clients. Comments and recommendations stated here rely on the individual opinions of the ones providing these comments and recommendations. These opinions may not fit to your financial status, risk and return preferences. For this reason, to make an investment decision by relying solely to this information stated here may not bring about outcomes that fit your expectations. Furthermore, Citi Research is a division of Citigroup Global Markets Inc. (the "Firm"), which does and seeks to do business with companies and/or trades on securities covered in this 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, however investors should also note that the Firm has in place organisational and administrative arrangements to manage potential conflicts of interest of this nature.

Securities recommended, offered, or sold by the Firm: (i) are not insured by the Federal Deposit Insurance Corporation; (ii) are not deposits or other obligations of any insured depository institution (including Citibank); and (iii) are subject to investment risks, including the possible loss of the principal amount invested. The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security. Any decision to purchase securities mentioned in the Product must take into account existing public information on such security or any registered prospectus. Although information has been obtained from and is based upon sources that the Firm believes to be reliable, we do not guarantee its accuracy and it may be incomplete and condensed. Note, however, that the Firm has taken all reasonable steps to determine the accuracy and completeness of the disclosures made in the Important Disclosures section of the Product. The Firm's research department has received assistance from the subject company(ies) referred to in this Product including, but not limited to, discussions with management of the subject company(ies). Firm policy prohibits research analysts from sending draft research to subject companies. However, it should be presumed that the author of the Product has had discussions with the subject company to ensure factual accuracy prior to publication. Statements and views concerning ESG (environmental, social, governance) factors are typically based upon public statements made by the affected company or other public news, which the author may not have independently verified. ESG factors are one consideration that investors may choose to examine when making investment decisions. All opinions, projections and estimates constitute the judgment of the author as of the date of the Product and these, plus any other information contained in the Product, are subject to change without notice. Prices and availability of financial instruments also are subject to change without notice. Notwithstanding other departments within the Firm advising the companies discussed in this Product, information obtained in such role is not used in the preparation of the Product. Although Citi Research does not set a predetermined frequency for publication, if the Product is a fundamental equity or credit research report, it is the intention of Citi Research to provide research coverage of the covered issuers, including in response to news affecting the issuer. For non-fundamental research reports, Citi Research may not provide regular updates to the views, recommendations and facts included in the reports. Notwithstanding that Citi Research maintains coverage on, makes recommendations concerning or discusses issuers, Citi Research may be periodically restricted from referencing certain issuers due to legal or policy reasons. Where a component of a published trade idea is subject to a restriction, the trade idea will be removed from any list of open trade ideas included in the Product. Upon the lifting of the restriction, the trade idea will either be re-instated in the open trade ideas list if the analyst continues to support it or it will be officially closed. Citi Research may provide different research products and services to different classes of customers (for example, based upon long-term or short-term investment horizons) that may lead to differing conclusions or recommendations that could impact the price of a security contrary to the recommendations in the alternative research product, provided that each is consistent with the rating system for each respective product.

Investing in non-U.S. securities, including ADRs, may entail certain risks. The securities of non-U.S. issuers may not be registered with, nor be subject to the reporting requirements of the U.S. Securities and Exchange Commission. There may be limited information available on foreign securities. Foreign companies are generally not subject to uniform audit and reporting standards, practices and requirements comparable to those in the U.S. Securities of some foreign companies may be less liquid and their prices more volatile than securities of comparable U.S. companies. In addition, exchange rate movements may have an adverse effect on the value of an investment in a foreign stock and its corresponding dividend payment for U.S. investors. Net dividends to ADR investors are estimated, using withholding tax rates conventions, deemed accurate, but investors are urged to consult their tax advisor for exact dividend computations. Investors who have received the Product from the Firm may be prohibited in certain states or other jurisdictions from purchasing securities mentioned in the Product from the Firm. Please ask your Financial Consultant for additional details. Citigroup Global Markets Inc. takes responsibility for the Product in the United States. Any orders by US investors resulting from the information contained in the Product may be placed only through Citigroup Global Markets Inc.

The Citigroup legal entity that takes responsibility for the production of the Product is the legal entity which the first named author is employed by.

The Product is made available in **Australia** through Citigroup Global Markets Australia Pty Limited. (ABN 64 003 114 832 and AFSL No. 240992), participant of the ASX Group and regulated by the Australian Securities & Investments Commission. Citigroup Centre, 2 Park Street, Sydney, NSW 2000. Citigroup Global Markets Australia Pty Limited is not an Authorised Deposit-Taking Institution under the Banking Act 1959, nor is it regulated by the Australian Prudential Regulation Authority.

The Product is made available in **Brazil** by Citigroup Global Markets Brasil - CCTVM SA, which is regulated by CVM - Comissão de Valores Mobiliários ("CVM"), BACEN - Brazilian Central Bank, APIMEC - Associação dos Analistas e Profissionais de

Investimento do Mercado de Capitais and ANBIMA – Associação Brasileira das Entidades dos Mercados Financeiro e de Capitais. Av. Paulista, 1111 - 14º andar(parte) - CEP: 01311920 - São Paulo - SP.

This Product is available in **Chile** through Banchile Corredores de Bolsa S.A., an indirect subsidiary of Citigroup Inc., which is regulated by the Comisión Para El Mercado Financiero. Agustinas 975, piso 2, Santiago, Chile.

Disclosure for investors in the Republic of Colombia: This communication or message does not constitute a professional recommendation to make investment in the terms of article 2.40.1.1.2 of Decree 2555 de 2010 or the regulations that modify, substitute or complement it. Para la elaboración y distribución de informes de investigación y de comunicaciones generales de que trata este artículo no se requiere ser una entidad vigilada por la Superintendencia Financiera de Colombia.

The Product is made available in **Germany** by Citigroup Global Markets Europe AG ("CGME"), which is regulated by the European Central Bank and the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht BaFin). CGME, Reuterweg 16, 60323 Frankfurt am Main.

Unless otherwise specified, if the analyst who prepared this report is based in Hong Kong and it relates to "securities" (as defined in the Securities and Futures Ordinance (Cap.571 of the Laws of Hong Kong)), the report is issued in Hong Kong by Citigroup Global Markets Asia Limited. Citigroup Global Markets Asia Limited is regulated by Hong Kong Securities and Futures Commission. If the report is prepared by a non-Hong Kong based analyst, please note that such analyst (and the legal entity that the analyst is employed by or accredited to) is not licensed/registered in Hong Kong and they do not hold themselves out as such. Please refer to the section "Research Analyst Affiliations / Non-US Research Analyst Disclosures" for the details of the employment entity of the analysts.

The Product is made available in **India** by Citigroup Global Markets India Private Limited (CGM), which is regulated by the Securities and Exchange Board of India (SEBI), as a Research Analyst (SEBI Registration No. INH000000438). CGM is also actively involved in the business of merchant banking (SEBI Registration No. INM000010718) and stock brokerage ((SEBI Registration No. INZ000263033) in India, and is registered with SEBI in this regard. Registration granted by SEBI and certification from National Institute of Securities Markets (NISM) in no way guarantee performance of the intermediary or provide any assurance of returns to investors. CGM's registered office is at 1202, 12th Floor, First International Financial Centre (FIFC), G Block, Bandra Kurla Complex, Bandra East, Mumbai – 400098 & registered Tel: +91 22 61759999. CGM's Corporate Identity Number is U99999MH2000PTC126657, and its Compliance Officer [Vishal Bohra] contact details are: Tel: +91-022-61759994, Fax: +91-022-61759851, Email: cgmcompliance@citi.com. The Investor Charter in respect of Research Analysts and Complaints information can be found at https://www.citivelocity.com/cvr/eppublic/citi_research_disclosures. The grievance officer [Nikita Jadhav] contact details are Tel: +91-022-42775089, Email: EMEA.CR.Complaints@citi.com. Investment in securities market are subject to market risks. Read all the related documents carefully before investing.

The Product is made available in **Indonesia** through PT Citigroup Securities Indonesia. Citibank Tower 10/F, Pacific Century Place, SCBD lot 10, Jl. Jend Sudirman Kav 52-53, Jakarta 12190, Indonesia. Neither this Product nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable capital market laws and regulations. This Product is not an offer of securities in Indonesia. The securities referred to in this Product have not been registered with the Capital Market and Financial Services Authority (OJK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market laws and regulations.

The Product is made available in **Japan** by Citigroup Global Markets Japan Inc. ("CGMJ"), which is regulated by Financial Services Agency, Securities and Exchange Surveillance Commission, Japan Securities Dealers Association, Tokyo Stock Exchange and Osaka Securities Exchange. Otemachi Park Building, 1-1-1 Otemachi, Chiyoda-ku, Tokyo 100-8132 Japan. If the Product was distributed by SMBC Nikko Securities Inc. it is being so distributed under license. In the event that an error is found in an CGMJ research report, a revised version will be posted on the Firm's Citi Velocity website. If you have questions regarding Citi Velocity, please call (81 3) 6270-3019 for help.

The product is made available in the **Kingdom of Saudi Arabia** in accordance with Saudi laws through Citigroup Saudi Arabia, which is regulated by the Capital Market Authority (CMA) under CMA license (17184-31). 2239 Al Urubah Rd – Al Olaya Dist. Unit No. 18, Riyadh 12214 – 9597, Kingdom Of Saudi Arabia.

The Product is made available in **Korea** by Citigroup Global Markets Korea Securities Ltd. (CGMK), which is regulated by the Financial Services Commission, the Financial Supervisory Service and the Korea Financial Investment Association (KOFIA). The address of CGMK is Citibank Center, 50 Saemunan-ro, Jongno-gu, Seoul 03184, Korea. KOFIA makes available registration information of research analysts on its website. Please visit the following website if you wish to find KOFIA registration information on research analysts of

CGMK. <http://dis.kofia.or.kr/websquare/index.jsp?w2xPath=/wq/fundMgr/DISFundMgrAnalystList.xml&divisionId=MDISO3002002000000&servicId=SDISO3002002000>. The Product is made available in Korea by Citibank Korea Inc., which is regulated by the Financial Services Commission and the Financial Supervisory Service. Address is Citibank Center, 50 Saemunan-ro, Jongno-gu, Seoul 03184, Korea. This research report is intended to be provided only to Professional Investors as defined in the Financial Investment Services and Capital Market Act and its Enforcement Decree in Korea.

The Product is made available in **Malaysia** by Citigroup Global Markets Malaysia Sdn Bhd (Registration No. 199801004692 (460819-D)) ("CGMM") to its clients and CGMM takes responsibility for its contents as regards CGMM's clients. CGMM is regulated by the Securities Commission of Malaysia. Please contact CGMM at Level 43 Menara Citibank, 165 Jalan Ampang, 50450 Kuala Lumpur, Malaysia in respect of any matters arising from, or in connection with, the Product.

The Product is made available in **Mexico** by Citibanamex Casa de Bolsa, S.A. De C. V., Casa de Bolsa, Integrante del Grupo Financiero Citibanamex which is a wholly owned subsidiary of Citigroup Inc. and is regulated by Comision Nacional Bancaria y de Valores. Actuario Roberto Medellín 800, Zedec Santa Fe, Álvaro Obregón, 01219 Ciudad de México, CDMX.

The Product is made available in **Poland** by Biuro Maklerskie Banku Handlowego (DMBH), separate department of Bank Handlowy w Warszawie S.A. a subsidiary of Citigroup Inc., which is regulated by Komisja Nadzoru Finansowego. Biuro Maklerskie Banku Handlowego (DMBH), ul.Senatorska 16, 00-923 Warszawa.

The Product is made available in **Singapore** through Citigroup Global Markets Singapore Pte. Ltd. ("CGMSPL"), a capital markets services license holder, and regulated by Monetary Authority of Singapore. Please contact CGMSPL at 8 Marina View, 21st Floor Asia Square Tower 1, Singapore 018960, in respect of any matters arising from, or in connection with, the analysis of this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). The Product is made available by The Citigroup Private Bank in Singapore through Citibank, N.A., Singapore Branch, a licensed bank in Singapore that is regulated by Monetary Authority of Singapore. Please contact your Private Banker in Citibank N.A., Singapore Branch if you have any queries on or any matters arising from or in connection with this document. This report is intended for recipients who are accredited, expert and institutional investors as defined under the Securities and Futures Act (Cap. 289). This report is distributed in Singapore by Citibank Singapore Ltd ("CSL") to selected Citigold/Citigold Private Clients. CSL provides no independent research or analysis of the substance or in preparation of this report. Please contact your Citigold//Citigold Private Client Relationship Manager in CSL if you have any queries on or any matters arising from or in connection with this report. This report is intended for recipients who are accredited investors as defined under the Securities and Futures Act (Cap. 289).

Citigroup Global Markets (Pty) Ltd. is incorporated in the **Republic of South Africa** (company registration number 2000/025866/07) and its registered office is at 145 West Street, Sandton, 2196, Saxonwold. Citigroup Global Markets (Pty) Ltd. is regulated by JSE Securities Exchange South Africa, South African Reserve Bank and the Financial Services Board. The investments and services contained herein are not available to private customers in South Africa.

The Product is made available in the **Republic of China (Taiwan)** through Citigroup Global Markets Taiwan Securities Company Ltd. ("CGMTS"), 14F, 15F and 16F, No. 1, Songzhi Road, Taipei 110, Taiwan, subject to the license scope and the applicable laws and regulations in the Republic of China (Taiwan). CGMTS is regulated by the Securities and Futures Bureau of the Financial Supervisory Commission of Taiwan, the Republic of China (Taiwan). No portion of the Product may be reproduced or quoted in the Republic of China (Taiwan) by the press or any third parties [without the written authorization of CGMTS]. Pursuant to the applicable laws and regulations in the Republic of China (Taiwan), the recipient of the Product shall not take advantage of such Product to involve in any matters in which the recipient may have conflicts of interest. If the Product covers securities which are not allowed to be offered or traded in the Republic of China (Taiwan), neither the Product nor any information contained in the Product shall be considered as advertising the securities or making recommendation of the securities in the Republic of China (Taiwan). The Product is for informational purposes only and is not intended as an offer or solicitation for the purchase or sale of a security or financial products. Any decision to purchase securities or financial products mentioned in the Product must take into account existing public information on such security or the financial products or any registered prospectus.

The Product is made available in **Thailand** through Citicorp Securities (Thailand) Ltd., which is regulated by the Securities and Exchange Commission of Thailand. 399 Interchange 21 Building, 18th Floor, Sukhumvit Road, Klongtoey Nua, Wattana ,Bangkok 10110, Thailand.

The Product is made available in **Turkey** through Citibank AS which is regulated by Capital Markets Board. Tekfen Tower, Eski Buyukdere Caddesi # 209 Kat 2B, 23294 Levent, Istanbul, Turkey.

In the **U.A.E**, these materials (the "Materials") are communicated by Citigroup Global Markets Limited, DIFC branch ("CGML"), an entity registered in the Dubai International Financial Center ("DIFC") and licensed and regulated by the Dubai Financial Services Authority ("DFSA") to Professional Clients and Market Counterparties only and should not be relied upon or distributed to Retail Clients. A distribution of the different Citi Research ratings distribution, in percentage terms for Investments in each sector covered is made available on request. Financial products and/or services to which the Materials relate will only be made available to Professional Clients and Market Counterparties.

The Product is made available in **United Kingdom** by Citigroup Global Markets Limited, which is authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA. This material may relate to investments or services of a person outside of the UK or to other matters which are not authorised by the PRA nor regulated by the FCA and the PRA and further details as to where this may be the case are available upon request in respect of this material. Citigroup Centre, Canada Square, Canary Wharf, London, E14 5LB.

The Product is made available in **United States** and **Canada** by Citigroup Global Markets Inc., which is a member of FINRA and registered with the US Securities and Exchange Commission. 388 Greenwich Street, New York, NY 10013.

Unless specified to the contrary, within EU Member States, the Product is made available by Citigroup Global Markets Europe AG ("CGME"), which is regulated by the European Central Bank and the German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht -BaFin).

The Product is not to be construed as providing investment services in any jurisdiction where the provision of such services would not be permitted.

Subject to the nature and contents of the Product, the investments described therein are subject to fluctuations in price and/or value and investors may get back less than originally invested. Certain high-volatility investments can be subject to

sudden and large falls in value that could equal or exceed the amount invested. The yield and average life of CMOs (collateralized mortgage obligations) referenced in this Product will fluctuate depending on the actual rate at which mortgage holders prepay the mortgages underlying the CMO and changes in current interest rates. Any government agency backing of the CMO applies only to the face value of the CMO and not to any premium paid. Certain investments contained in the Product may have tax implications for private customers whereby levels and basis of taxation may be subject to change. If in doubt, investors should seek advice from a tax adviser. The Product does not purport to identify the nature of the specific market or other risks associated with a particular transaction. Advice in the Product is general and should not be construed as personal advice given it has been prepared without taking account of the objectives, financial situation or needs of any particular investor. Accordingly, investors should, before acting on the advice, consider the appropriateness of the advice, having regard to their objectives, financial situation and needs. Prior to acquiring any financial product, it is the client's responsibility to obtain the relevant offer document for the product and consider it before making a decision as to whether to purchase the product.

Citi Research product may source data from dataCentral. dataCentral is a Citi Research proprietary database, which includes the Firm's estimates, data from company reports and feeds from Thomson Reuters. The source for all referenced prices, unless otherwise stated, is DataCentral. Past performance is not a guarantee or reliable indicator of future results. Forecasts are not a guarantee or reliable indicator of future performance. The printed and printable version of the research report may not include all the information (e.g. certain financial summary information and comparable company data) that is linked to the online version available on the Firm's proprietary electronic distribution platforms.

Card Insights. Where this report references Card Insights data, Card Insights consists of selected data from a subset of Citi's proprietary credit card transactions. Such data has undergone rigorous security protocols to keep all customer information confidential and secure; the data is highly aggregated and anonymized so that all unique customer identifiable information is removed from the data prior to receipt by the report's author or distribution to external parties. This data should be considered in the context of other economic indicators and publicly available information. Further, the selected data represents only a subset of Citi's proprietary credit card transactions due to the selection methodology or other limitations and should not be considered as indicative or predictive of the past or future financial performance of Citi or its credit card business.

Where included in this report, MSCI sourced information is the exclusive property of Morgan Stanley Capital International Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced, disseminated or used to create any financial products, including any indices. This information is provided on an "as is" basis. The user assumes the entire risk of any use made of this information. MSCI, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the information have any liability for any damages of any kind. MSCI, Morgan Stanley Capital International and the MSCI indexes are services marks of MSCI and its affiliates. Part of this product may contain Sustainalytics proprietary information that may not be reproduced, used, disseminated, modified nor published in any manner without the express written consent of Sustainalytics. Sustainalytics, its affiliates and any third party involved in, or related to, computing or compiling the information hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Any information attributed to Sustainalytics is provided solely for informational purposes and on its own should not be considered an offer to buy or sell a security. Neither Sustainalytics nor all its third-party suppliers provide investment advice (as defined in the applicable jurisdiction) or any other form of (financial) advice. The information is provided "as is" and, therefore Sustainalytics assumes no responsibility for errors or omissions. Sustainalytics cannot be held liable for damage arising from the use of this product or information contained herein in any manner whatsoever. Where data is attributed to Morningstar that data is © 2024 Morningstar, Inc. All Rights Reserved. That information: (1) is proprietary to Morningstar and/or its content providers; (2) may not be copied or distributed; and (3) is not warranted to be accurate, complete or timely. Neither Morningstar nor its content providers are responsible for any damages or losses arising from any use of this information.

The Firm accepts no liability whatsoever for the actions of third parties. The Product may provide the addresses of, or contain hyperlinks to, websites. Except to the extent to which the Product refers to website material of the Firm, the Firm has not reviewed the linked site. Equally, except to the extent to which the Product refers to website material of the Firm, the Firm takes no responsibility for, and makes no representations or warranties whatsoever as to, the data and information contained therein. Such address or hyperlink (including addresses or hyperlinks to website material of the Firm) is provided solely for your convenience and information and the content of the linked site does not in any way form part of this document. Accessing such website or following such link through the Product or the website of the Firm shall be at your own risk and the Firm shall have no liability arising out of, or in connection with, any such referenced website.

© 2024 Citigroup Global Markets Inc. Citi Research is a division of Citigroup Global Markets Inc. Citi and Citi with Arc Design are trademarks and service marks of Citigroup Inc. and its affiliates and are used and registered throughout the world. All rights reserved. The research data in this report are not intended to be used for the purpose of (a) determining the price of or amounts due in respect of (or to value) one or more financial products or instruments and/or (b) measuring or comparing the performance of, or defining the asset allocation of a financial product, a portfolio of financial instruments, or a collective investment undertaking, and any such use is strictly prohibited without the prior written consent of Citi Research. Any unauthorized use, duplication, redistribution or disclosure of this report (the "Product"), including, but not limited to, redistribution of the Product by electronic mail, posting of the Product on a website or page, and/or providing to a third party a

link to the Product, is prohibited by law and will result in prosecution. The information contained in the Product is intended solely for the recipient and may not be further distributed by the recipient to any third party.

ADDITIONAL INFORMATION IS AVAILABLE UPON REQUEST
