

This material is neither intended to be distributed to Mainland China investors nor to provide securities investment consultancy services within the territory of Mainland China. This material or any portion hereof may not be reprinted, sold or redistributed without the written consent of J.P. Morgan.

## Flows & Liquidity

What are the spillovers from private to public assets?

- In principle, the risks posed by private assets to public markets should be modest given that the holders of private assets are typically investors such as SWFs, endowments, pension funds and high net worth individuals with long investment horizons and who intend to hold these assets to maturity.
- However there are circumstances where there could be spillover effects from private assets to public markets particularly in a recession and within private assets these circumstances are more likely to emanate from private equity.
- The recent rebound in US liquidity or money supply should prove temporary.
- While euro area companies appear to have accumulated a rather heavy effective long EUR position, speculative investors such as CTAs have to yet to reach extreme long EUR territory.
- Positions across commodity futures look oversold in Brent oil, neutral in copper and overbought in gold.

### Global Markets Strategy

#### Nikolaos Panigirtzoglou <sup>AC</sup>

(44-20) 7134-7815  
nikolaos.panigirtzoglou@jpmorgan.com  
J.P. Morgan Securities plc

#### Mika Inkinen

(44-20) 7742 6565  
mika.j.inkinen@jpmorgan.com  
J.P. Morgan Securities plc

#### Mayur Yeole

(91 22) 6157 3872  
mayur.yeole@jpmchase.com  
J.P. Morgan India Private Limited

#### Krutik P Mehta

(91-22) 6157-5016  
krutik.mehta@jpmchase.com  
J.P. Morgan India Private Limited

- The stock of private assets i.e. private equity, private credit, real estate and hedge funds, continued to grow this year approaching the \$30tr mark (Figure 1). This represents a sizable close to 15% share of the total asset universe of both private and public assets (Figure 2). While private assets continue to attract a large amount of investor capital of above \$1tr each year, fundraising has slowed significantly in recent years as higher interest rates have hit private assets such private equity and real estate. Figure 3 suggests that fundraising for private assets had peaked at \$1.6tr in 2021 and has been slowing steadily since then with the YTD pace of \$1.07tr representing the slowest pace since 2018.

Figure 1: Capitalization of global asset classes – traditional versus private

\$tr.

| Asset Class                             | end - 2003    | end - 2006    | end - 2015     | end - 2019     | end - 2020     | end-2021       | end-2022       | end-2023       | Q3-2024 (QTD)  | Annualised growth vs end-2019 | Annualised growth vs. end-2021 | Annualised growth vs. end-2015 |
|---|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------------------|--------------------------------|--------------------------------|
| World Equities                          | \$27.1        | \$43.1        | \$50.9         | \$71.5         | \$82.8         | \$97.0         | \$78.8         | \$92.5         | \$101.9        | 7.9%                          | 1.9%                           | 8.4%                           |
| World FI                                | \$22.3        | \$26.9        | \$51.9         | \$64.8         | \$78.3         | \$77.0         | \$68.8         | \$72.9         | \$75.7         | 3.4%                          | -0.6%                          | 4.5%                           |
| <b>Total Traditional Assets</b>         | <b>\$49.4</b> | <b>\$70.0</b> | <b>\$102.7</b> | <b>\$136.3</b> | <b>\$161.1</b> | <b>\$174.0</b> | <b>\$147.6</b> | <b>\$165.3</b> | <b>\$177.1</b> | <b>5.0%</b>                   | <b>-0.6%</b>                   | <b>6.1%</b>                    |
| Private Equity                          | \$0.7         | \$1.2         | \$2.4          | \$4.3          | \$5.2          | \$6.7          | \$7.7          | \$8.7          | \$9.5          | 18.7%                         | 14.2%                          | 17.3%                          |
| Private Debt                            | \$0.1         | \$0.1         | \$0.5          | \$0.8          | \$1.0          | \$1.2          | \$1.4          | \$1.7          | \$1.9          | 19.2%                         | 18.4%                          | 16.1%                          |
| Real Estate                             | \$6.3         | \$8.6         | \$8.8          | \$11.8         | \$12.9         | \$13.9         | \$13.3         | \$13.2         | \$13.2         | 2.4%                          | -2.0%                          | 4.8%                           |
| Hedge Funds                             | \$0.8         | \$1.5         | \$2.9          | \$3.3          | \$3.6          | \$4.0          | \$3.8          | \$4.1          | \$4.3          | 5.8%                          | 2.9%                           | 4.7%                           |
| <b>Total Private Assets</b>             | <b>\$7.9</b>  | <b>\$11.4</b> | <b>\$14.6</b>  | <b>\$20.2</b>  | <b>\$22.7</b>  | <b>\$25.8</b>  | <b>\$26.2</b>  | <b>\$27.7</b>  | <b>\$28.9</b>  | <b>7.9%</b>                   | <b>4.3%</b>                    | <b>8.2%</b>                    |
| Share of Private as a % of Total Assets | 13.8%         | 14.0%         | 12.4%          | 12.9%          | 12.3%          | 12.9%          | 15.1%          | 14.4%          | 14.4%          |                               |                                |                                |

Source: EIKON, Bloomberg Finance L.P., Barclays, Preqin, MSCI, HFR, J.P. Morgan.

### See page 27 for analyst certification and important disclosures.

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

- Given the headwind to private assets from higher interest rates a question that has emerged in our conversations is regarding the risks posed by private assets to public markets. In principle, these risks should be modest given that the holders of private assets are typically investors such as SWFs, endowments, pension funds and high net worth individuals with long investment horizons and who intend to hold these assets to maturity. However there are circumstances where there could be spillover effects from private assets to public markets particularly in a recession and within private assets these circumstances are more likely to emanate from private equity.

**Figure 2: Share of private assets in the total asset universe of both private and traditional asset classes**



Source: EIKON, Bloomberg Finance L.P., Barclays, Prequin, MSCI, HFR, J.P. Morgan.

**Figure 3: Flows/Fundraising into private asset classes**

In \$bn.

| in \$bn  | PE   | Private Debt | Real Estate | HF  | Total |
|----------|------|--------------|-------------|-----|-------|
| 2015     | 488  | 110          | 152         | 44  | 793   |
| 2016     | 759  | 127          | 142         | -70 | 958   |
| 2017     | 822  | 132          | 166         | 10  | 1130  |
| 2018     | 815  | 137          | 176         | -34 | 1094  |
| 2019     | 917  | 153          | 202         | -43 | 1229  |
| 2020     | 896  | 196          | 171         | -30 | 1233  |
| 2021     | 1105 | 239          | 251         | 15  | 1610  |
| 2022     | 999  | 224          | 221         | -55 | 1388  |
| 2023     | 905  | 210          | 153         | -10 | 1258  |
| 2024 YTD | 508  | 123          | 77          | 7   | 715   |

Source: EIKON, Bloomberg Finance L.P., Barclays, Prequin, MSCI, HFR, J.P. Morgan.

- The question of vulnerabilities in the private equity space was one of the issues that we have touched on in our sister publication Alternative Investments Outlook and Strategy (AIOS). We have noted that rising debt service costs has

created issues for older vintages in particular, where deals were made typically with higher leverage and higher interest costs present a larger drain on cash flows and consequently a larger headwind for payouts to private equity investors. In turn, this has been a factor behind the prolonged period of softness in exit activity, amid a persistent gap between the price that sellers expect to receive and what buyers are prepared to pay, even as fundraising has remained robust. One of the manifestations of this gap is the discount to NAV on publicly listed PE funds (Figure 4). This discount has improved from its lows in 2H22 when it averaged around 25% to 23% in 2023. In 2024, this had improved further from around 20% in 1Q24 and close to 15% in 2Q24. The deterioration in sentiment around risk assets saw it widen again briefly to around 20%, but the recovery in publicly listed markets has also been accompanied by a partial reversal of this deterioration in discount to NAV.

**Figure 4: Premium/Discount on LPX Major Market Index of publicly listed private equity**

In %. Measured as the premium or discount embedded in the price to book ratio of the LPX index. Dashed line denotes the average discount in 2021, 1H22, 2H22, 2023 and 2024 to-date.



Source: LPX, J.P. Morgan.

- In the event this gap between robust fundraising and weak exits continues there could be spillover effects from private equity to broader markets. If PE investors struggle to meet capital commitments they have made via participating in previous fundraising rounds because cashflows from existing investments prove insufficient, then they could be forced to sell assets in order to meet these commitments. And capital calls by private equity funds for example tend to rise during downturns as the sponsored companies struggle for survival, potentially exacerbating the problem.
- This headwind to payouts to PE investors can also be seen in a rising gap between distribution and capital call rates, shown in Figure 5. It shows the 12-month rolling distribu-

22 August 2024

tions of cash as a percentage of NAV and the 12-month rolling capital calls as a percentage of dry powder, as well as the z-score of the difference between distribution and capital call rates. Capital call rates rose sharply in 2021 and 2022 as PE fund managers sought to increase deal activity, but while they have slowed from their 3Q22 highs capital calls remain at the upper end of their pre-pandemic ranges. At the same time, distribution rates have declined from their 2021 high as exit activity slowed to levels last seen in 2010. As a result, the z-score of the difference between the distribution and capital call rates remains rather depressed the past two decades. Not only has the gap between the two remained depressed, but net cash flows to PE investors have turned negative in notional terms as well as capital calls are outpacing distributions (Figure 6). Another manifestation of this bottleneck in exits is that the share of NAV that has been held for more than 7 years in PE funds has increased from around a quarter in 2021 to around a third in mid-2023 according to Pitchbook data.

**Figure 5: Global private equity (PE) distribution and capital call rates**

Distribution rate as a % of NAV and capital call rate as a % of dry powder in % (lhs), z-score of the difference between distribution and capital call rate (rhs).



Source: Pitchbook, J.P. Morgan.

**Figure 6: Global PE net cash flows as difference between distributions and contributions**



Source: Pitchbook, J.P. Morgan.

- This negative gap between distributions and capital calls, while perhaps not large in magnitude, nonetheless highlights a vulnerability to negative shocks in the current conjuncture. While broader market sentiment in listed equity and bond markets has improved, after weaker than expected US labor market data had prompted a notable increase in concerns over recession risk, there is an apparent fragility in market sentiment. And in the event recession risks increase or even materialise, this negative gap between distributions and capital calls could worsen. And as we note above, eventually this could force investors to sell public assets to meet these private asset commitments (similar to 2008) or sell private assets in secondary markets. The development and growth in the secondary market in private equity following the financial crisis has been a positive development in this regard as it means there is an alternative route for investors to raise liquidity by offloading private equity stakes. Coupled with publicly listed markets holding up, this likely provides some confidence for PE investors that they will be able to meet capital calls for new commitments.
- There are some signs that the pickup in activity in secondary markets in 2Q24 after a weak 1Q has continued in 3Q thus far (Figure 7). Given that the dry powder of secondary funds stood at around \$235bn in 2H23 according to Pitchbook estimates, this suggests that there is significant space to absorb these sales. In 2H23, a similar increase in the pace of exits vs. a weaker 1H23 was accompanied by an improvement in discounts to NAV on secondary transactions according to Jefferies data. But this improvement was in part flattered by PE investors selling newer vintages to reduce discounts as they sought to raise liquidity to free up capital for new investments. The capacity of secondary markets to absorb stakes when PE investors need

to raise liquidity is clearly a positive, in particular compared to 2008 when the secondary market for private equity was just emerging in response to the bottleneck the financial crisis at the time had inflicted on private equity. But if this tendency to sell recent vintages to raise liquidity to meet commitments in subsequent fundraisings continues, it also underscores this vulnerability arising from the negative gap between distributions and capital calls. In this regard, a pickup in exits would clearly be welcome.

Figure 7: US secondary buyout PE deal activity

\$bn, 3Q24 as of Aug 20th.

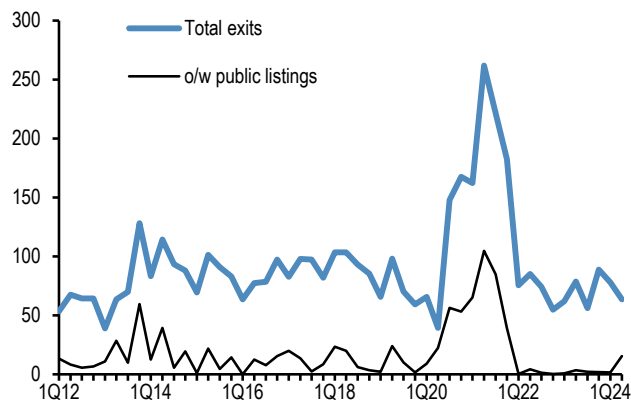


Source: Pitchbook, J.P. Morgan.

- When it comes to exits, however, the picture is rather mixed. On the positive side, the fact US PE saw an uptick in exits via public listings in 2Q24 to \$15bn (Figure 8), almost equalling the combined total of the prior nine quarters since the start of 2022, was clearly positive. At the same time, the total pace of exits of just under \$65bn is below the quarterly average since the start of 2022 of just under \$75bn, as well as below the average pace of exits in the five years preceding the financial crisis of around \$85bn per quarter. This suggests a rather low exit pace when factoring in the growth in the PE universe relative to the pre-pandemic period.

Figure 8: Quarterly US PE exits

In \$bn.



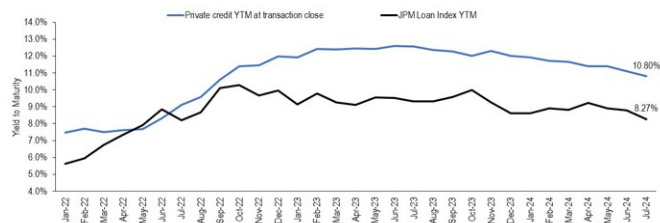
Source: Pitchbook, J.P. Morgan.

- The start of an eventual easing cycle by the Fed should provide some relief as it could signal that after a prolonged period of high interest costs this headwind for older vintages could begin to recede. However, this clearly depends on the catalyst for these rate cuts. If it represents a gradual shift away from tight monetary conditions towards neutral as inflation settles closer to target and growth holds up, this would clearly be positive. If, on the other hand, it represents the start of a cutting cycle amid an economy that approaches contraction, the implications are clearly less benign and the reduced headwind from interest costs would likely be more than offset by a hit to cash flows generated by the underlying companies.
- While the above highlights a vulnerability for private equity, in private credit there are fewer causes for concern. Private credit deals have typically been transacted at higher yields than leveraged loans (Figure 9), giving some cushion to absorb defaults, and the regular interest payments create a steadier stream of cash flows. Indeed, as we note above, there has been some moderation in fundraising, and an improvement in sentiment has seen improved capital market conditions for syndicated loans and seen a recapturing of market share by public markets from private lenders. Indeed, increased competition between private and syndicated markets has seen around \$24bn of syndicated loans refinanced into private credit and around \$23bn of direct loans into syndicated loans YTD. Moreover, default activity in private credit and leveraged loans have been broadly comparable ([JPM High Yield and Leveraged Loans](#), Aug 14th).
- What about real estate? High interest rates remain a headwind for commercial real estate, challenging both valuations and refinancing. Legacy non-transacted private real estate has yet to be revalued properly as we previously explained in our sister publication AIOS. That said, simi-

22 August 2024

lar to private credit, there is steadier stream of cash flows in real estate which combined with some moderation in fundraising reduces the risk of the bottleneck we fear for private equity where investors might be forced to sell public assets to meet capital calls. In all, any spillover effects from private assets to public markets are more likely to emanate from private equity rather than private credit or real estate. That said, rising delinquency rates which are evident in the office space do pose risks to segments of credit markets such as more office-exposed CMBS.

Figure 9: Private credit transactions v Public market pricing



Source: J.P. Morgan. YTM Includes OID.

### The recent rebound in US liquidity or money supply should prove temporary

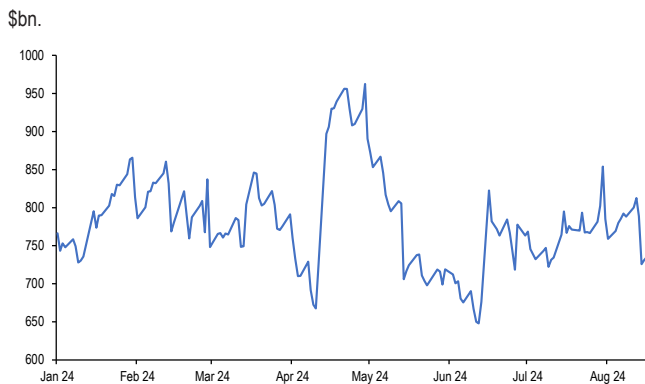
- We had argued previously in our publication that the US liquidity or money supply backdrop, i.e. the sum of the stock of US bank deposits and Money Market Funds (MMFs), has likely entered a mildly contracting trend from April onwards. This forecast of mildly contracting trend of US liquidity that we previously envisaged to last until at least year-end reflected three factors: 1) continuation of the Fed's QT till at least year-end even as the QT pace was halved from June onwards; 2) a bottoming out in the usage of the Fed's reverse repo facility by domestic counterparties; and 3) a milder expansion of US bank loans compared to previous years.
- After contracting in April, US liquidity or money supply rebounded in recent months (Figure 10). While this rebound challenges our above forecast for a mildly contracting trend until at least year-end, we believe that our forecast is still reasonable and that the recent rebound in US liquidity is likely to prove temporary. In our mind there have been two recent boosts to US liquidity.
- One temporary boost to US liquidity emanated from the recent decline in the US Treasury General Account (TGA) to below the \$850bn level the US Treasury expects for September-end. As the TGA balance rises from its current level of \$743bn to \$850bn by September-end, this would exert downward pressure on US liquidity.

Figure 10: Stock of US M2 money supply proxied by the sum of the stock of US commercial bank deposits and the AUM of US MMFs



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

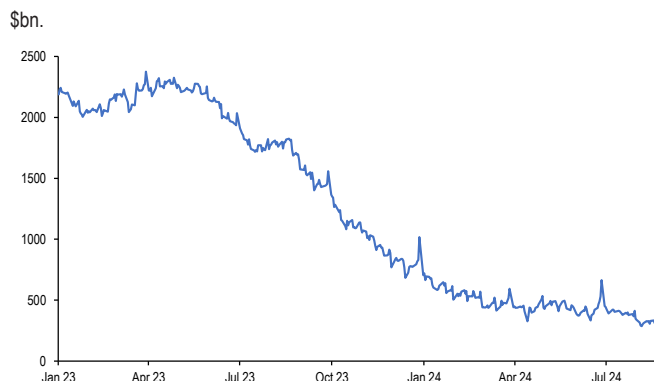
Figure 11: US Treasury General Account (TGA) at the Fed



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

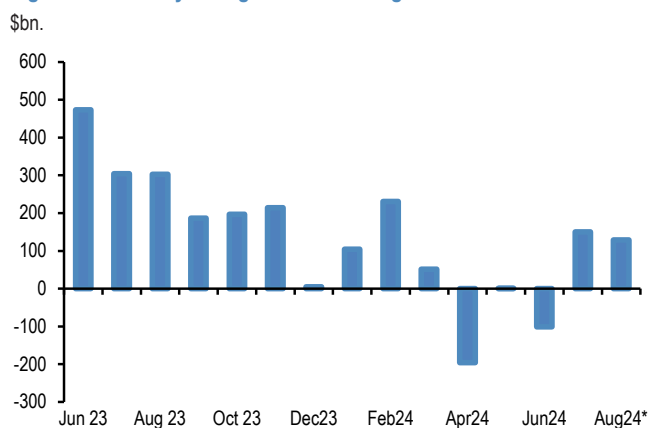
- The second temporary boost emanated from the recent reduction in the Fed's reverse repo facility to below \$300bn in August (Figure 12). In turn this reduction was driven by elevated US Tbill issuance during July and August (Figure 13) that induced US money market funds to shift from reverse repos to Tbills. This force is likely behind us as we expect very little Tbill issuance between now and year-end and we thus look for the Fed's reverse repo facility to stop declining and hover at close to current levels.

**Figure 12: Fed's Reverse Repo facility usage by domestic counterparties**



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

**Figure 13: Monthly change in outstanding T-bills**

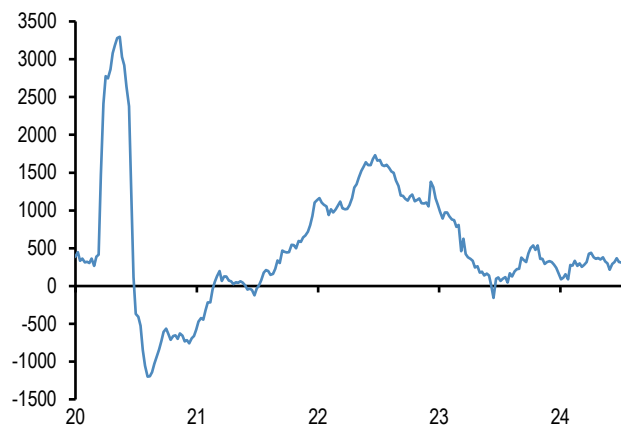


Source: Federal Reserve, J.P. Morgan.

- With these two temporary boosts likely behind us, the Fed's ongoing QT and a milder expansion of US bank loans (Figure 14) should all combine to create a contracting trajectory for US liquidity or money supply into year end. And this would represent a big change from the past year and in particular the 11-month period between the end of April 2023 and the end of March 2024, when US money supply had expanded by \$1.3tr, largely as the result of the liquidity injection induced by the \$1.8tr reduction in the Fed's reverse repo facility. Over the past few years, we can thus detect three phases in the trajectory for US liquidity or money supply: a mildly contracting phase from the beginning of 2022 to April 2023, a rapidly expanding phase from the end of April 2023 to the end of March 2024 and a return to a mildly contracting phase from April this year onwards.

**Figure 14: US commercial bank loan growth**

3-month (or 13-week) annualized pace of loan growth in \$bn.



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

**While euro area companies appear to have accumulated a rather heavy effective long EUR position, speculative investors such as CTAs have to yet to reach extreme long EUR territory**

- With expectations on Fed rate cuts intensifying on US recession fears the dollar has come under pressure in particular against the euro given a backdrop of more resilient euro area growth. With the euro breaking out above 1.11, a level which over the past year and a half had triggered mean reversion, a question arises about the current extremity of short dollar/long euro positions.
- Starting first with currency only hedge funds, they appear to have started the year with a long dollar stance during January as suggested by the positive beta between the monthly HFRI Currency HF index and the JPM USD tradeable index. According to Figure 15 this positive beta was also present until May but appears to have got unwound during June and July. In other words, currency hedge funds appear to have entered August rather neutral on the dollar.

22 August 2024

**Figure 15: Currency HF and USD returns**

Monthly returns of the HFRI Currency HF index and the JPM USD tradable index.



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

- That said, the speculative position indicator based on the non-commercial category of CFTC data which includes a broader set of macro managers beyond currency only hedge funds, had pointed to a modest long dollar base at the end of July (Figure 16). Surely some of that previous long dollar base in Figure 16 was due to systematic funds such as CTAs. In particular, the signals from our momentum-based framework (see Tables A3 and A4 in the Appendix) that we regularly use to proxy positioning by momentum traders such as CTAs, pointed to much heavier yen shorts relative to euro shorts at the end of July (Figure 17). While these previous extreme short yen positions by systematic funds swung from extremely short to extremely long territory and then back down to neutral over the past three weeks, previous euro shorts have seen more orderly unwinding shifting from modestly short territory at the end of July to modestly long territory currently. So in our framework, momentum traders such as CTAs have yet to reach extreme long positions in the euro.

**Figure 16: Spec position indicator on aggregate USD**

As a % of open interest. Last obs. 13th Aug 24.



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

**Figure 17: Momentum Signals for the Euro and the Yen**

Average z-score of Short and Long term momentum signal in our Trend Following Strategy framework shown in Tables A3 and A4 in the Appendix.



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

- What about corporates? Corporate hedging behavior can also be important for currency moves as corporates come under pressure to boost their hedges when currency fluctuations increase. What evidence do we have on corporate hedging behavior? Gauging corporate hedging behavior or their currency exposure is a difficult task given that corporates face multiple currency influences both in terms of cash flow and balance sheet items. In addition, their reporting on hedges is rather sporadic, lagged and incomplete. To overcome this difficulty, we apply a framework first presented in Gauging corporate fx hedging, Sep 2017, that draws on the academic literature that has devised indirect ways to gauge corporates' currency exposures via measuring the sensitivity of equity values to for-

eign exchange changes.

- We follow the extensive academic literature built on the original paper by Adler and Dumas ( “Exposure to Currency Risk” 1984) and we proxy the currency exposure of corporates via the following bivariate regression at the individual firm level:

- $R_{i,t} = a + c_i \times RM_{t,t} + b_i \times \Delta FX_{t,t} + \text{residual}$ .

- where  $R_{i,t}$  is the return on the equity value of the firm  $i$  for the period  $t-1$  to  $t$ ,  $RM_{t,t}$  is the return on the market portfolio proxied by a country’s equity index in local currency terms,  $c_i$  is the firm’s market beta,  $\Delta FX_{t,t}$  is the change in the relevant trade weighted exchange rate for the period  $t-1$  to  $t$  and  $b_i$  is the firm’s exchange rate beta.
- This exchange rate beta coefficient is used as proxy for each firm’s net currency exposure. It effectively reflects the change in each firm’s value that can be explained by movements in the exchange rate after conditioning on the market return. Most empirical academic studies follow the above specification, i.e. they include the return to a market portfolio along with the exchange rate variable in their regression models. The market portfolio return not only controls for “macro” influences on a firm’s value outside the exchange rate, but also improves the precision of the regression coefficient estimates as the residual variance of the model is dramatically reduced.
- We apply this framework to both euro area large cap companies, i.e. the 50 companies behind the Eurostoxx50 index, and small cap companies, i.e. the 50 biggest companies behind the Eurostoxx Small Cap index. Figure 18 shows these average betas, i.e. the average of the bivariate regression coefficients across 50 individual firm regression models for Eurostoxx50 and for 50 small-cap companies. The regressions are done over 6-month rolling periods and are based on weekly equity returns and currency changes of the JPM euro trade weighted index. Given the 6-month rolling periods the betas tend to be more backward looking and as a result more difficult to interpret. That said, the abrupt increases in Figure 18 do suggest that Euro area companies had accumulated a rather heavy effective long euro position, perhaps due to importers’ reluctance to hedge their structural long euro position or due to exporters overhedging their structural short euro position.

**Figure 18: Average beta of Eurostoxx 50 companies and Eurostoxx Mid-Cap to trade-weighted EUR**

Rolling 26 weeks average betas based on a bivariate regression of the weekly returns of individual stocks in the Eurostoxx 50 index to the weekly returns of the MSCI AC World and JPM EUR Nominal broad effective exchange rate (NEER).



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

**Speculative investors’ positions across commodity futures look oversold in Brent oil, neutral in copper and overbought in gold**

- With Brent oil prices about to breach this year’s low, how oversold are oil positions? As we argued previously the mean of net long positions in Brent futures by the managed money category appears to have experienced a structural shift post the pandemic, as the supply of net short positions by the “producer/user” category has been reduced. After taking this structural break into account, we find that discretionary spec investors have exhibited marked OVs in oil futures in September 2023 and early April 2024 but have shifted in the opposite direction in recent weeks shifting to historically very oversold levels (Figure 19).



22 August 2024

**Figure 19: Net speculative (managed money) longs in Brent futures**

% of open interest. Dashed line shows average for 2015-2019 and 2020 onward.



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

- What about other commodities? For copper futures, whether one looks at the speculative/managed money positions (Figure 20) or our momentum signals as a proxy of how momentum traders such as CTAs are positioned (Figure 21), positions look close to neutral. For gold futures whether one looks at the speculative/managed money positions (Figure 22) or our momentum signals as a proxy of how momentum traders such as CTAs are positioned (Figure 23), positions look rather overbought.

**Figure 20: Net speculative (managed money) longs in copper future**

As a % of open interest.



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

**Figure 21: Momentum signals for copper futures**

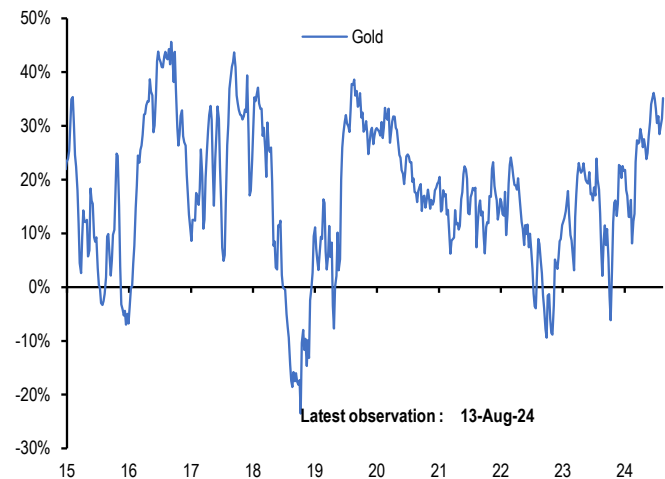
Average z-score of shorter- and longer-term signals.



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

**Figure 22: Net speculative (managed money) longs in gold futures**

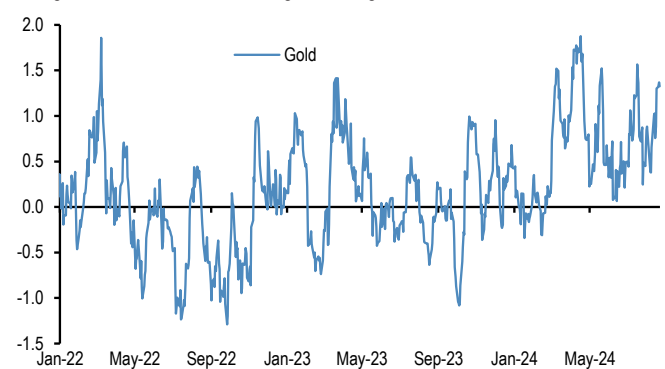
% of open interest.



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

**Figure 23: Momentum signals for gold futures**

Average z-score of shorter- and longer-term signals.



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

## Appendix

### Chart A1: Global equity & bond fund flows

\$bn per year of Net Sales, i.e. includes net new sales + reinvested dividends for Mutual Funds and ETFs globally, i.e. for funds domiciled both inside and outside the US. Flows come from ICI (worldwide data up to Q1'24). Data since then are a combination of monthly and weekly data from Lipper, EPFR and ETF flows from Bloomberg Finance L.P.



Source: ICI, EPFR, Lipper, Bloomberg Finance L.P., J.P. Morgan.

### Table A1: Flow Monitor

\$bn per week. The first two rows include Mutual Fund and ETF flows globally, i.e. flows for funds domiciled both inside and outside the US (source: EPFR). The last four rows only include funds domiciled in the US. International Equity funds are equity funds domiciled in the US that invest outside the US (source: ICI and Bloomberg Finance L.P.).

| MF & ETF Flows     | 14-Aug | 4 wk avg  | 13 wk avg | 2024 avg |
|--------------------|--------|-----------|-----------|----------|
| All Equity         | 11.52  | 13.1      | 14.2      | 10.4     |
| All Bond           | 6.36   | 11.8      | 12.3      | 11.6     |
| US Equity          | -4.67  | -4.5      | -1.6      | -3.9     |
| US Bonds           | 1.46   | 3.5       | 5.1       | 6.9      |
| Non-US Equity      | 16.19  | 17.6      | 15.8      | 14.2     |
| Non-US Bonds       | 4.90   | 8.2       | 7.2       | 4.5      |
| US Taxable Bonds   | 6.73   | 5.9       | 6.1       | 4.8      |
| US Municipal Bonds | 0.13   | 0.2       | 0.1       | 0.1      |
| US HG Bonds        | 5.57   | 3.6       | 3.4       | 4.2      |
| US HY Bonds        | -0.38  | -0.9      | 0.1       | 0.3      |
| US MMFs            | 29.58  | 7.8       | 9.6       | 8.7      |
| UCITS Flows        | May-24 | 3 mth avg | 2023 avg  | 2024 avg |
| Euro MMFs          | -13.13 | 2.08      | 15.63     | 4.06     |
| Euro Equities      | 28.53  | 8.7       | 0.6       | 7.7      |
| Euro Bonds         | 22.24  | 23.5      | 12.3      | 28.5     |

Source: ICI, EPFR, EFAMA, Bloomberg Finance L.P., and J.P. Morgan.

### Chart A2: Fund flow indicator

**Difference between flows into Equity and Bond funds:** \$bn per week. Difference between flows into Equity vs. Bond funds in \$bn per week. Flows include Mutual Fund and ETF flows globally, i.e. funds domiciled both inside and outside the US (source: EPFR). The thin blue line shows the 4-week average of difference between Equity and Bond fund flows. Dotted lines depict  $\pm 1$  StDev of the blue line. The thick black line shows a smoothed version of the same series. The smoothing is done using a Hodrick-Prescott filter with a Lambda parameter of 100.



Source: EPFR, J.P. Morgan.

### Table A2: Trading turnover monitor

Volumes are monthly and Turnover ratio is annualised (monthly trading volume annualised divided by the amount outstanding). UST Cash is primary dealer transactions in all US government securities. UST futures are from Bloomberg Finance L.P. JGBs are OTC volumes in all Japanese government securities. Bunds, Gold, Oil and Copper are futures. Gold includes Gold ETFs. Min-Max chart is based on Turnover ratio. For Bunds and Commodities, futures trading volumes are used while the outstanding amount is proxied by open interest. The diamond reflects the latest turnover observation. The thin blue line marks the distance between the min and max for the complete time series since Jan-2005 onwards. Y/Y change is change in YTD notional volumes over the same period last year.

| As of Jul-24          | MIN | MAX | Turnover ratio | Vol (tr) | y/y chng |
|-----------------------|-----|-----|----------------|----------|----------|
| <b>Equities</b>       |     |     |                |          |          |
| EM Equity             | ◆   | —   | 0.8            | \$0.9    | 10%      |
| DM Equity             | ◆   | —   | 0.8            | \$4.7    | 3%       |
| <b>Govt Bonds</b>     |     |     |                |          |          |
| UST cash              | ◆   | —   | 13.0           | \$18.2   | 18%      |
| UST futures           | ◆   | —   | 0.8            | \$14.8   | 23%      |
| JGBs                  | —   | ◆   | 47.9           | ¥4,796   | 20%      |
| Bund futures          | —   | ◆   | 1.5            | €5.6     | 23%      |
| <b>Credit</b>         |     |     |                |          |          |
| US HG                 | —   | ◆   | 0.9            | \$0.6    | 21%      |
| US HY                 | ◆   | —   | 0.7            | \$0.1    | 9%       |
| US Convertibles       | —   | ◆   | 2.7            | \$0.03   | 11%      |
| <b>Commodities</b>    |     |     |                |          |          |
| Gold                  | —   | ◆   | 49.3           | \$1.5    | 25%      |
| Oil                   | —   | ◆   | 93.4           | \$3.0    | -13%     |
| Copper                | —   | ◆   | 2.1            | \$0.6    | 30%      |
| <b>Digital Assets</b> |     |     |                |          |          |
| CME Bitcoin           | ◆   | —   | 77.7           | \$0.070  | 172%     |
| CME Ethereum          | ◆   | —   | 162.0          | \$0.016  | 91%      |

\* Data with one month lag

Source: Bloomberg Finance L.P., Federal Reserve, Trace, Japan Securities Dealer Association, WFE, J.P. Morgan.

## ETF Flow Monitor (as of 14th Aug)

**Chart A3: Global Cross Asset ETF Flows**

Cumulative flow into ETFs as a % of AUM



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

**Chart A5: Global Equity ETF Flows**

Cumulative flow into global equity ETFs as a % of AUM



Source: Bloomberg Finance L.P., J.P. Morgan.  
 Note: We include ETFs with AUM > \$200mn in all the flow monitor charts. Chart A5 exclude China On-shore (A-share) ETFs from EM and in Japan. We subtract the BoJ buying of ETFs.

**Chart A4: Bond ETF Flows**

Cumulative flow into bond ETFs as a % of AUM



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

**Chart A6: Equity Sectoral and Regional ETF Flows**

Rolling 3-month and 12-month change in cumulative flows as a % of AUM. Both sorted by 12-month change



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

## Short Interest Monitor

**Chart A7: Short interest on the EEM and EMB US ETF**

Short Interest as a % share of share outstanding.



Source: S3, J.P. Morgan

**Chart A9: Short interest on the SPY and QQQ US ETF**

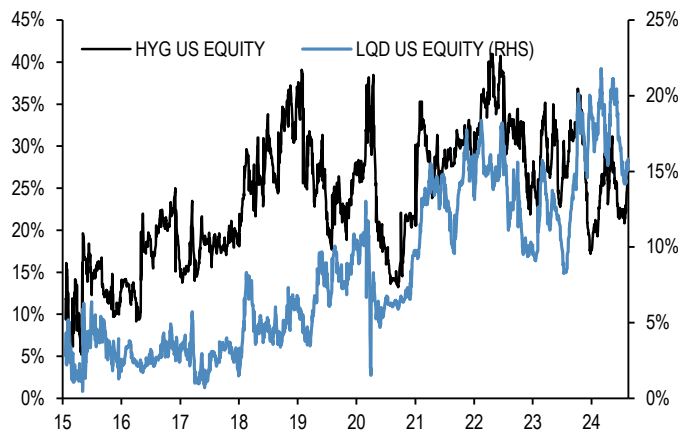
Short Interest as a % share of share outstanding. Last obs is for 16<sup>th</sup> August 2024.



Source: S3, J.P. Morgan

**Chart A8: Short interest on the LQD and HYG US ETF**

Short Interest as a % share of share outstanding.



Source: S3, J.P. Morgan

**Chart A10: S&P500 sector short interest**

Short interest as a % of shares outstanding based on z-scores. A strategy which overweights the S&P500 sectors with the highest short interest z-score (as % of shares o/s) vs. those with the lowest, produced an information ratio of 0.7 with a success rate of 56% (see F&L, Jun 28,2013 for more details).



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

## Chart A11a: Cross Asset Volatility Monitor 3m ATM Implied Volatility (1y history), as of 20th Aug-2024

This table shows the richness/cheapness of current three-month implied volatility levels (red dot) against their one-year historical range (thin blue bar) and the ratio to current realised volatility. Assets with implied volatility outside their 25th/75th percentile range (thick blue bar) are highlighted. The implied-to-realised volatility ratio uses 3-month implied volatilities and 1-month (around 21 trading days) realised volatilities for each asset.

| Asset              | Current | Low | Low date  | High | High date | Upside | Downside | Implied/realized volatility |
|--------------------|---------|-----|-----------|------|-----------|--------|----------|-----------------------------|
| S&P 500            | 14%     | 11% | 21-May-24 | 25%  | 05-Aug-24 | 11%    | 2%       | 0.58x                       |
| EuroSTOXX          | 14%     | 12% | 20-May-24 | 20%  | 05-Aug-24 | 6%     | 2%       | 0.70x                       |
| Nikkei 225         | 22%     | 16% | 02-Jul-24 | 37%  | 05-Aug-24 | 15%    | 7%       | 0.31x                       |
| Hang Seng          | 19%     | 18% | 10-Jul-24 | 25%  | 06-Feb-24 | 6%     | 1%       | 0.99x                       |
| MSCI EM            | 15%     | 11% | 28-Mar-24 | 32%  | 26-Jan-24 | 17%    | 3%       | 0.68x                       |
| Gold               | 17%     | 10% | 27-Feb-24 | 17%  | 12-Aug-24 | 0%     | 7%       | 1.00x                       |
| Oil (brent)        | 26%     | 20% | 15-Jul-24 | 41%  | 13-Oct-23 | 15%    | 6%       | 0.87x                       |
| Copper             | 22%     | 15% | 01-Mar-24 | 31%  | 20-May-24 | 9%     | 7%       | 0.94x                       |
| BB commodity index | 13%     | 12% | 12-Jul-24 | 16%  | 23-Aug-23 | 2%     | 1%       | 1.15x                       |
| EUR/USD            | 6%      | 5%  | 12-Jul-24 | 8%   | 20-Oct-23 | 1%     | 1%       | 0.99x                       |
| USD/NOK            | 12%     | 9%  | 23-May-24 | 14%  | 24-Aug-23 | 2%     | 3%       | 1.16x                       |
| USD/JPY            | 11%     | 8%  | 27-Feb-24 | 13%  | 05-Aug-24 | 1%     | 4%       | 0.55x                       |
| GBP/USD            | 7%      | 6%  | 13-Mar-24 | 8%   | 04-Oct-23 | 1%     | 1%       | 1.84x                       |
| USD/CHF            | 8%      | 6%  | 12-Jul-24 | 9%   | 05-Aug-24 | 1%     | 2%       | 0.70x                       |
| 10y US swaps       | 96%     | 88% | 22-May-24 | 135% | 20-Oct-23 | 39%    | 8%       | 1.00x                       |
| 10y Eur swaps      | 70%     | 67% | 22-Jul-24 | 109% | 10-Oct-23 | 39%    | 3%       | 1.44x                       |
| CDX IG             | 48%     | 36% | 20-May-24 | 60%  | 05-Aug-24 | 12%    | 12%      | 1.27x                       |
| CDX HY             | 39%     | 30% | 12-Jun-24 | 46%  | 27-Oct-23 | 8%     | 9%       | 1.29x                       |
| iTraxx             | 47%     | 37% | 22-Nov-23 | 61%  | 05-Aug-24 | 14%    | 9%       | 0.92x                       |
| iTraxx X/O         | 42%     | 32% | 22-Nov-23 | 54%  | 05-Aug-24 | 12%    | 10%      | 1.09x                       |

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

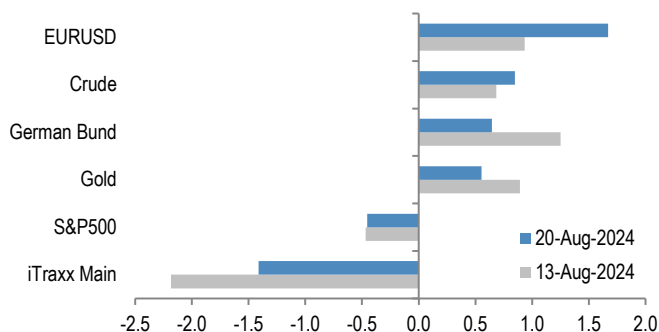
Note: Swaps volatility is 3m 10y payer ATM implied annualized BP vol and credit volatility is 3m 5y on-the-run ATM spread volatility. MSCI EM, Gold, Oil, Copper, BB Commodity Index and Treasury futures are 3m implied vol from Bloomberg.

### Definitions:

|                              |   |
|------------------------------|---|
| Current:                     | Latest available closing level (19-Aug-24)  |
| Low:                         | Lowest closing level in the last 1y   |
| Low date:                    | Date the lowest closing level was reached (or the first time it was reached in the case of several identical low closing levels)                    |
| High:                        | Highest closing level in the last 1y  |
| High date:                   | Date the highest closing level was reached (or the first time it was reached in the case of several identical high closing levels)                  |
| Graph:                       | Shows the current level and the 25th/75th percentile relative to the 1y high/low  |
| Upside:                      | Implied return/volatility percentage points from current level up to the High (note: return is calculated as simple difference for spread products) |
| Upside (σ):                  | Upside in terms of standard deviations (Upside / Current 1y realized volatility)  |
| Downside:                    | Implied return/volatility percentage points from current level down to the Low (note: return calculated as simple difference for spread products)   |
| Downside (σ):                | Downside in terms of standard deviations (Downside / Current 1y realized volatility)  |
| Implied/realized volatility: | Current 3m implied volatility / current realized 3m volatility  |

**Chart A11b: Option skew monitor**

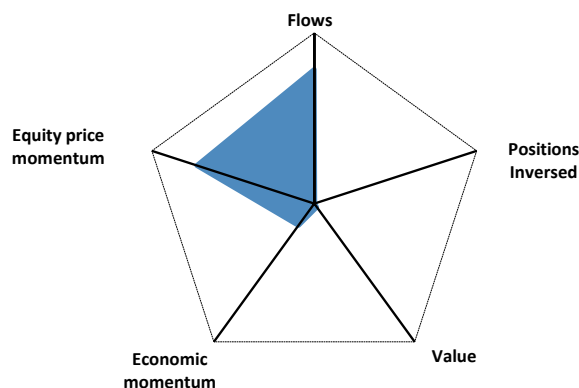
Skew is the difference between the implied volatility of out-of-the-money (OTM) call options and put options. A positive skew implies more demand for calls than puts and a negative skew, higher demand for puts than calls. It can therefore be seen as an indicator of risk perception in that a highly negative skew inequities is indicative of a bearish view. The chart shows z-score of the skew, i.e. the skew minus a rolling 2-year avg skew divided by a rolling two-year standard deviation of the skew. A negative skew on iTraxx Main means investors favour buying protection, i.e. a short risk position. A positive skew for the Bund reflects a long duration view, also a short risk position.



Source: J.P. Morgan.

**Chart A11c: Equity-Bond metric map**

**Explanation of Equity - Bond metric map:** Each of the five axes corresponds to a key indicator for markets. The position of the blue line on each axis shows how far the current observation is from the extremes at either end of the scale. For example, a reading at the centre for value would mean that risky assets are the most expensive they have ever been while a reading at the other end of the axis would mean they are the cheapest they have ever been. Overall, the larger the blue area within the pentagon, the better for the risky markets. All variables are expressed as the percentile of the distribution that the observation falls into. I.e. a reading in the middle of the axis means that the observation falls exactly at the median of all historical observations. **Value:** The slope of the risk-return trade-off line calculated across USTs, US HG and HY corporate bonds and US equities (see GMOS p. 6, Loeys et al, Jul 6 2011 for more details). **Positions:** Difference between net spec positions on US equities and intermediate sector UST. See Chart A13. **Flow momentum:** The difference between flows into equity funds (incl. ETFs) and flows into bond funds. Chart A1. We then smooth this using a Hodrick-Prescott filter with a lambda parameter of 100. We then take the weekly change in this smoothed series as shown in Chart A1. **Economic momentum:** The 2-month change in the global manufacturing PMI. (See REVISITING: Using the Global PMI as trading signal, Nikolaos Panigirtzoglou, Jan 2012). **Equity price momentum:** The 6-month change in the S&P500 equity index. As of 16th Aug 24.



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

## Spec position monitor

### Chart A12: Weekly Spec Position Monitor

Net spec positions are proxied by the number of long contracts minus the number of short contracts using the speculative category of the Commitments of Traders reports (as reported by CFTC). To proxy for speculative investors for equity and US Treasury bond futures positions we use Asset managers and leveraged funds (see Chart A13), whereas for other assets we use the legacy Non-Commercial category. This net position is then converted to a dollar amount by multiplying by the contract size and then the corresponding futures price. We then scale the net positions by open interest. The chart shows the z-score of these net positions. US rates is a duration-weighted composite of the individual UST futures contracts excluding the Eurodollar contract.



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

### Chart A13: Positions in US equity futures by Asset managers and Leveraged funds

CFTC positions in US equity futures by Leveraged funds and Asset managers (as a % of open interest). It is an aggregate of the S&P500, DowJones, NASDAQ and their Mini futures contracts.



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

### Chart A14: Spec position indicator on Risky vs. Safe currencies

Difference between net spec positions on risky & safe currencies. Net spec position is calculated in USD across 5 'risky' and 3 'safe' currencies (safe currencies also include Gold). These positions are then scaled by open interest and we take an average of 'risky' and 'safe' assets to create two series. The chart is then simply the difference between the "risky" and "safe" series. The final series shown in the chart below is demeaned using data since 2006. The risky currencies are: AUD, NZD, CAD, MXN and BRL. The safe currencies are: JPY, CHF and Gold.



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

### Chart A15: Spec position indicator on US equity futures vs. intermediate sector UST futures

Difference between net spec positions on US equity futures vs. intermediate sector UST futures. This indicator is derived by the difference between total CFTC positions in US equity futures by Asset managers + Leveraged Funds scaled by open interest minus the Asset managers + Leveraged Funds spec position on intermediate sector UST futures (i.e. all UST futures duration weighted ex ED and ex 2Y UST futures) also scaled by open interest.

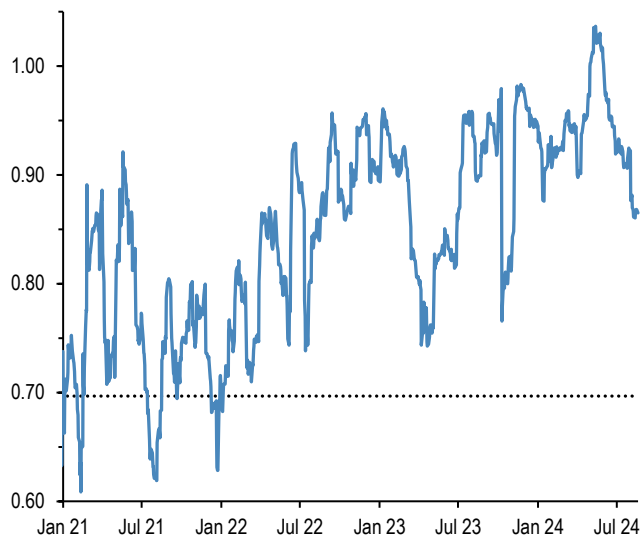


Source: CFTC, Bloomberg Finance L.P. and J.P. Morgan

## Mutual fund and hedge fund betas

**Chart A16: 21-day rolling beta of 20 biggest active US bond mutual fund managers with respect to the US Agg Bond Index**

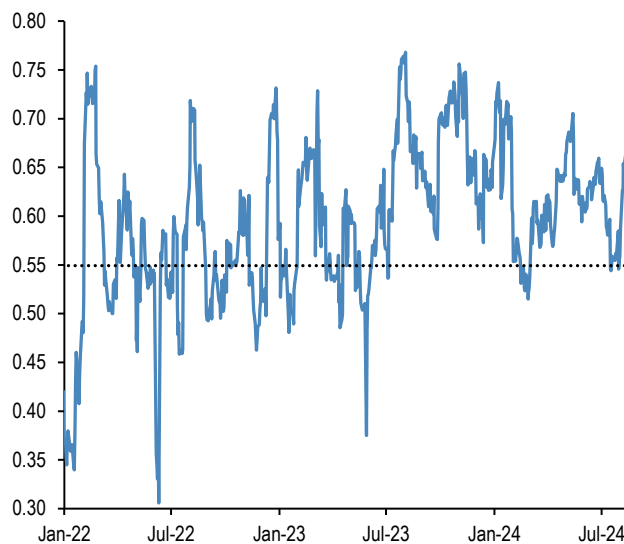
The dotted line shows the average beta since 2013.



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

**Chart A17: 21-day rolling beta of 20 biggest active Euro bond mutual fund managers with respect to the Euro Agg Bond Index**

The dotted line shows the average beta since 2013.



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

**Chart A18: Performance of various type of investors**

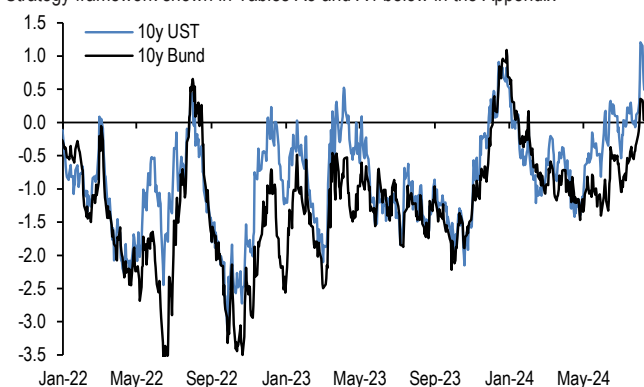
The table depicts the performance of various types of investors in % as of 13th August 2024.

| Date                       | 2018  | 2019  | 2020  | 2021  | 2022   | 2023  | 2024  |
|----------------------------|-------|-------|-------|-------|--------|-------|-------|
| <b>Investors</b>           |       |       |       |       |        |       |       |
| Equity L/S                 | -4.8% | 12.6% | 13.4% | 9.3%  | -7.0%  | 11.3% | 8.6%  |
| Macro ex-CTAs              | -2.0% | 5.6%  | 4.9%  | 4.3%  | 11.5%  | 1.3%  | 3.6%  |
| CTAs                       | -3.7% | 7.1%  | 1.2%  | 8.8%  | 14.7%  | -2.5% | 5.2%  |
| Risk Parity Funds          | -6.5% | 18.4% | 3.5%  | 4.7%  | -18.6% | 6.0%  | 6.5%  |
| US Balanced MFs            | -4.9% | 20.1% | 13.2% | 14.4% | -13.0% | 13.8% | 9.8%  |
| <b>Benchmark</b>           |       |       |       |       |        |       |       |
| MSCI AC World              | -9.4% | 26.6% | 16.3% | 16.4% | -18.4% | 22.2% | 14.7% |
| Barclays Global Agg        | 1.8%  | 8.2%  | 5.6%  | -2.5% | -11.2% | 7.1%  | 3.4%  |
| 60 US Equity : 40 US Bonds | -1.9% | 22.2% | 13.3% | 14.8% | -15.4% | 18.6% | 12.4% |
| S&P Riskparity Vol 10      | -4.3% | 22.8% | 11.5% | 12.8% | -16.2% | 15.0% | 5.0%  |

Source: Bloomberg Finance L.P., HFR, Pivotal Path, J.P. Morgan.

**Chart A19: Momentum signals for 10Y UST and 10Y Bunds**

Average z-score of Short- and Long-term momentum signal in our Trend Following Strategy framework shown in Tables A3 and A4 below in the Appendix



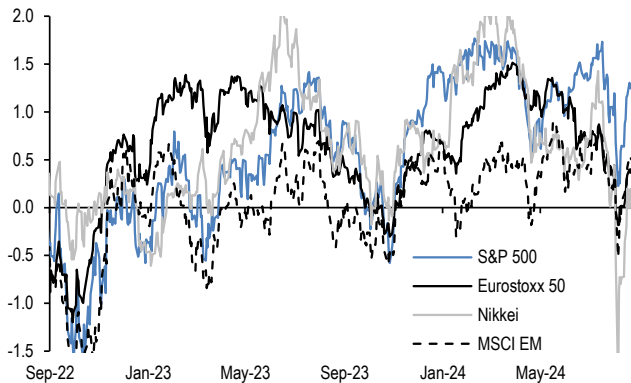
Source: Bloomberg Finance L.P., J.P. Morgan.



22 August 2024

**Chart A20: Momentum signals for S&P500**

Average z-score of Short- and Long-term momentum signal in our Trend Following Strategy framework shown in Tables A3 and A4 below in the Appendix.



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

**Chart A21: Equity beta of US Balanced Mutual funds and Risk Parity funds**

Rolling 21-day equity beta based on a bivariate regression of the daily returns of our Balanced Mutual fund and Risk Parity fund return indices to the daily returns of the S&P 500 and BarCap US Agg indices. Given that these funds invest in both equities and bonds we believe that the bivariate regression will be more suitable for these funds. Our risk parity index consists of 25 daily reporting Risk Parity funds. Our Balanced Mutual fund index includes the top 20 US-based active funds by assets and that have existed since 2006. Our Balanced Mutual fund index has a total AUM of \$700bn, which is around half of the total AUM of \$1.5tr of US based Balanced funds which we believe to be a good proxy of the overall industry. It excludes tracker funds and funds with a low tracking error. Dotted lines are average since 2015.



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

**Chart A22: Equity beta of monthly reporting Equity Long/Short hedge funds**

Proxied by the ratio of the monthly performance of Pivotal Path Asset-Weighted Equity Hedge fund index divided by the monthly performance of MSCI ACWorld Index.



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

**Chart A23: USD exposure of currency hedge funds**

The net spec position in the USD as reported by the CFTC. Spec is the non-commercial category from the CFTC.



Source: CFTC, Barclay, Datastream, Bloomberg Finance L.P., J.P. Morgan.

## CTAs – Trend following investors' momentum indicators

**Table A3: Simple return momentum trading rules across various commodities**

Optimal look-back period of each momentum strategy combined with a mean reversion indicator that turns signal neutral when momentum z-score more than 1.5 standard deviations above or below mean, and a filter that turns neutral when the z-score is low (below 0.05 and above -0.05) to avoid excessive trading. Look-backs, current signals and z-scores are shown for shorter-term and longer-term momentum separately, along with performance of a combined signal. Annualised return, volatility and information ratio of the signal; current signal; and z-score of the current return over the relevant look-back period; data from 1999 onward.

|                        |       | Lookback (moving avg, days) | Annualized return (%) | Vol (%) | IR   | Current signal | Time since last change (days) | Z-score | % Change of return index from its moving average |
|------------------------|-------|-----------------------------|-----------------------|---------|------|----------------|-------------------------------|---------|--|
| WTI                    | short | 21                          |                       |         |      | -1             | 1                             | -0.4    | -2.6%  |
|                        | long  | 462                         | 6.6                   | 22.5    | 0.29 | 0              | 1                             | 0.0     | -0.2%  |
| Brent                  | short | 84                          |                       |         |      | -1             | 5                             | -0.4    | -5.4%  |
|                        | long  | 504                         | 5.5                   | 21.4    | 0.26 | 0              | 1                             | 0.0     | -0.9%  |
| Unleaded gas           | short | 105                         |                       |         |      | -1             | 30                            | -0.7    | -9.0%  |
|                        | long  | 483                         | 4.1                   | 23.5    | 0.18 | -1             | 2                             | -0.2    | -4.7%  |
| Heat Oil               | short | 63                          |                       |         |      | -1             | 22                            | -0.8    | -8.1%  |
|                        | long  | 483                         | 5.9                   | 21.7    | 0.27 | -1             | 17                            | -0.3    | -9.7%  |
| Gasoil                 | short | 63                          |                       |         |      | -1             | 22                            | -0.8    | -7.9%  |
|                        | long  | 378                         | 9.0                   | 20.6    | 0.44 | -1             | 1                             | -0.2    | -4.5%  |
| Nat gas                | short | 105                         |                       |         |      | -1             | 36                            | -0.6    | -11.2%   |
|                        | long  | 315                         | 18.4                  | 35.3    | 0.52 | -1             | 126                           | -1.0    | -30.4%   |
| EU emission allowances | short | 42                          |                       |         |      | 1              | 10                            | 0.6     | 5.7%   |
|                        | long  | 483                         | 11.6                  | 29.9    | 0.39 | -1             | 221                           | -0.2    | -9.9%  |
| 1m fwd TTF Nat gas     | short | 21                          |                       |         |      | 1              | 6                             | 0.3     | 3.0%   |
|                        | long  | 294                         | 45.0                  | 32.4    | 1.39 | -1             | 0                             | -0.1    | -5.0%  |
| Gold                   | short | 21                          |                       |         |      | 1              | 8                             | 1.2     | 3.2%   |
|                        | long  | 483                         | 3.3                   | 10.5    | 0.31 | 0              | 1                             | 1.5     | 17.8%  |
| Silver                 | short | 10                          |                       |         |      | 0              | 1                             | 1.6     | 5.3%   |
|                        | long  | 462                         | 5.1                   | 18.9    | 0.27 | 1              | 58                            | 0.7     | 14.3%  |
| Palladium              | short | 42                          |                       |         |      | -1             | 1                             | -0.3    | -2.5%  |
|                        | long  | 273                         | 13.3                  | 22.8    | 0.58 | -1             | 482                           | -0.6    | -13.7%   |
| Platinum               | short | 105                         |                       |         |      | -1             | 13                            | -0.4    | -3.4%  |
|                        | long  | 273                         | 4.9                   | 18.2    | 0.27 | -1             | 0                             | -0.1    | -1.0%  |
| Aluminium              | short | 105                         |                       |         |      | -1             | 14                            | -0.1    | -0.8%  |
|                        | long  | 357                         | 5.3                   | 15.2    | 0.35 | 1              | 1                             | 0.2     | 3.2%   |
| Copper                 | short | 147                         |                       |         |      | -1             | 22                            | -0.2    | -2.9%  |
|                        | long  | 399                         | 7.9                   | 17.4    | 0.45 | 1              | 1                             | 0.1     | 1.3%   |
| Lead                   | short | 126                         |                       |         |      | -1             | 26                            | -0.6    | -6.9%  |
|                        | long  | 357                         | 1.6                   | 19.8    | 0.08 | -1             | 23                            | -0.3    | -7.2%  |
| Nickel                 | short | 42                          |                       |         |      | 1              | 0                             | 0.2     | 2.0%   |
|                        | long  | 336                         | 13.4                  | 23.5    | 0.57 | -1             | 58                            | -0.4    | -11.7%   |
| Zinc                   | short | 126                         |                       |         |      | -1             | 21                            | -0.1    | -0.8%  |
|                        | long  | 399                         | 8.9                   | 20.0    | 0.45 | 1              | 1                             | 0.1     | 2.5%   |
| Wheat                  | short | 168                         |                       |         |      | -1             | 47                            | -1.0    | -12.3%   |
|                        | long  | 294                         | 3.7                   | 23.6    | 0.16 | -1             | 54                            | -1.0    | -16.4%   |
| Kansas wheat           | short | 147                         |                       |         |      | -1             | 46                            | -0.9    | -10.6%   |
|                        | long  | 483                         | 8.8                   | 21.0    | 0.42 | -1             | 118                           | -1.2    | -26.8%   |
| Corn                   | short | 63                          |                       |         |      | -1             | 13                            | -1.1    | -8.8%  |
|                        | long  | 399                         | 8.4                   | 17.0    | 0.50 | -1             | 279                           | -1.4    | -26.5%   |
| Soybeans               | short | 42                          |                       |         |      | -1             | 1                             | -1.3    | -7.2%  |
|                        | long  | 231                         | 6.4                   | 14.8    | 0.44 | -1             | 1                             | -1.4    | -18.5%   |
| Cotton                 | short | 168                         |                       |         |      | -1             | 97                            | -1.1    | -15.0%   |
|                        | long  | 483                         | 5.3                   | 18.9    | 0.28 | -1             | 98                            | -0.7    | -17.9%   |
| Sugar                  | short | 63                          |                       |         |      | -1             | 14                            | -0.8    | -7.2%  |
|                        | long  | 252                         | 7.5                   | 21.7    | 0.34 | -1             | 143                           | -1.0    | -19.0%   |
| Coffee                 | short | 63                          |                       |         |      | 1              | 10                            | 1.0     | 8.5%   |
|                        | long  | 273                         | 7.1                   | 23.5    | 0.30 | 0              | 3                             | 1.8     | 33.7%  |
| Cocoa*                 |       | 10                          | 4.1                   | 29.0    | 0.14 | 1              | 6                             | 2.4     | 8.5%   |

\* For cocoa, uses only short-term momentum and a z-score threshold of 3 rather than 1.5 as for other contracts.

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

**Table A4: Simple return momentum trading rules across international equity indices, bond futures and FX**

Optimal look-back period of each momentum strategy combined with a mean reversion indicator that turns signal neutral when momentum z-score more than 1.5 standard deviations above or below mean, and a filter that turns neutral when the z-score is low (below 0.05 and above -0.05) to avoid excessive trading. Look-backs, current signals and z-scores are shown for shorter-term and longer-term momentum separately, along with performance of a combined signal. Annualised return, volatility and information ratio of the signal; current signal; and z-score of the current return over the relevant look-back period; data from 1999 onward.

|                 |       | Lookback (moving avg, days) | Annualized return (%) | Vol (%) | IR   | Current signal | Time since last change (days) | Z-score | % Change of return index from its moving average |
|-----------------|-------|-----------------------------|-----------------------|---------|------|----------------|-------------------------------|---------|--|
| S&P 500         | short | 84                          |                       |         |      | 1              | 4                             | 0.9     | 4.6%   |
|                 | long  | 357                         | 7.1                   | 11.9    | 0.59 | 0              | 2                             | 1.7     | 18.9%  |
| Nasdaq 100      | short | 84                          |                       |         |      | 1              | 4                             | 0.5     | 4.1%   |
|                 | long  | 462                         | 8.4                   | 14.8    | 0.57 | 1              | 18                            | 1.4     | 28.7%  |
| Nikkei          | short | 84                          |                       |         |      | -1             | 8                             | -0.4    | -3.0%  |
|                 | long  | 294                         | 3.3                   | 14.4    | 0.23 | 1              | 4                             | 0.4     | 5.6%   |
| FTSE 100        | short | 168                         |                       |         |      | 1              | 62                            | 1.0     | 6.3%   |
|                 | long  | 462                         | 4.8                   | 12.1    | 0.40 | 1              | 475                           | 1.1     | 12.1%  |
| Eurostoxx 50    | short | 168                         |                       |         |      | 1              | 1                             | 0.2     | 1.5%   |
|                 | long  | 315                         | 4.6                   | 15.6    | 0.29 | 1              | 209                           | 0.6     | 7.8%   |
| MSCI EM         | short | 42                          |                       |         |      | 1              | 1                             | 0.4     | 1.9%   |
|                 | long  | 336                         | 12.8                  | 11.4    | 1.12 | 1              | 149                           | 0.7     | 10.9%  |
| 2Y USTs         | short | 252                         |                       |         |      | 1              | 12                            | 0.4     | 0.4%   |
|                 | long  | 420                         | 1.0                   | 1.1     | 0.92 | -1             | 2                             | -0.2    | -0.3%  |
| 5Y USTs         | short | 252                         |                       |         |      | 1              | 16                            | 0.6     | 1.4%   |
|                 | long  | 420                         | 1.9                   | 3.1     | 0.61 | 1              | 1                             | 0.1     | 0.2%   |
| 10Y USTs        | short | 42                          |                       |         |      | 1              | 2                             | 1.1     | 1.6%   |
|                 | long  | 504                         | 2.2                   | 3.7     | 0.60 | 0              | 2                             | 0.0     | 0.1%   |
| 2Y Schatz       | short | 189                         |                       |         |      | 0              | 2                             | -1.6    | -1.3%  |
|                 | long  | 504                         | 0.7                   | 0.9     | 0.74 | 0              | 330                           | -2.5    | -3.8%  |
| 5y Bobl         | short | 84                          |                       |         |      | 1              | 15                            | 0.3     | 0.4%   |
|                 | long  | 483                         | 1.6                   | 2.1     | 0.77 | -1             | 28                            | -1.1    | -3.5%  |
| 10y Bund        | short | 84                          |                       |         |      | 1              | 17                            | 0.5     | 1.0%   |
|                 | long  | 483                         | 2.7                   | 3.7     | 0.72 | -1             | 190                           | -0.5    | -2.8%  |
| 10Y JGB         | short | 126                         |                       |         |      | 1              | 9                             | 0.6     | 0.6%   |
|                 | long  | 273                         | 1.0                   | 2.1     | 0.46 | 1              | 10                            | 0.4     | 0.5%   |
| 10Y Gilts       | short | 105                         |                       |         |      | 1              | 13                            | 0.2     | 0.6%   |
|                 | long  | 399                         | 2.0                   | 4.5     | 0.44 | -1             | 184                           | -0.5    | -2.6%  |
| 10y OAT vs Bund | short | 189                         |                       |         |      | -1             | 8                             | -1.1    | -1.0%  |
|                 | long  | 294                         | 0.6                   | 1.4     | 0.41 | -1             | 36                            | -0.8    | -0.8%  |
| 10y BTP vs Bund | short | 84                          |                       |         |      | 0              | 0                             | 0.0     | 0.0%   |
|                 | long  | 273                         | 2.5                   | 6.2     | 0.41 | 1              | 217                           | 0.4     | 2.1%   |
| Euro            | short | 423                         |                       |         |      | 1              | 11                            | 0.7     | 1.5%   |
|                 | long  | 273                         | 2.9                   | 6.2     | 0.47 | -1             | 252                           | -0.2    | -1.1%  |
| Yen             | short | 21                          |                       |         |      | 1              | 3                             | 1.1     | 1.7%   |
|                 | long  | 462                         | 3.7                   | 6.3     | 0.58 | -1             | 11                            | -1.3    | -11.0%   |
| Sterling        | short | 168                         |                       |         |      | 1              | 0                             | 0.1     | 0.5%   |
|                 | long  | 294                         | 2.0                   | 7.1     | 0.28 | 0              | 0                             | 0.0     | -0.3%  |
| AUD             | short | 42                          |                       |         |      | 1              | 0                             | 0.3     | 0.8%   |
|                 | long  | 420                         | 4.0                   | 7.7     | 0.52 | -1             | 480                           | -0.4    | -3.5%  |
| CAD             | short | 168                         |                       |         |      | -1             | 164                           | -0.6    | -2.1%  |
|                 | long  | 504                         | 1.0                   | 6.0     | 0.16 | -1             | 570                           | -0.9    | -6.0%  |

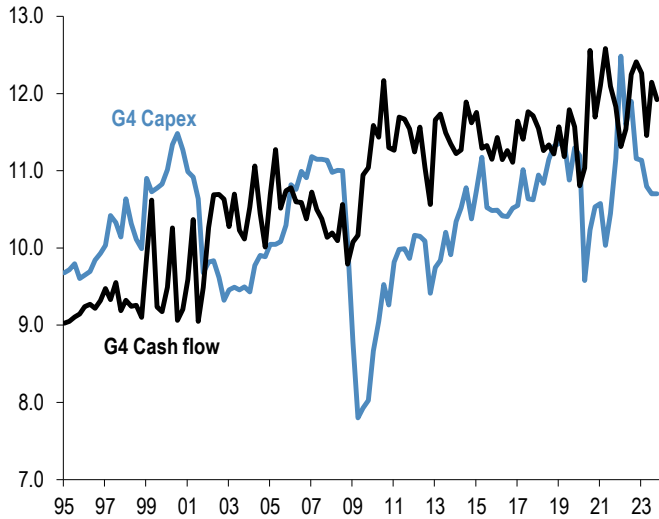
Source: Bloomberg Finance L.P., J.P. Morgan calculations.

22 August 2024

## Corporate Activity

**Chart A24: G4 non-financial corporate capex and cash flow as % of GDP**

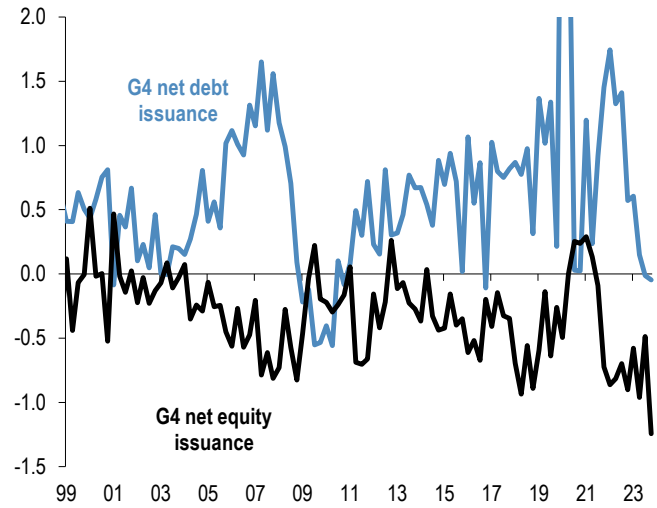
% of GDP, G4 includes the US, the UK, the Euro area and Japan. Last observation as of Q4 2023.



Source: ECB, BOJ, BOE, Federal Reserve flow of funds, J.P. Morgan.

**Chart A25: G4 non-financial corporate sector net debt and equity issuance**

\$tr per quarter, G4 includes the US, the UK, the Euro area and Japan. Last observation as of Q4 2023.



Source: ECB, BOJ, BOE, Federal Reserve flow of funds, J.P. Morgan.

**Chart A26: Global M&A and LBO**

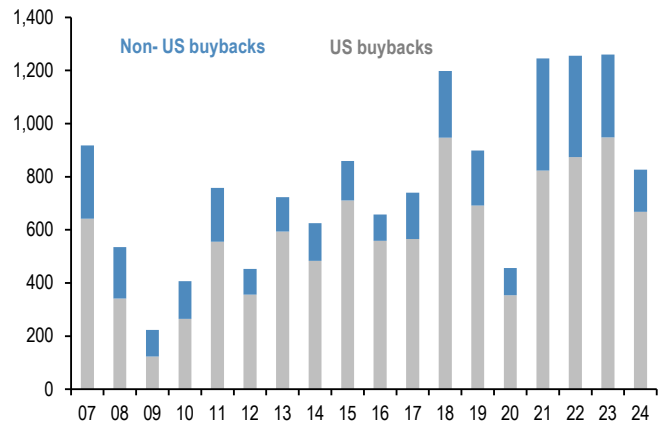
\$tr. M&A and LBOs are announced.



Source: Dealogic, J.P. Morgan.

**Chart A27: US and non-US share buyback**

\$bn, are as of August'24. Buybacks are announced.



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

## Pension fund and insurance company flows

**Chart A28: G4 pension funds and insurance companies equity and bond flows**

Equity and bond buying in \$bn per quarter. G4 includes the US, the UK, Euro area and Japan. Last observation is Q1 2024.



Source: ECB, BOJ, BOE, Federal Reserve flow of funds, J.P. Morgan.

**Chart A29: G4 pension funds and insurance companies equity and bond levels**

Equity and bond as % of total assets per quarter. G4 includes the US, the UK, Euro area and Japan. Last observation is Q1 2024.



Source: ECB, BOJ, BOE, Federal Reserve flow of funds., J.P. Morgan

**Chart A30: Pension fund deficits**

US\$bn. For US, funded status of the 100 largest corporate defined benefit pension plans, from Milliman. For UK, funded status of the defined benefit schemes eligible for entry to the Pension Protection Fund, converted to US\$at today's exchange rates. Last obs. is July'24 for US & UK.



Source: Milliman, UK Pension Protection Fund, J.P. Morgan.

**Chart A31: G4 pension funds and insurance companies cash and alternatives levels**

Cash and alternative investments as % of total assets per quarter. G4 includes the US, the UK, Euro area and Japan. Last observation is Q1 2024.

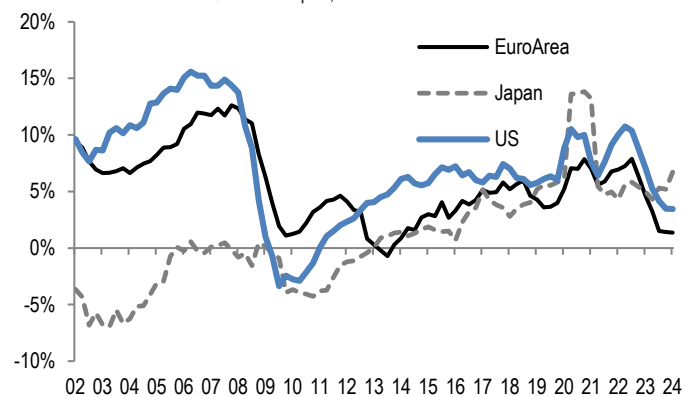


Source: ECB, BOJ, BOE, Federal Reserve flow of funds, J.P. Morgan.

## Credit Creation

**Chart A32: Credit creation in the US, Japan and Euro area**

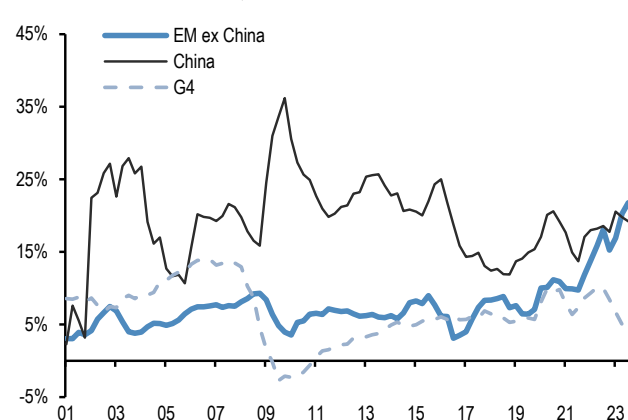
Rolling sum of 4-quarter credit creation as % of GDP. Credit creation includes both bank loans as well as net debt issuance by non-financial corporations and households. Last obs. is Q1'24 for Japan, Euro Area and US.



Source: Fed, ECB, BoJ, Bloomberg Finance L.P., and J.P. Morgan calculations.

**Chart A33: Credit creation in EM**

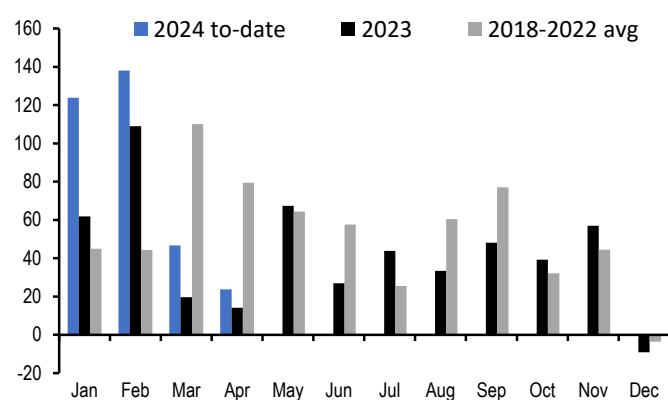
Rolling sum of 4-quarter credit creation as % of GDP. Credit creation includes both bank loans as well as net debt issuance by non-financial corporations and households. Last obs. is for Q4'23.



Source: G4 Central banks FoF, BIS, ICI, Barcap, Bloomberg Finance L.P., IMF, and J.P.Morgan calculation

**Chart A34: Monthly net issuance of US HG bonds**

\$bn. May 2024.



Source: Dealogic, J.P. Morgan

**Table A5: Equity and Bond issuance**

\$bn. Equity supply and corporate announcements are based on announced deals, not completed. M&A is announced deal value and buybacks are announced transactions. Y/Y change is change in YTD announcements over the same period last year.

| Equity Supply                  | 16-Aug | 4 wk avg  | 13 wk avg | y/y chng |
|--------------------------------|--------|-----------|-----------|----------|
| Global IPOs                    | 0.8    | 2.9       | 2.0       | -14%     |
| Secondary Offerings            | 5.5    | 5.5       | 7.8       | 15%      |
| <b>Corporate announcements</b> |        |           |           |          |
| M&A - Global                   | 80.2   | 79.6      | 67.3      | 19%      |
| - US Target                    | 60.1   | 38.4      | 27.9      | 26%      |
| - Non-US Target                | 20.2   | 41.2      | 39.5      | 13%      |
| Net bond issuance              | Feb-24 | 3 mth avg | YTD avg   | y/y chng |
| USD                            | 129    | 172       | 207       | 97%      |
| Non-USD                        | 2      | 44        | 133       | -44%     |

Source: Bloomberg Finance L.P., Dealogic, Thomson Reuters, J.P. Morgan.

## Bitcoin monitor

**Chart A35: Our Bitcoin position proxy based on open interest in CME Bitcoin futures contracts**

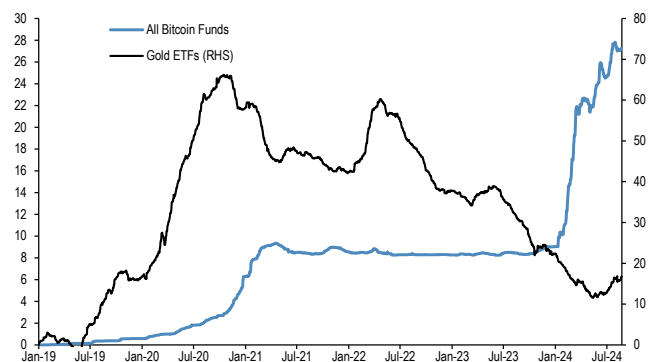
In number of contracts. Last obs. for 21<sup>st</sup> August 2024.



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

**Chart A36: Cumulative Flows in all Bitcoin funds and Gold ETF holdings**

Both the y-axis in \$bn.



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

**Chart A37: Ratio of bitcoin market price to production cost**

Based on the cost of production approach following Hayes (2018).



Source: Bitinfocharts, J.P. Morgan

**Chart A38: Flow pace into publicly-listed bitcoin funds including bitcoin ETFs**

\$mm per week, 4-week rolling average flow.



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

22 August 2024

## Japanese flows and positions

**Chart A39: Tokyo Stock Exchange margin trading: total buys minus total sells**

In bn of shares. Topix on right axis.



Source: Tokyo Stock Exchange, Bloomberg Finance L.P., J.P. Morgan.

**Chart A40: Monthly net purchases of Japanese bonds and Japanese equities by foreign residents**

\$bn, Last weekly obs. is for 9th Aug' 24.



Source: Japan MoF, Bloomberg Finance L.P., and J.P. Morgan.

**Chart A41: Monthly net purchases of foreign bonds and foreign equities by Japanese residents**

\$bn, Last weekly obs. is for 9th Aug' 24.



Source: Japan MoF, Bloomberg Finance L.P., and J.P. Morgan.

**Chart A42: Overseas CFTC spec positions**

CFTC spec positions are in \$bn. For Nikkei we use CFTC positions in Nikkei futures (USD & JPY) by Leveraged funds and Asset managers.



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

## Commodity flows and positions

**Chart A43: Gold spec positions**

\$bn. CFTC net long minus short position in futures for the Managed Money category.



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

**Chart A44: Gold ETFs**

Mn troy oz. Physical gold held by all gold ETFs globally.



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

**Chart A45: Oil spec positions**

Net spec positions divided by open interest. CFTC futures positions for WTI and Brent are net long minus short for the Managed Money category.



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

**Chart A46: Energy ETF flows**

Cumulative energy ETFs flow as a % of AUM. MLP refers to the Alerian MLP ETF.



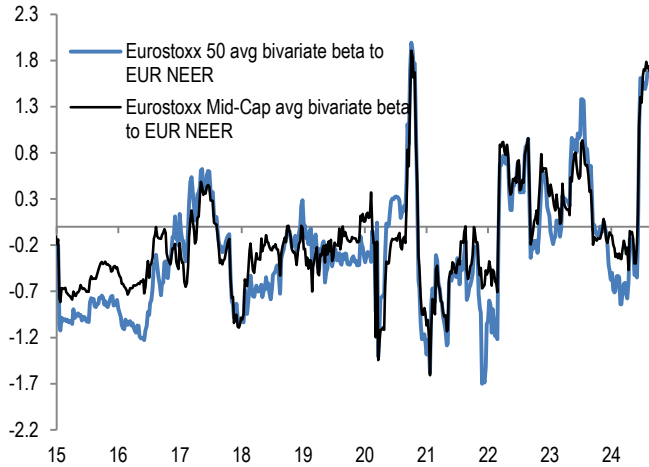
Source: CFTC, Bloomberg Finance L.P., J.P. Morgan.



## Corporate FX hedging proxies

**Chart A47: Average beta of Eurostoxx 50 companies and Eurostoxx Mid-Cap to trade-weighted EUR**

Rolling 26 weeks average betas based on a bivariate regression of the weekly returns of individual stocks in the Eurostoxx 50 index to the weekly returns of the MSCI AC World and JPM EUR Nominal broad effective exchange rate (NEER).



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

**Chart A48: Average beta of S&P500 companies to trade-weighted US dollar**

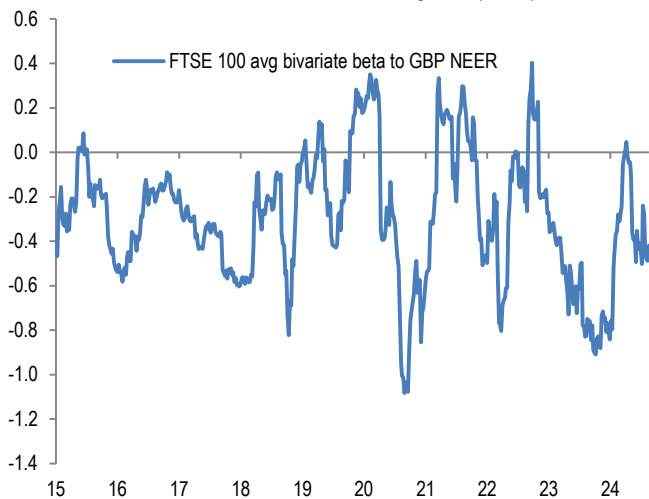
Rolling 26 weeks average betas based on a bivariate regression of the weekly returns of stocks in the S&P500 index to the weekly returns of the MSCI AC World and JPM USD Nominal broad effective exchange rate(NEER).



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

**Chart A49: Average beta of FTSE 100 companies to trade-weighted GBP**

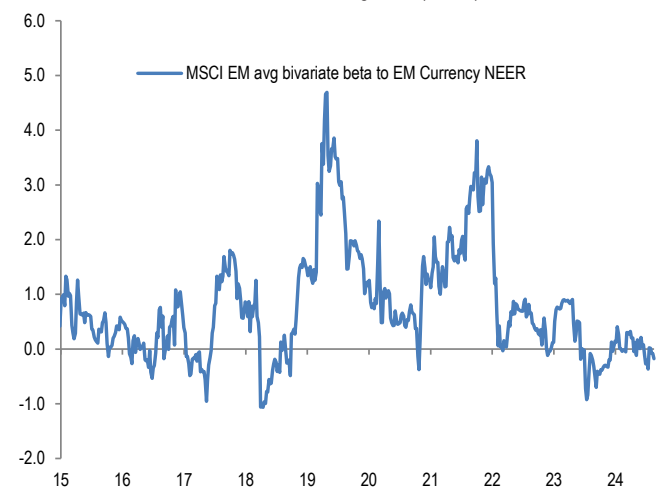
Rolling 26 weeks average betas based on a bivariate regression of the weekly returns of individual stocks in the FTSE 100 index to the weekly returns of the MSCI AC World and JPM GBP Nominal broad effective exchange rate (NEER).



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

**Chart A50: Average beta of MSCI EM companies to trade-weighted EM Currency Index**

Rolling 26 weeks average betas based on a bivariate regression of the weekly returns of individual stocks in the MSCI EM index to the weekly returns of the MSCI AC World and JPM EM Nominal broad effective exchange rate (NEER).

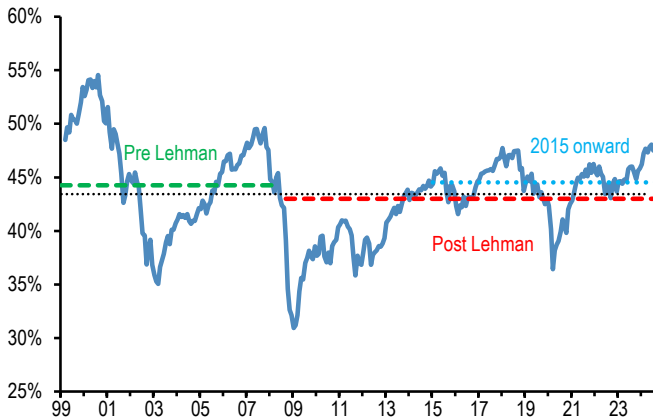


Source: Bloomberg Finance L.P., J.P. Morgan

## Non-Bank investors' implied allocations

**Chart A51: Implied equity allocation by non-bank investors globally**

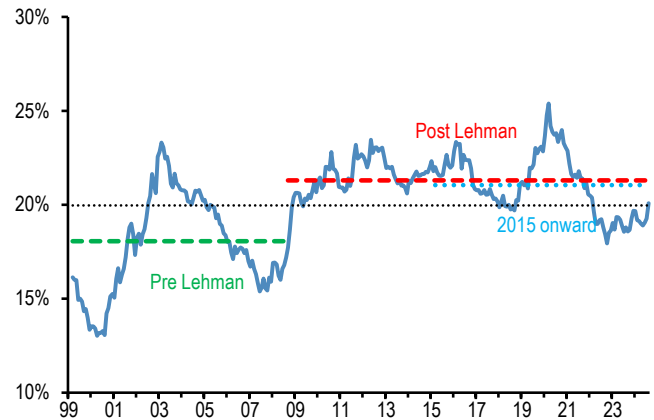
Global equities as % total holdings of equities/bonds/M2 by non-bank investors. Dotted lines are averages.



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

**Chart A52: Implied bond allocation by non-bank investors globally**

Global bonds as % total holdings of equities/bonds/M2 by non-bank investors. Dotted lines are averages.



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

**Chart A53: Implied cash allocation by non-bank investors globally**

Global cash held by non-bank investors as % total holdings of equities/bonds/M2 by non-bank investors. Dotted lines are averages.



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

**Chart A54: Implied commodity allocation by non-bank investors globally**

Proxied by the open interest of commodity futures ex gold as % of the stock of equities, bonds and cash held by non-bank investors globally.



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

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

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

**Important Disclosures**

An analyst listed on the front cover has personal holdings in digital or crypto assets.

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

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

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

**J.P. Morgan Equity Research Ratings Distribution, as of July 06, 2024**

|  | Overweight<br>(buy) | Neutral<br>(hold) | Underweight<br>(sell) |
|--|---------------------|-------------------|-----------------------|
| J.P. Morgan Global Equity Research Coverage* | 49%                 | 38%               | 13%                   |
| IB clients**                                 | 49%                 | 46%               | 34%                   |
| JPMS Equity Research Coverage*               | 48%                 | 41%               | 11%                   |
| IB clients**                                 | 69%                 | 66%               | 50%                   |

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

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

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

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

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

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

**Registration of non-US Analysts:** Unless otherwise noted, the non-US analysts listed on the front of this report are employees of non-US affiliates of J.P. Morgan Securities LLC, may not be registered as research analysts under FINRA rules, may not be associated persons of J.P.

Morgan Securities LLC, and may not be subject to FINRA Rule 2241 or 2242 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

## Other Disclosures

---

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

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

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

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

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

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

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

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

**Options and Futures related research:** If the information contained herein regards options- or futures-related research, such information is available only to persons who have received the proper options or futures risk disclosure documents. Please contact your J.P. Morgan Representative or visit <https://www.theocc.com/components/docs/riskstoc.pdf> for a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options or [http://www.finra.org/sites/default/files/Security\\_Futures\\_Risk\\_Disclosure\\_Statement\\_2018.pdf](http://www.finra.org/sites/default/files/Security_Futures_Risk_Disclosure_Statement_2018.pdf) for a copy of the Security Futures Risk Disclosure Statement.

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

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

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

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

**Argentina:** JPMorgan Chase Bank N.A Sucursal Buenos Aires is regulated by Banco Central de la República Argentina ("BCRA"- Central Bank of Argentina) and Comisión Nacional de Valores ("CNV"- Argentinian Securities Commission - ALYC y AN Integral N°51). **Australia:** J.P. Morgan Securities Australia Limited ("JPMSAL") (ABN 61 003 245 234/AFS Licence No: 238066) is regulated by the Australian Securities and Investments Commission and is a Market Participant of ASX Limited, a Clearing and Settlement Participant of ASX Clear Pty Limited and a Clearing Participant of ASX Clear (Futures) Pty Limited. This material is issued and distributed in Australia by or on behalf of JPMSAL only to "wholesale clients" (as defined in section 761G of the Corporations Act 2001). A list of all financial products covered can be found by visiting <https://www.jpmm.com/research/disclosures>. J.P. Morgan seeks to cover companies of relevance to the domestic and

international investor base across all Global Industry Classification Standard (GICS) sectors, as well as across a range of market capitalisation sizes. If applicable, in the course of conducting public side due diligence on the subject company(ies), the Research Analyst team may at times perform such diligence through corporate engagements such as site visits, discussions with company representatives, management presentations, etc. Research issued by JPMSAL has been prepared in accordance with J.P. Morgan Australia's Research Independence Policy which can be found at the following link: [J.P. Morgan Australia - Research Independence Policy](#). **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. Ombudsman J.P. Morgan: 0800-7700847 / 0800-7700810 (For Hearing Impaired) / [ouvidoria.jp.morgan@jpmorgan.com](mailto:ouvidoria.jp.morgan@jpmorgan.com). **Canada:** J.P. Morgan Securities Canada Inc. is a registered investment dealer, regulated by the Canadian Investment Regulatory Organization and the Ontario Securities Commission and is the participating member on Canadian exchanges. This material is distributed in Canada by or on behalf of J.P.Morgan Securities Canada Inc. **Chile:** Inversiones J.P. Morgan Limitada is an unregulated entity incorporated in Chile. **China:** J.P. Morgan Securities (China) Company Limited has been approved by CSRC to conduct the securities investment consultancy business. **Dubai International Financial Centre (DIFC):** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - The Gate, West Wing, Level 3 and 9 PO Box 506551, Dubai, UAE. This material has been distributed by JP Morgan Chase Bank, N.A., Dubai Branch to persons regarded as professional clients or market counterparties as defined under the DFSA rules. **European Economic Area (EEA):** Unless specified to the contrary, research is distributed in the EEA by J.P. Morgan SE ("JPM SE"), which is authorised as a credit institution by the Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and jointly supervised by the BaFin, the German Central Bank (Deutsche Bundesbank) and the European Central Bank (ECB). JPM SE is a company headquartered in Frankfurt with registered address at TaunusTurm, Taunustor 1, Frankfurt am Main, 60310, Germany. The material has been distributed in the EEA to persons regarded as professional investors (or equivalent) pursuant to Art. 4 para. 1 no. 10 and Annex II of MiFID II and its respective implementation in their home jurisdictions ("EEA professional investors"). This material must not be acted on or relied on by persons who are not EEA professional investors. Any investment or investment activity to which this material relates is only available to EEA relevant persons and will be engaged in only with EEA relevant persons. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong, and J.P. Morgan Broking (Hong Kong) Limited (CE number AAB027) is regulated by the Securities and Futures Commission in Hong Kong. JP Morgan Chase Bank, N.A., Hong Kong Branch (CE Number AAL996) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission, is organized under the laws of the United States with limited liability. Where the distribution of this material is a regulated activity in Hong Kong, the material is distributed in Hong Kong by or through J.P. Morgan Securities (Asia Pacific) Limited and/or J.P. Morgan Broking (Hong Kong) Limited. **India:** J.P. Morgan India Private Limited (Corporate Identity Number - U67120MH1992FTC068724), having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz - East, Mumbai – 400098, is registered with the Securities and Exchange Board of India (SEBI) as a 'Research Analyst' having registration number INH000001873. J.P. Morgan India Private Limited is also registered with SEBI as a member of the National Stock Exchange of India Limited and the Bombay Stock Exchange Limited (SEBI Registration Number – INZ000239730) and as a Merchant Banker (SEBI Registration Number - MB/INM000002970). Telephone: 91-22-6157 3000, Facsimile: 91-22-6157 3990 and Website: <http://www.jpmipl.com>. JPMorgan Chase Bank, N.A. - Mumbai Branch is licensed by the Reserve Bank of India (RBI) (Licence No. 53/ Licence No. BY.4/94; SEBI - IN/CUS/014/ CDSL : IN-DP-CDSL-444-2008/ IN-DP-NSDL-285-2008/ INBI00000984/ INE231311239) as a Scheduled Commercial Bank in India, which is its primary license allowing it to carry on Banking business in India and other activities, which a Bank branch in India are permitted to undertake. For non-local research material, this material is not distributed in India by J.P. Morgan India Private Limited. Compliance Officer: Spurthi Gadamsetty; [spurthi.gadamsetty@jpmchase.com](mailto:spurthi.gadamsetty@jpmchase.com); +912261573225. Grievance Officer: Ramprasadh K, [jpmipl.research.feedback@jpmorgan.com](mailto:jpmipl.research.feedback@jpmorgan.com); +912261573000.

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

**Indonesia:** PT J.P. Morgan Sekuritas Indonesia is a member of the Indonesia Stock Exchange and is registered and supervised by the Otoritas Jasa Keuangan (OJK). **Korea:** J.P. Morgan Securities (Far East) Limited, Seoul Branch, is a member of the Korea Exchange (KRX). JPMorgan Chase Bank, N.A., Seoul Branch, is licensed as a branch office of foreign bank (JPMorgan Chase Bank, N.A.) in Korea. Both entities are regulated by the Financial Services Commission (FSC) and the Financial Supervisory Service (FSS). For non-macro research material, the material is distributed in Korea by or through J.P. Morgan Securities (Far East) Limited, Seoul Branch. **Japan:** JPMorgan Securities Japan Co., Ltd. and JPMorgan Chase Bank, N.A., Tokyo Branch are regulated by the Financial Services Agency in Japan. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X), which is a Participating Organization of Bursa Malaysia Berhad and holds a Capital Markets Services License issued by the Securities Commission in Malaysia. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V. and J.P. Morgan Grupo Financiero are members of the Mexican Stock Exchange and are authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to "wholesale clients" (as defined in the Financial Markets Conduct Act 2013). JPMSAL is registered as a Financial Service Provider under the Financial Service providers (Registration and Dispute Resolution) Act of 2008. **Philippines:** J.P. Morgan Securities Philippines Inc. is a Trading Participant of the Philippine Stock Exchange and a member of the Securities Clearing Corporation of the Philippines and the Securities Investor Protection Fund. It is regulated by the Securities and Exchange Commission. **Singapore:** This material is issued and distributed in Singapore by or through J.P. Morgan Securities Singapore Private Limited (JPMS) [MCI (P) 030/08/2023 and Co. Reg. No.: 199405335R], which is a member of the Singapore Exchange Securities Trading Limited, and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore), both of which are regulated by the Monetary Authority of Singapore. This material is issued and distributed in Singapore only to accredited investors, expert investors and institutional investors, as defined in Section 4A of the Securities and Futures Act, Cap. 289 (SFA). This material is not intended to be issued or distributed to any retail investors or any other investors that do not fall into the classes of "accredited investors," "expert investors" or "institutional investors," as defined under Section 4A of the SFA. Recipients of this material in

Singapore are to contact JPMS or JPMCB Singapore in respect of any matters arising from, or in connection with, the material. **South Africa:** J.P. Morgan Equities South Africa Proprietary Limited and JPMorgan Chase Bank, N.A., Johannesburg Branch are members of the Johannesburg Securities Exchange and are regulated by the Financial Services Conduct Authority (FSCA). **Taiwan:** J.P. Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. Material relating to equity securities is issued and distributed in Taiwan by J.P. Morgan Securities (Taiwan) Limited, subject to the license scope and the applicable laws and the regulations in Taiwan. According to Paragraph 2, Article 7-1 of Operational Regulations Governing Securities Firms Recommending Trades in Securities to Customers (as amended or supplemented) and/or other applicable laws or regulations, please note that the recipient of this material is not permitted to engage in any activities in connection with the material that may give rise to conflicts of interests, unless otherwise disclosed in the "Important Disclosures" in this material. **Thailand:** This material is issued and distributed in Thailand by JPMorgan Securities (Thailand) Ltd., which is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission, and its registered address is 3rd Floor, 20 North Sathorn Road, Silom, Bangrak, Bangkok 10500. **UK:** Unless specified to the contrary, research is distributed in the UK by J.P. Morgan Securities plc ("JPMS plc") which is a member of the London Stock Exchange and is authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority. JPMS plc is registered in England & Wales No. 2711006, Registered Office 25 Bank Street, London, E14 5JP. This material is directed in the UK only to: (a) persons having professional experience in matters relating to investments falling within article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) (Order) 2005 ("the FPO"); (b) persons outlined in article 49 of the FPO (high net worth companies, unincorporated associations or partnerships, the trustees of high value trusts, etc.); or (c) any persons to whom this communication may otherwise lawfully be made; all such persons being referred to as "UK relevant persons". This material must not be acted on or relied on by persons who are not UK relevant persons. Any investment or investment activity to which this material relates is only available to UK relevant persons and will be engaged in only with UK relevant persons. Research issued by JPMS plc has been prepared in accordance with JPMS plc's policy for prevention and avoidance of conflicts of interest related to the production of Research which can be found at the following link: [J.P. Morgan EMEA - Research Independence Policy](#). U.S.: J.P. Morgan Securities LLC ("JPMS") is a member of the NYSE, FINRA, SIPC, and the NFA. JPMorgan Chase Bank, N.A. is a member of the FDIC. Material published by non-U.S. affiliates is distributed in the U.S. by JPMS who accepts responsibility for its content.

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

**Confidentiality and Security Notice:** This transmission may contain information that is privileged, confidential, legally privileged, and/or exempt from disclosure under applicable law. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or use of the information contained herein (including any reliance thereon) is STRICTLY PROHIBITED. Although this transmission and any attachments are believed to be free of any virus or other defect that might affect any computer system into which it is

received and opened, it is the responsibility of the recipient to ensure that it is virus free and no responsibility is accepted by JPMorgan Chase & Co., its subsidiaries and affiliates, as applicable, for any loss or damage arising in any way from its use. If you received this transmission in error, please immediately contact the sender and destroy the material in its entirety, whether in electronic or hard copy format. This message is subject to electronic monitoring: <https://www.jpmorgan.com/disclosures/email>

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

Sustainalytics: Certain information, data, analyses and opinions contained herein are reproduced by permission of Sustainalytics and: (1) includes the proprietary information of Sustainalytics; (2) may not be copied or redistributed except as specifically authorized; (3) do not constitute investment advice nor an endorsement of any product or project; (4) are provided solely for informational purposes; and (5) are not warranted to be complete, accurate or timely. Sustainalytics is not responsible for any trading decisions, damages or other losses related to it or its use. The use of the data is subject to conditions available at <https://www.sustainalytics.com/legal-disclaimers>. ©2024 Sustainalytics. All Rights Reserved.

"Other Disclosures" last revised July 06, 2024.

---

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

Completed 22 Aug 2024 11:20 AM BST

Disseminated 22 Aug 2024 11:21 AM BST