

GOAL POSITIONING

Tracking the momentum-led deleveraging in Tech

- **Our sentiment and positioning indicator has turned more negative and is now around the 53rd-ile.** Our Risk Appetite Indicator remains elevated, around 0.8. Equity flows have been resilient (Exhibit 13) but fixed income flows have dominated on a YTD basis, particularly in relative terms (Exhibit 11, Exhibit 12). Most fast-moving positioning indicators have shifted more bearish. Futures positioning in US equities remains elevated, but is no longer at extremes (Exhibit 53), call/put ratios have decreased and investors' surveys have turned less optimistic. Active managers' US equity positioning (NAAIM Index - 79.7) has also pulled back modestly, while hedge funds have deleveraged meaningfully (Exhibit 65): gross leverage has reversed half of the yearly increase, and net leverage is down on the year.
- **Investor activity has been dominated by momentum unwind in AI-related trades rather than signs of broad-based de-risking.** According to GS Prime Brokerage data, last week global Info Tech stocks recorded the largest long selling since Jan '21, and the second-largest 2-day long selling of the past decade. As highlighted previously, re-risking over recent weeks has been fast and highly concentrated around the 'AI trade', with participation increasingly expressed through

short-dated options (like ODTE) and other leveraged ETPs (Exhibit 1). Optimism around a handful of AI capex/semiconductor stocks has driven unusually high dispersion within the market: Exhibit 2 shows the average single stock implied vol rising to its highest level since 2020, while index implied correlation has remained anchored at low levels.

- **After peaking at record highs, retail leverage has started to moderate, particularly in DM Asia.** Margin balances surged to record highs in South Korean equities before starting to reverse (Exhibit 3). A similar pattern emerged in Japan, where margin-financed equity purchases reached their highest level since 1990 (Exhibit 4). In the US, retail investors also moderated purchases of semiconductor stocks, after the strong inflows earlier this year (Exhibit 5). Assets in leveraged ETFs exposed to Tech, including South Korea and Taiwan, have retraced after the sharp build-up in the previous weeks (Exhibit 6).
- **Leveraged funds reduced their short VIX futures exposure**, similar to previous VIX carry unwinds in 2018 ('volmageddon') and 2024-25 (Exhibit 7). By contrast, equity-linked debt issuance remained resilient, like

Christian Mueller-Glissmann, CFA
+44(20)7774-1714 | christian.mueller-glissmann@gs.com
Goldman Sachs International

Alessandro Giglio
+44(20)7051-6240 | alessandro.giglio@gs.com
Goldman Sachs International

Andrea Ferrario
+44(20)7552-4353 | andrea.ferrario@gs.com
Goldman Sachs International

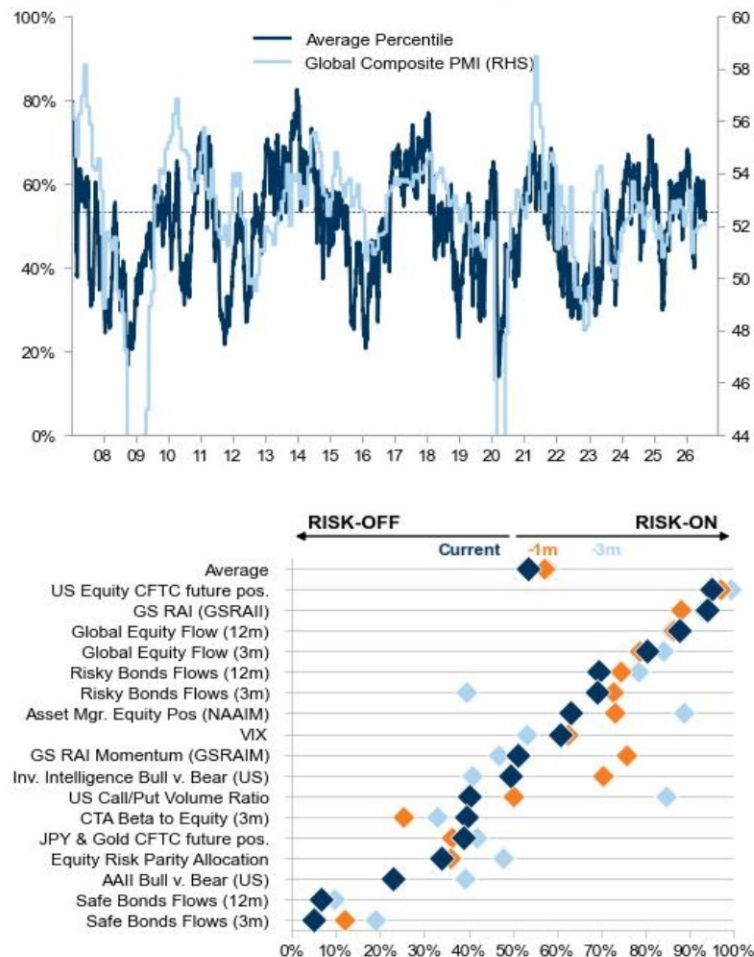
Elena Porfidia
+44(20)7051-5240 | elena.porfidia@gs.com
Goldman Sachs International

Peter Oppenheimer
+44(20)7552-5782 | peter.oppenheimer@gs.com
Goldman Sachs International

global Tech convertible issuance, which was particularly strong during Q2 ([Exhibit 8](#)).

- **Outside of equities, the largest shifts in cross-asset positioning reflected the repricing of policy expectations following the latest central bank meetings and FX interventions.** USD net future speculative positioning increased sharply ([Exhibit 50](#)) and long-dated Treasury ETF put-call skew rose sharply after the FOMC ([Exhibit 9](#)). JPY risk reversals rebounded sharply into the recent FX intervention, although net future non-commercial positioning remains negative ([Exhibit 10](#)).

Our positioning and sentiment indicator lingers around the 53rd-ile

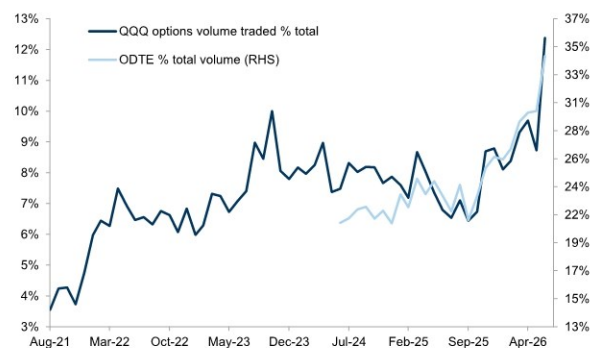


Source: Datastream, Haver Analytics, Goldman Sachs Global Investment Research

10 charts we are watching: Tracking the momentum-led deleveraging in Tech

Exhibit 1: Option trading volume became more concentrated and short-dated

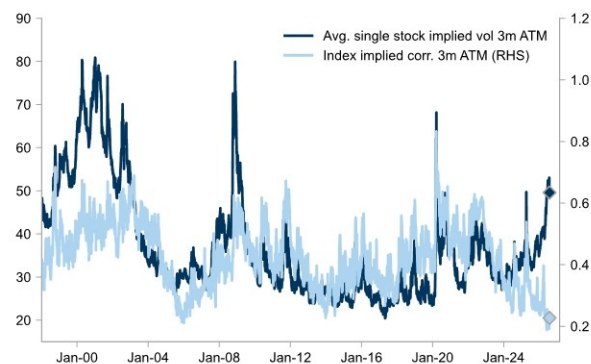
Option avg. volume traded by instrument/expiry, as % of the average traded volume across selected US venues. Monthly data as of June 2026.



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 2: High average single stock implied vol, low US Tech correlation points to widening dispersion in US Tech

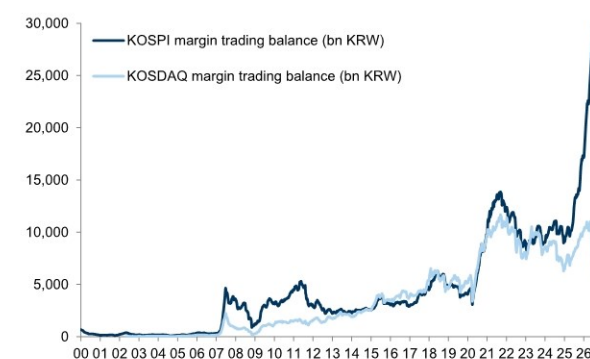
Daily data, Nasdaq index.



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 3: The margin trading balance in Korean stocks started to decrease after the peak

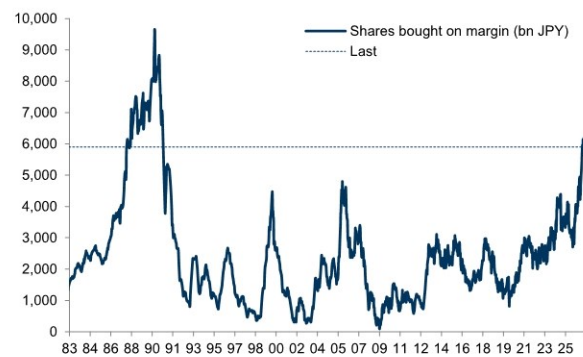
Margin trading balance, weekly data in bn KRW, as of 31 July.



Source: Korea Financial Investment Association, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 4: Margin trading in Japanese stocks is around the highest level since 1990

Shs. bought on margin minus shs. sold short from customer accounts. Weekly data in JPY, as of 24 July.



Source: Japan Exchange Group, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 5: Semiconductor single stocks have seen some outflows from retail investors

15d rolling net flows, daily data in \$bn. Sum of the net notional (retail buy-sell) for the 30 constituents in the PHLX Semiconductor (SOX).



Source: Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

Exhibit 6: Leveraged ETFs' total net assets, in bn\$.

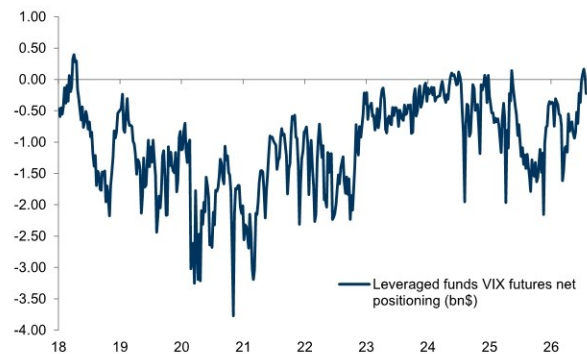
As of July 29th, Universe: 78bn\$, excluding US ex-Tech and inversed exposed.



Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 7: VIX futures positioning from leveraged funds turned neutral

VIX futures net positioning, weekly data.



Source: CFTC, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 8: Convertible bonds global issuance from Tech companies

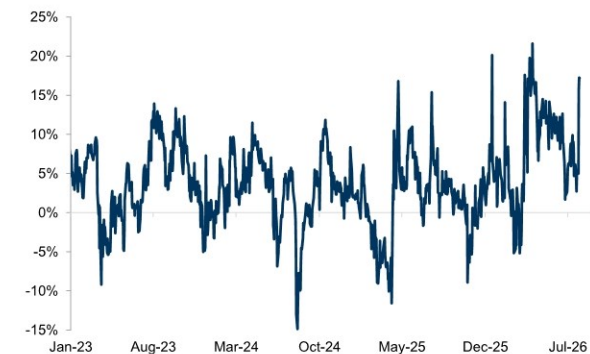
6m rolling (bn\$) issued amount in billion \$. Monthly data, as of July.



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 9: Long-dated US treasuries ETF put-call skew spiked after the FOMC

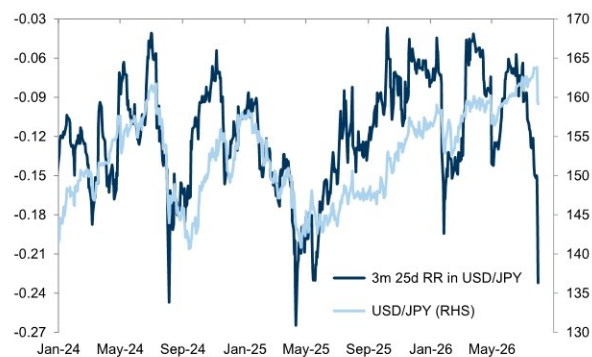
TLT (20y+ US treasuries) 1-month, 25d put-call skew.



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 10: JPY option-implied sentiment rebounded after the intervention

25d risk reversal (as call vs. put) / ATM vol

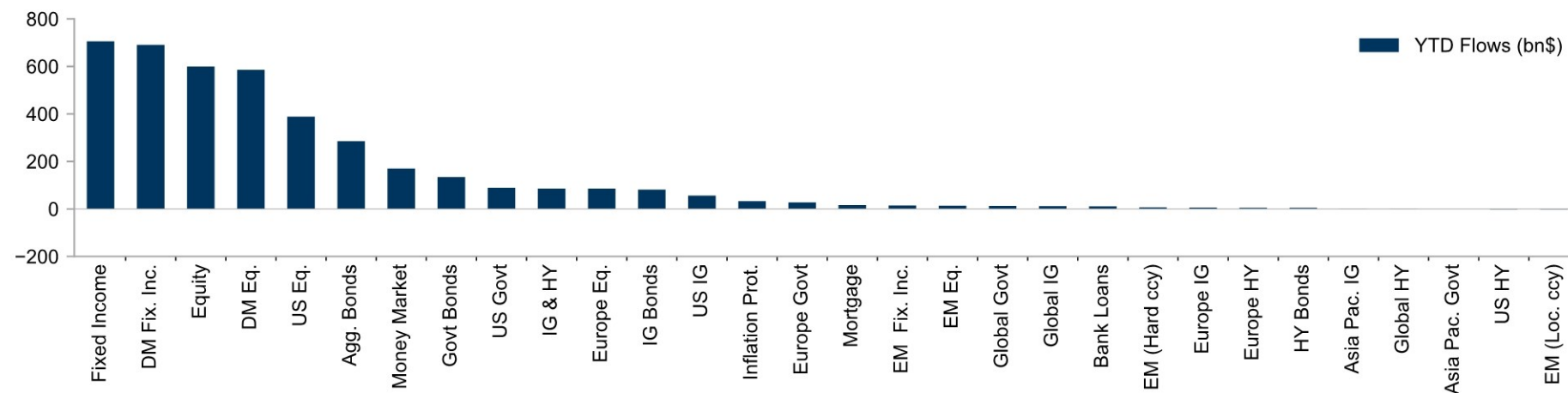


Source: Bloomberg, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: YTD

Exhibit 11: Cross-asset YTD global fund flows (\$bn)

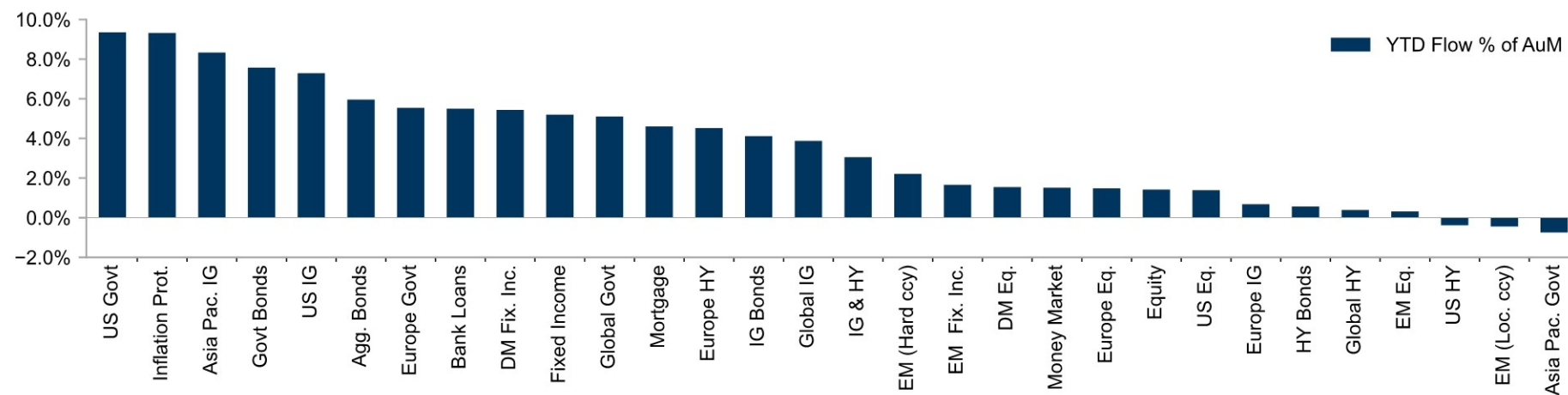
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 12: Cross-asset YTD global fund flows as a percentage of AuM

Monthly flows. MTD sum of weekly flows when monthly not yet available

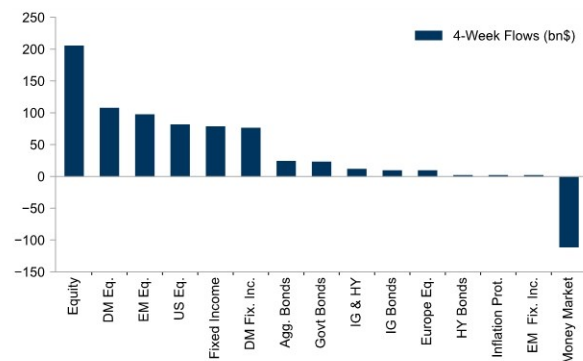


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: 4-week, 3-month, 12-month

Exhibit 13: 4-week cross-asset global fund flows (\$bn)

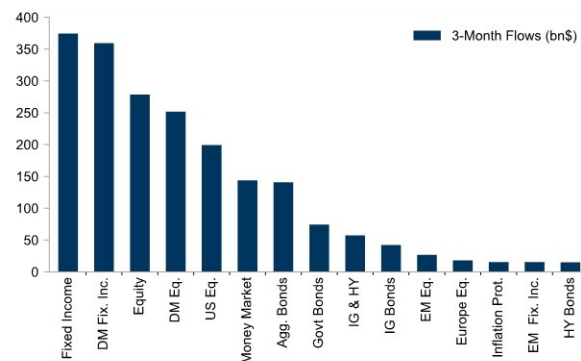
All funds reporting weekly



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 14: 3-month cross-asset global fund flows (\$bn)

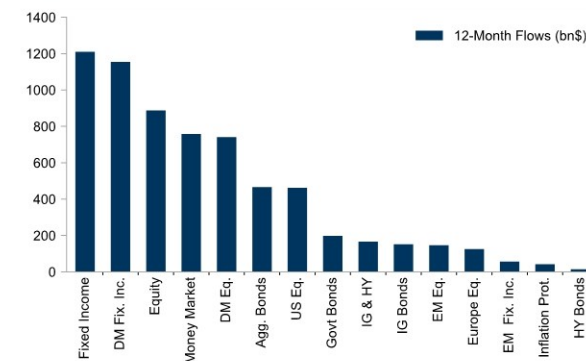
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 15: 12-month cross-asset global fund flows (\$bn)

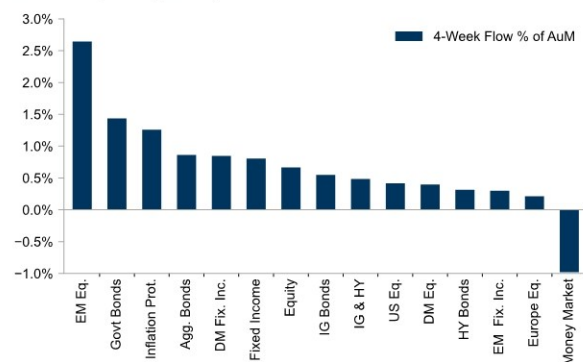
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 16: 4-week cross-asset global fund flows as a percentage of AuM

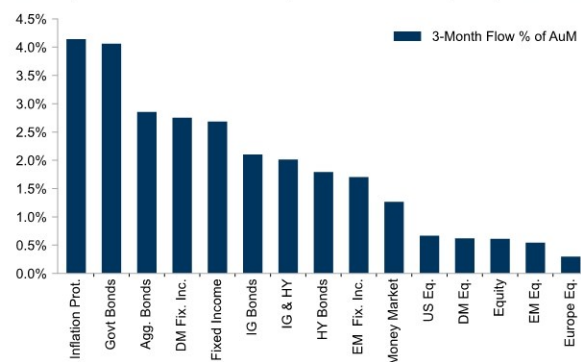
All funds reporting weekly



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 17: 3-month cross-asset global fund flows as a percentage of AuM

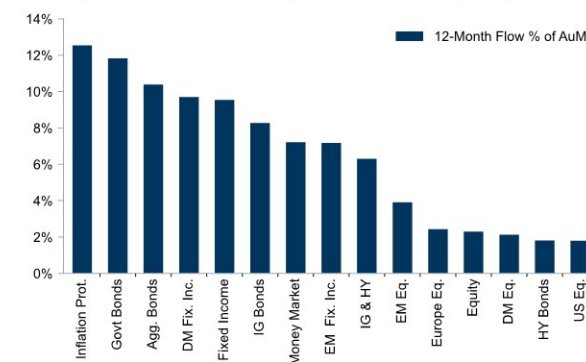
Monthly flows. MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 18: 12-month cross-asset global fund flows as a percentage of AuM

Monthly flows. MTD sum of weekly flows when monthly not yet available

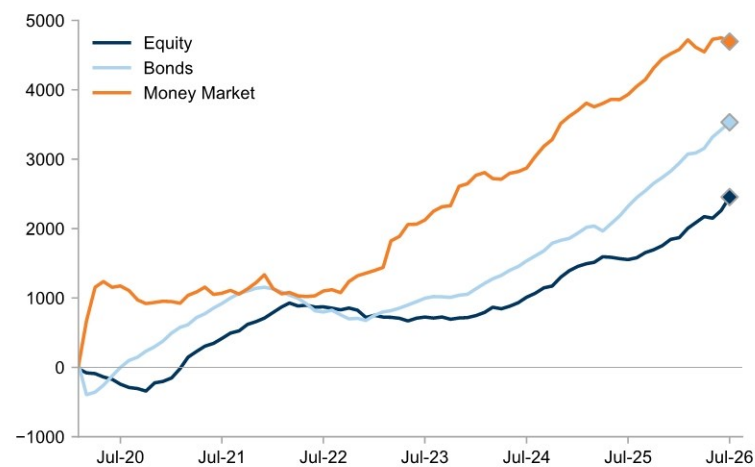


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: Cumulative & 1-month rolling by asset class and region

Exhibit 19: Cumulative global fund flows across assets

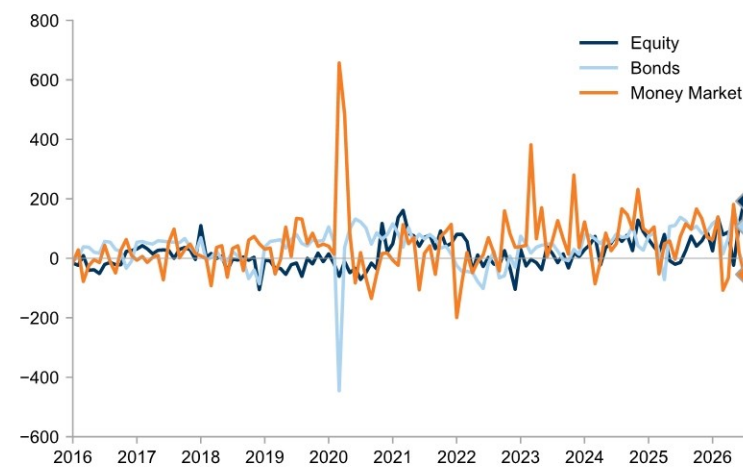
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 20: 1-month global fund flows across assets

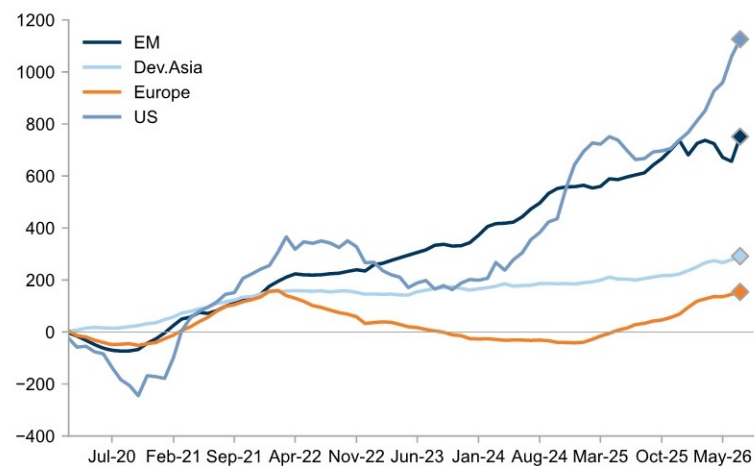
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 21: Cumulative global equity fund flows across regions

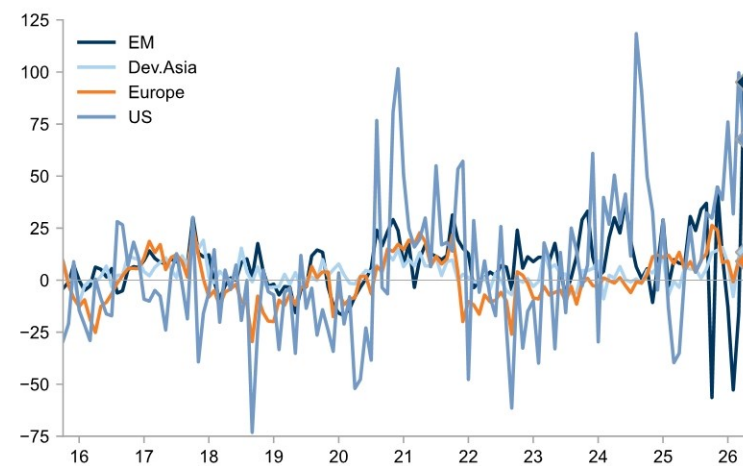
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 22: 1-month global equity fund flows across regions

Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available

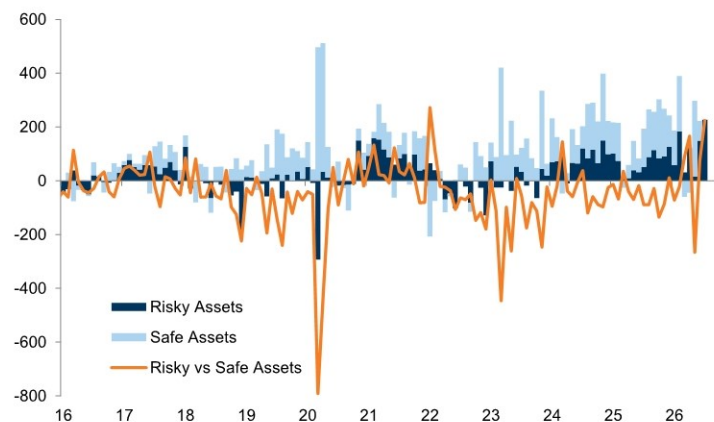


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: Risky vs. Safe Assets

Exhibit 23: Risky vs. safe assets: 1-month rolling global fund flows

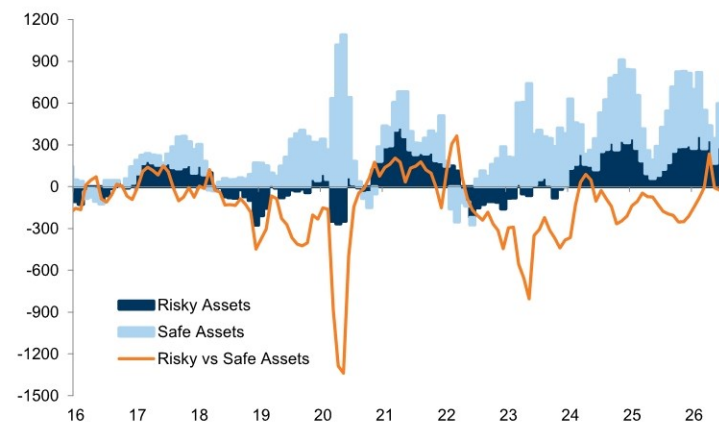
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 24: Risky vs. safe assets: 3-month rolling global fund flows

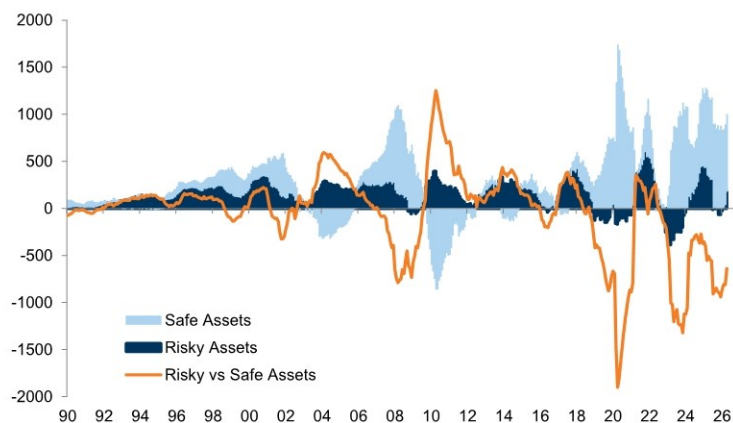
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 25: Risky vs. safe assets: 12-month rolling global fund flows

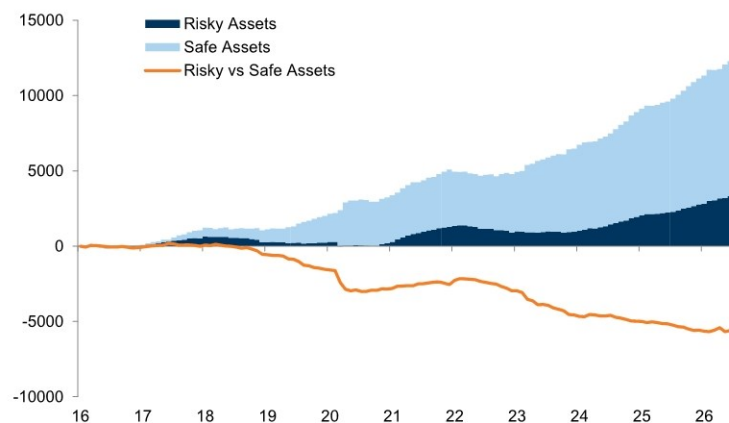
Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available



Source: ICI, Haver, Goldman Sachs Global Investment Research

Exhibit 26: Risky vs. safe assets: Cumulative global fund flows

Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available

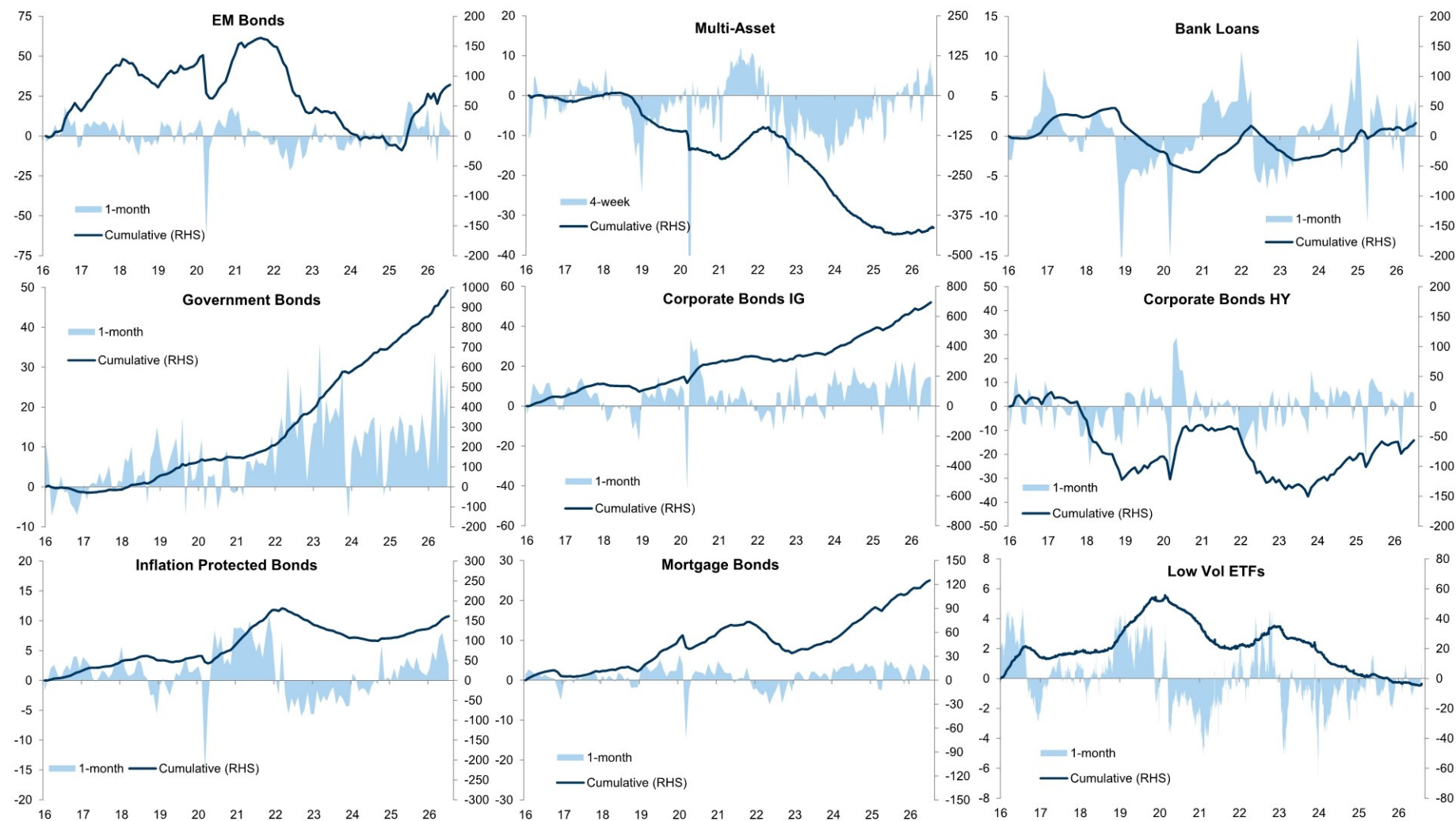


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: Cumulative & 1-month

Exhibit 27: Cumulative and 1-month rolling global fund flows (\$bn)

Monthly flows (\$bn). MTD sum of weekly flows when monthly not yet available. Weekly flows for Multi-Asset and Low Vol ETFs

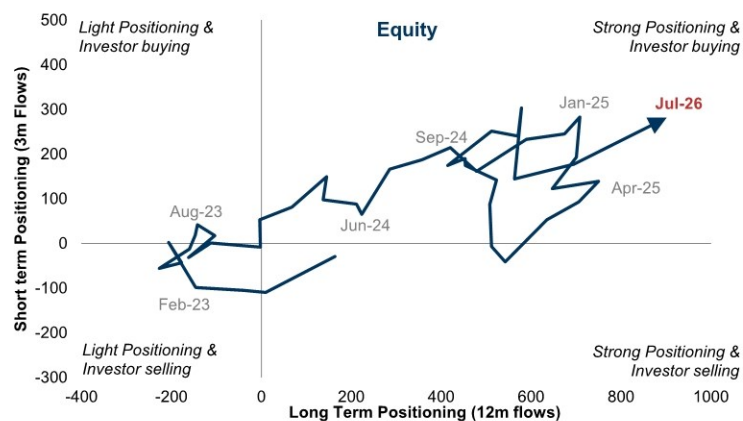


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Cross-Asset Global Fund Flows: Fund Flows Cycle Across Assets

Exhibit 28: Equity: short- & long-term global fund flow cycle

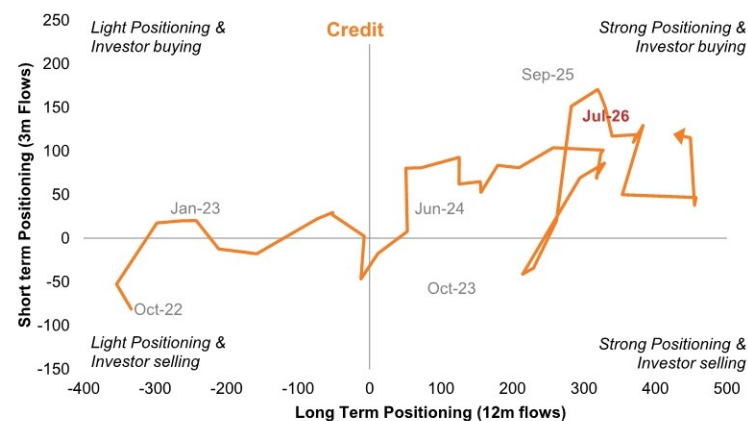
Monthly data until Jun-26, 5-week sum for Jul-26.



Source: EPFR, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 29: Credit: short- & long-term global fund flow cycle

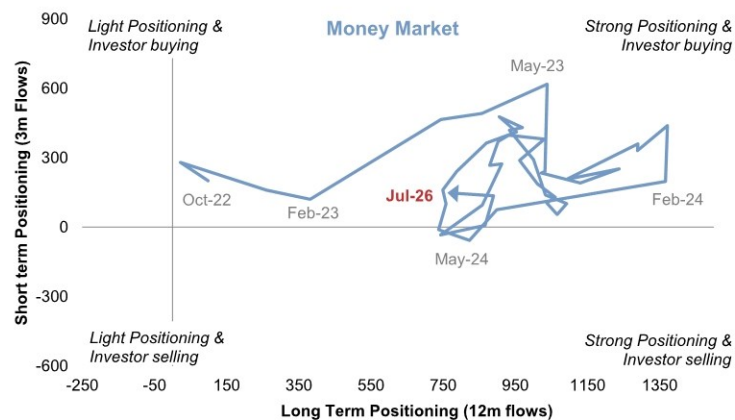
Monthly data until Jun-26, 5-week sum for Jul-26.



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 30: Money market: short- & long-term global fund flow cycle

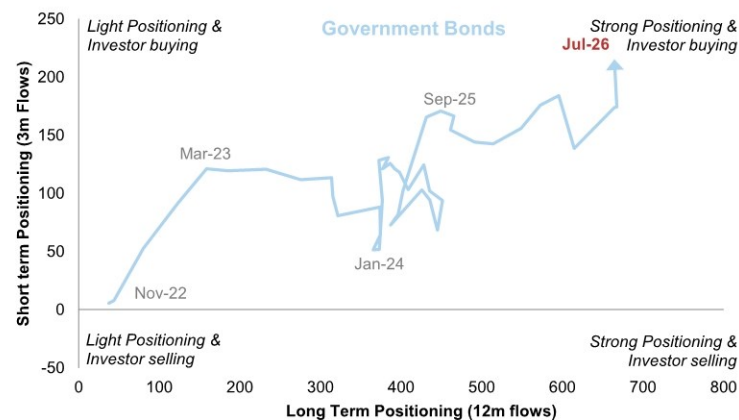
Monthly data until Jun-26, 5-week sum for Jul-26.



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 31: Government bonds: short- & long-term global fund flow cycle

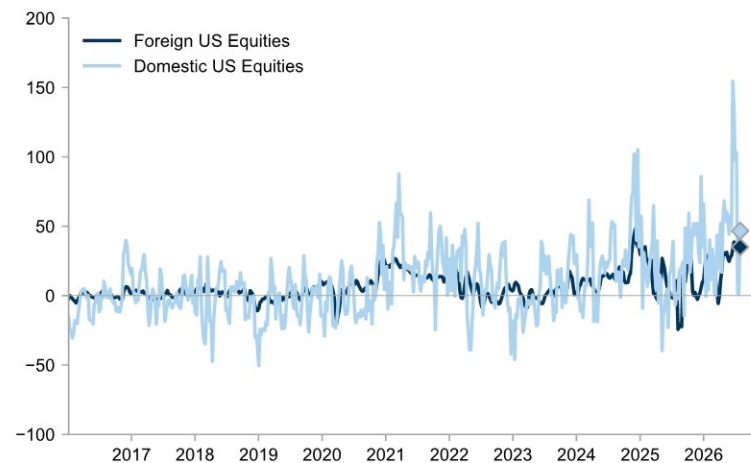
Monthly data until Jun-26, 5-week sum for Jul-26.



Source: EPFR, Haver, Goldman Sachs Global Investment Research

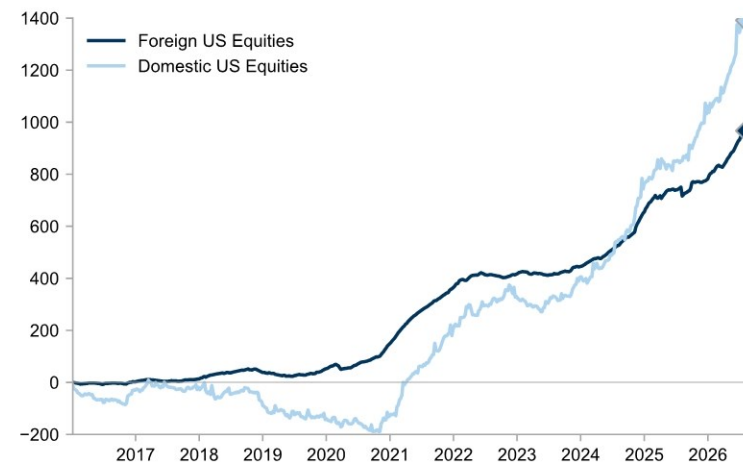
Equity Global Fund Flows: Foreign/Domestic Investor Flows

Exhibit 32: US equity foreign/domestic 4-week global fund flows



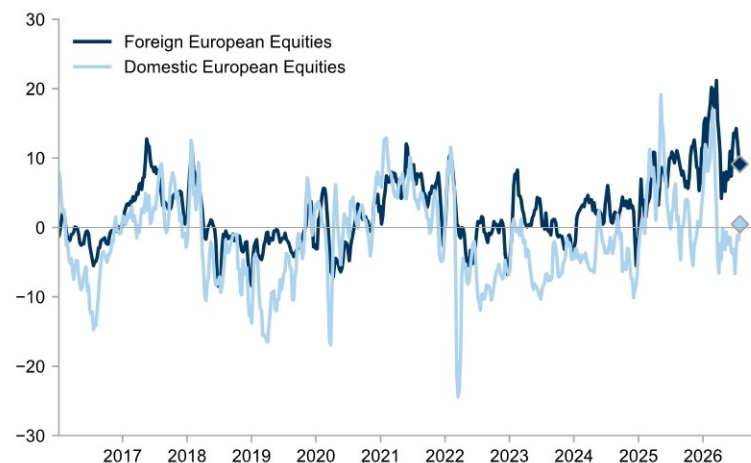
Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 33: US equity foreign/domestic cumulative fund flows



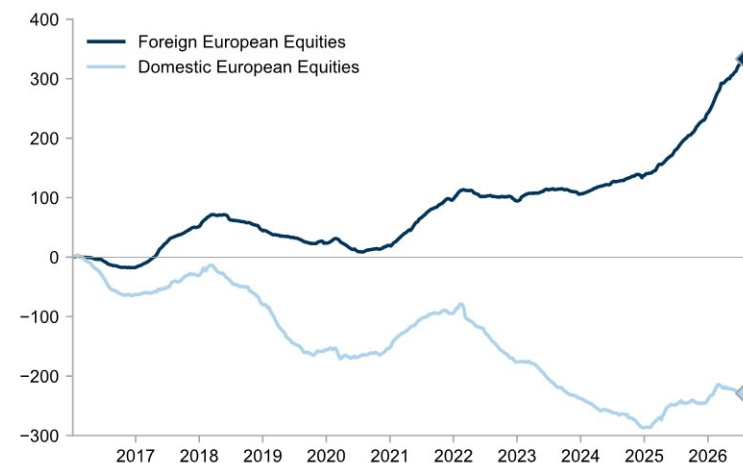
Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 34: European equity foreign/domestic 4-week global fund flows



Source: EPFR, Haver, Goldman Sachs Global Investment Research

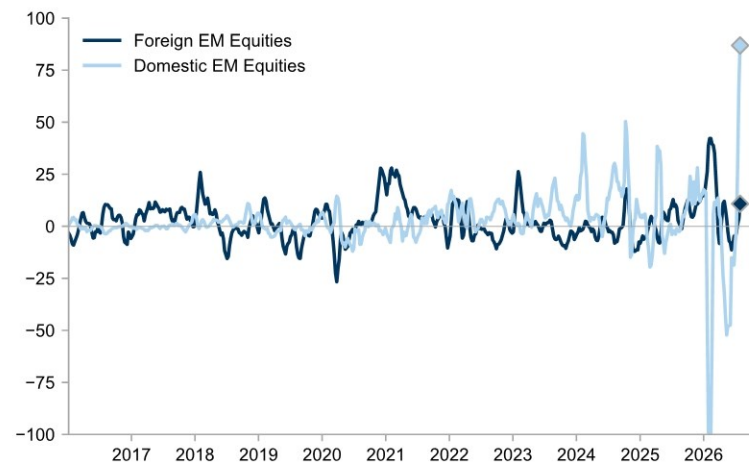
Exhibit 35: European equity foreign/domestic cumulative global fund flows



Source: EPFR, Haver, Goldman Sachs Global Investment Research

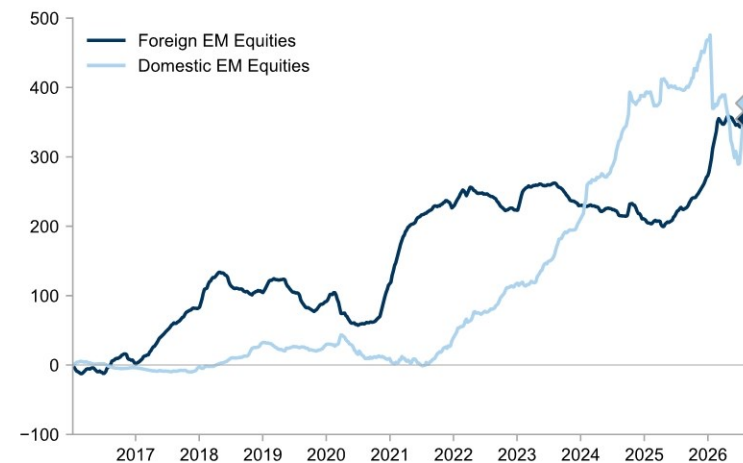
Equity Global Fund Flows: Foreign/Domestic Investor Flows

Exhibit 36: EM equity foreign/domestic 4-week global fund flows



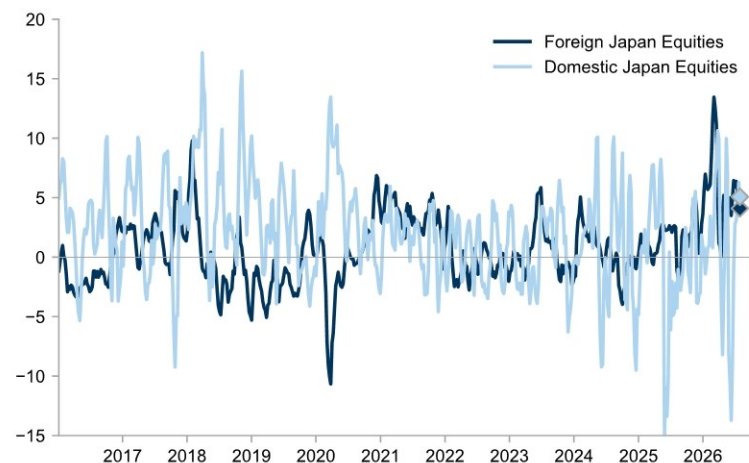
Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 37: EM equity foreign/domestic cumulative global fund flows



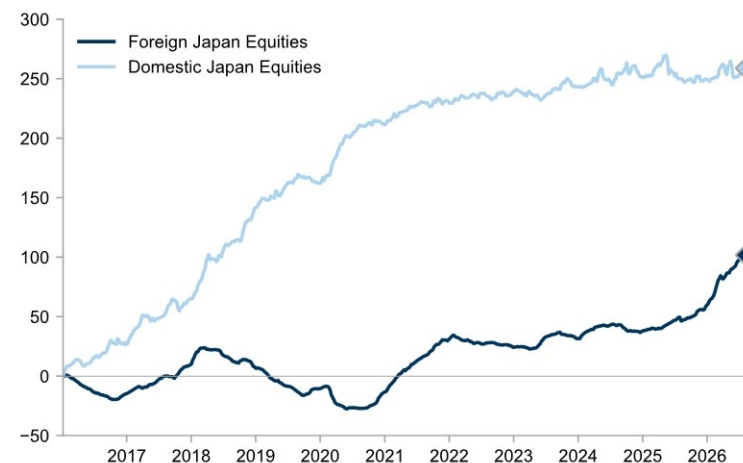
Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 38: Japan equity foreign/domestic 4-week global fund flows



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 39: Japan equity foreign/domestic cumulative global fund flows

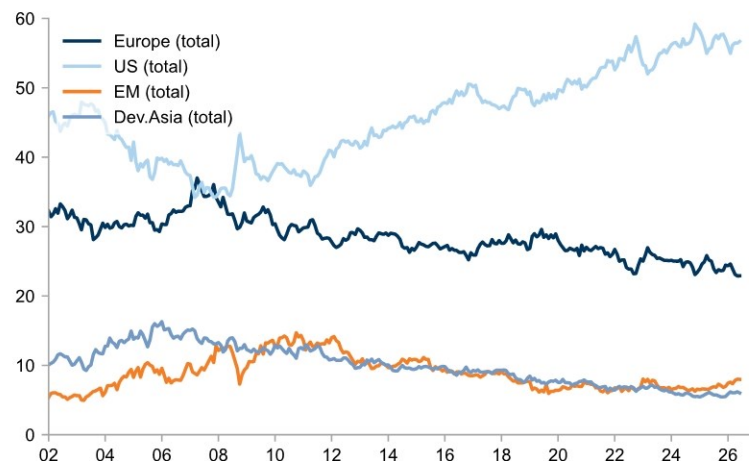


Source: EPFR, Haver, Goldman Sachs Global Investment Research

Global Equity & Bonds Mutual Funds Allocation

Exhibit 40: Global equity mutual funds' regional allocation

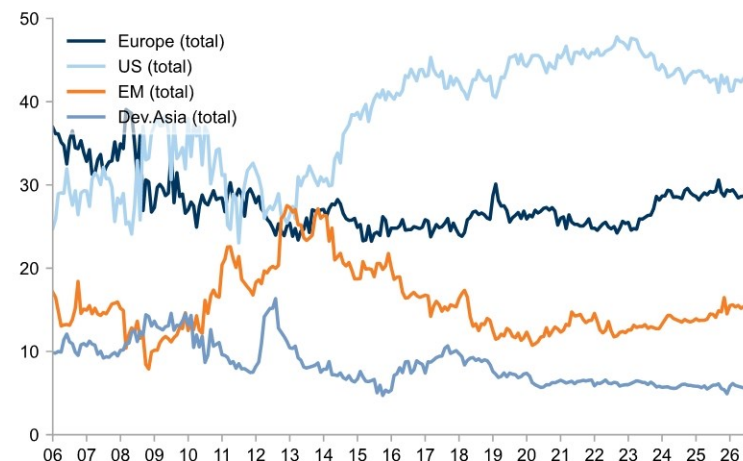
As of June 2026



Source: EPFR, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 41: Global bonds mutual funds' regional allocation

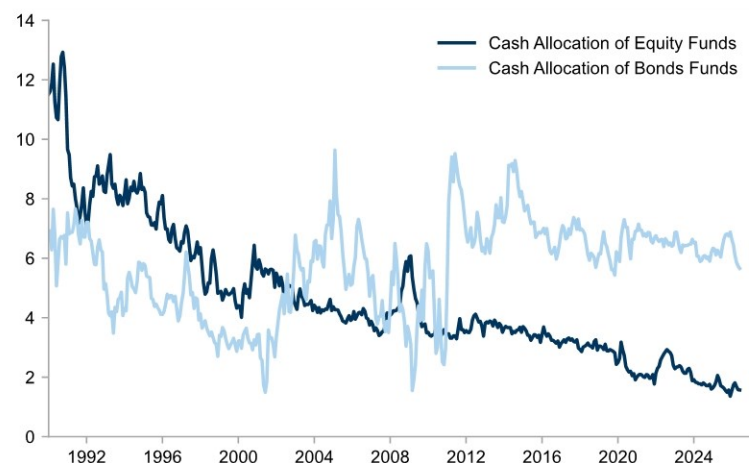
As of June 2026



Source: EPFR, Haver, Goldman Sachs Global Investment Research

Exhibit 42: Cash allocation of equity and bond funds

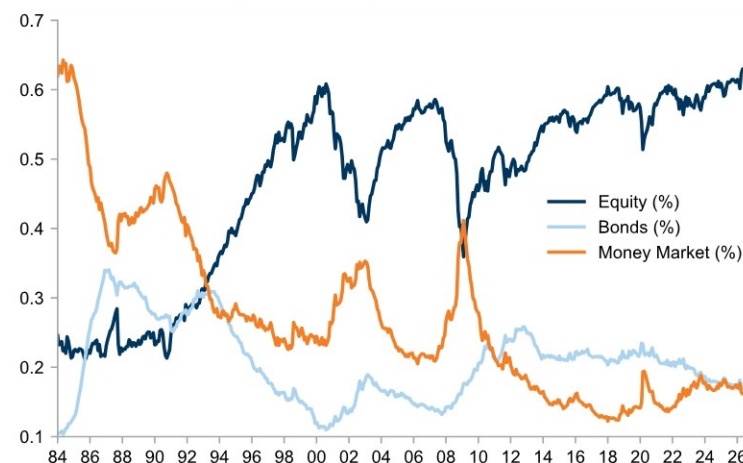
US domiciled funds (as of June 2026)



Source: ICI, Haver, Goldman Sachs Global Investment Research

Exhibit 43: US mutual funds & ETFs - AUM breakdown into equity, bonds and money market

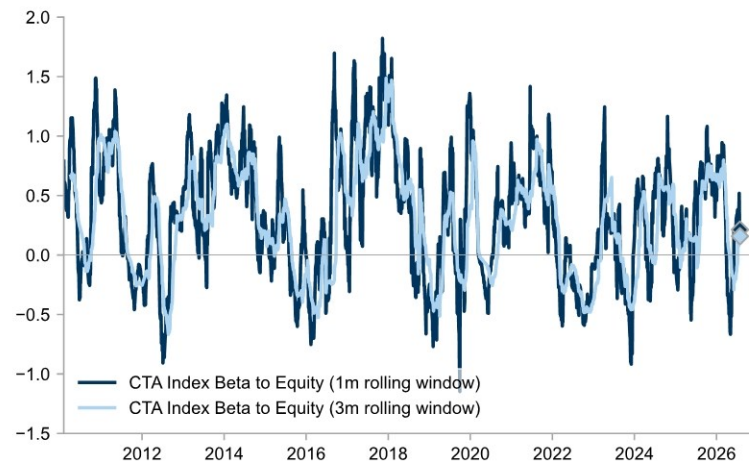
US domiciled mutual funds (as of June 2026)



Source: ICI, Haver, Goldman Sachs Global Investment Research

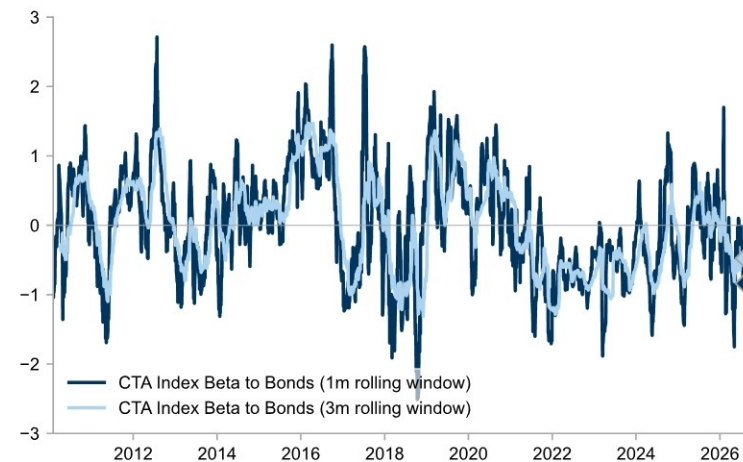
CTAs: Performance Sensitivities

Exhibit 44: Global CTAs performance beta to equity



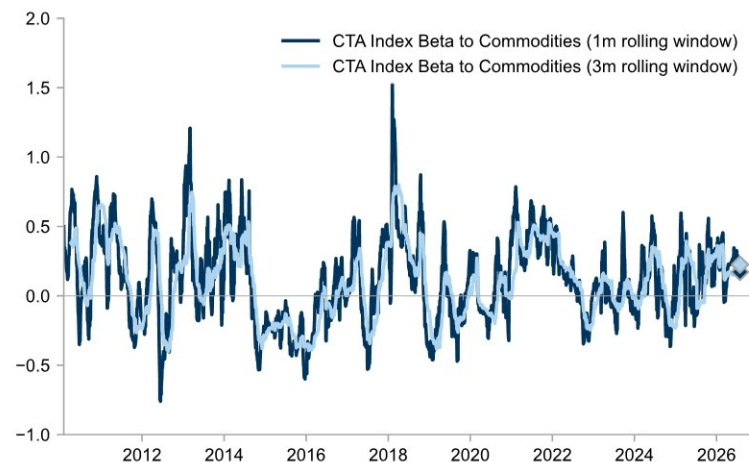
Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 45: Global CTAs performance beta to US 10y bonds



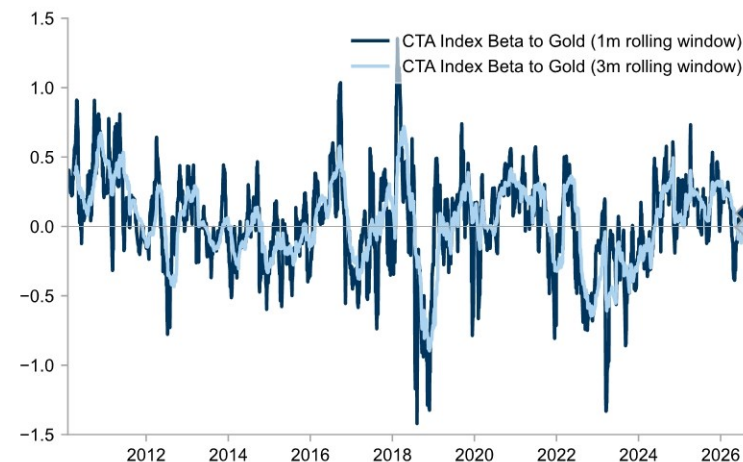
Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 46: Global CTAs performance beta to S&P GSCI



Source: Bloomberg, Goldman Sachs Global Investment Research

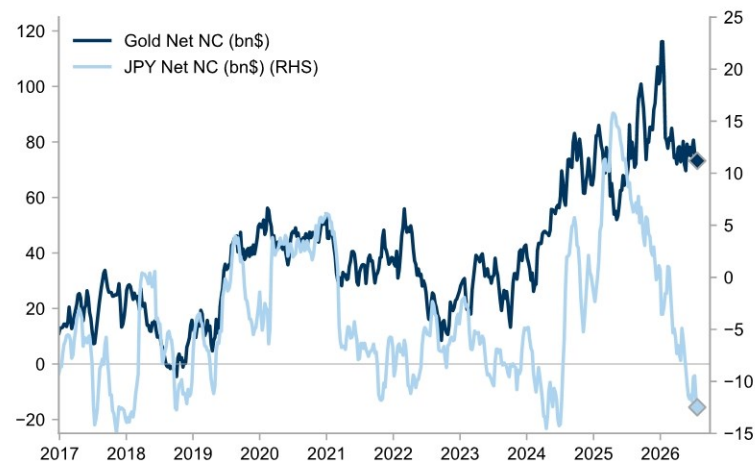
Exhibit 47: Global CTAs performance beta to Gold



Source: Bloomberg, Goldman Sachs Global Investment Research

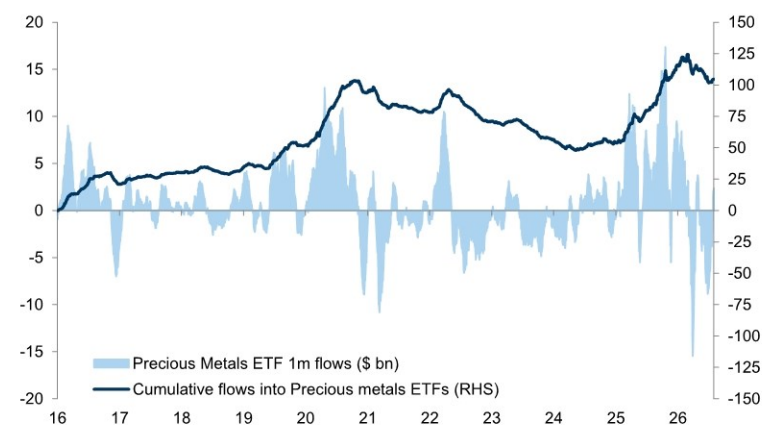
Gold, JPY and the Dollar

Exhibit 48: Gold and USD/JPY net non-commercial future positions



Source: CFTC, Haver, Goldman Sachs Global Investment Research

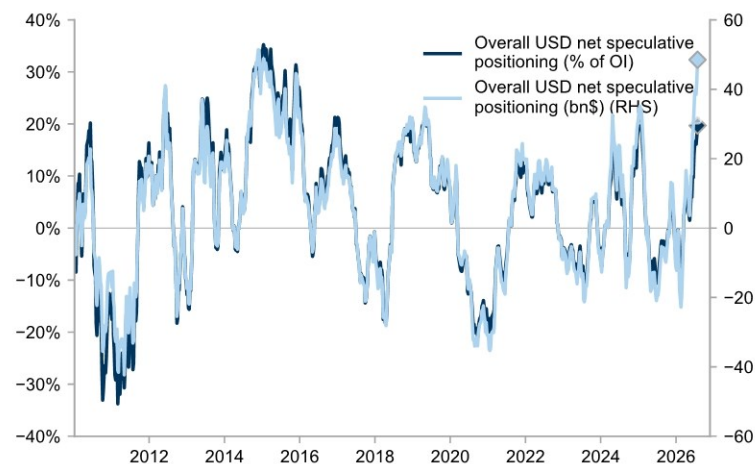
Exhibit 49: Precious metal ETFs global flows



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 50: Net non-commercial future positions in USD vs. other FX

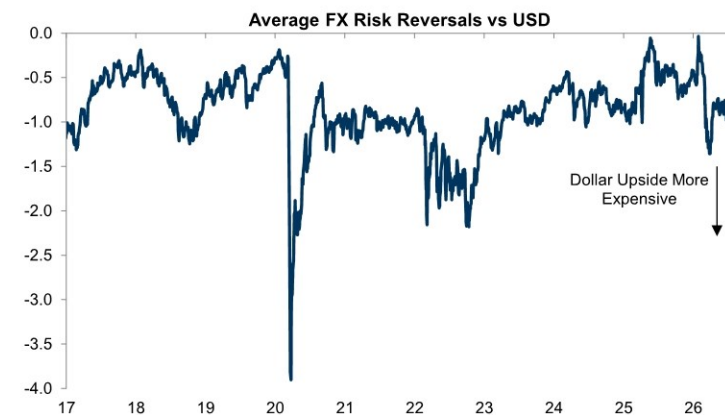
FX included: EUR, JPY, GBP, AUD, NZD, CAD, CHF, MXN, BRL, RUB



Source: CFTC, Goldman Sachs Global Investment Research

Exhibit 51: Average FX risk reversal vs. USD

3m 25-delta FX risk reversal vs. USD



Source: Bloomberg, Goldman Sachs Global Investment Research

CFTC Cross-Asset Positioning

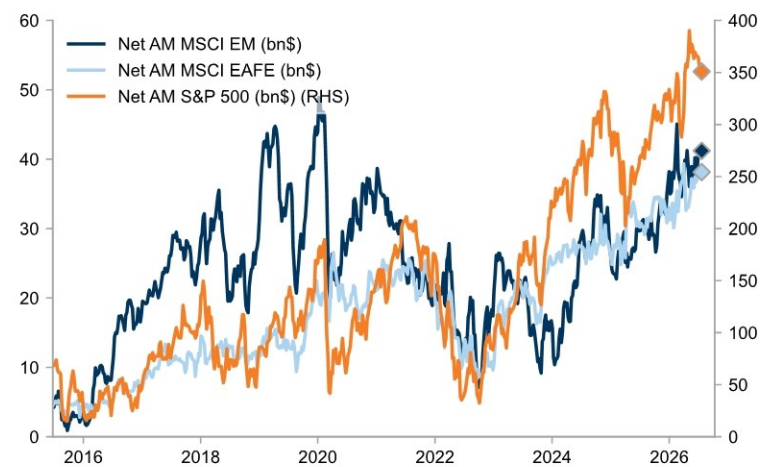
Exhibit 52: Cross-asset CFTC positioning indicators

Asset	Positioning vs last 5y		Net Future Pos. (% of Open Int.)	Net Future Pos. (\$ bn)	Open Int. (\$ bn)
	Short (Min)	Long (Max)			
USD			20%	49	245
EAFE Mini			55%	38	70
EM Mini			49%	41	84
S&P 500			47%	351	746
US Equity			42%	396	946
Copper			25%	10	43
Nasdaq 100			24%	43	178
Gold			47%	73	155
VIX			-13%	-1	6
Nikkei			23%	2	7
US 2-year			-26%	-225	881
US Bond			-21%	-427	2032
CHF			-30%	-5	17
US 10-year			-16%	-88	531
WTI			6%	10	150
GBP			-24%	-5	22
JPY			-38%	-12	33
EUR			-9%	-10	117

Source: CFTC, Haver, Goldman Sachs Global Investment Research

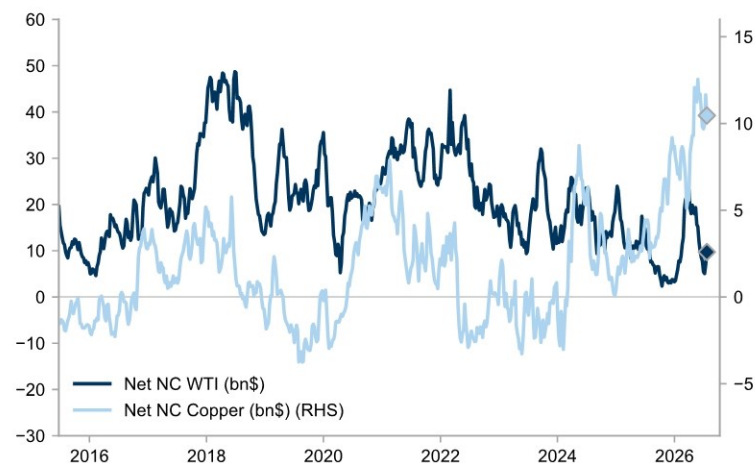
Exhibit 53: Equity future asset managers' positions

Asset manager net positioning in \$bn



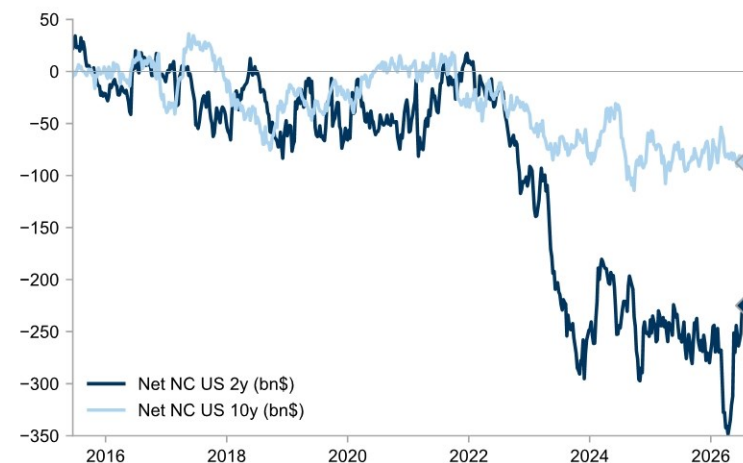
Source: CFTC, Haver, Goldman Sachs Global Investment Research

Exhibit 54: Commodity net non-commercial future positions



Source: CFTC, Goldman Sachs Global Investment Research

Exhibit 55: US bond net non-commercial future positions

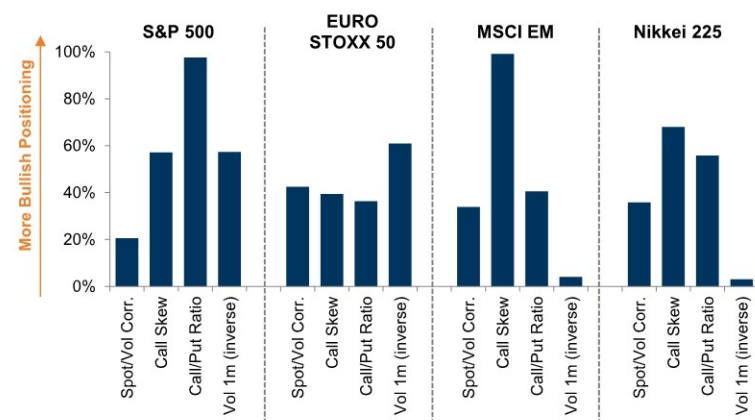


Source: CFTC, Goldman Sachs Global Investment Research

Equity Options Positioning Indicators

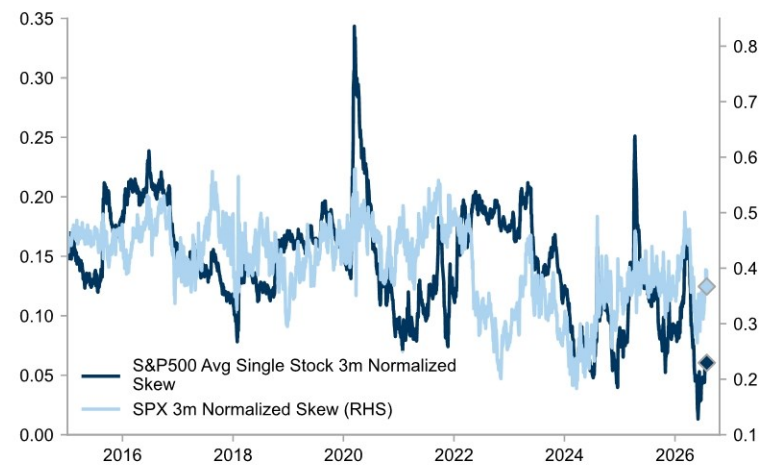
Exhibit 56: Option positioning indicators

Percentile since 2015



Source: Bloomberg, Goldman Sachs Global Investment Research

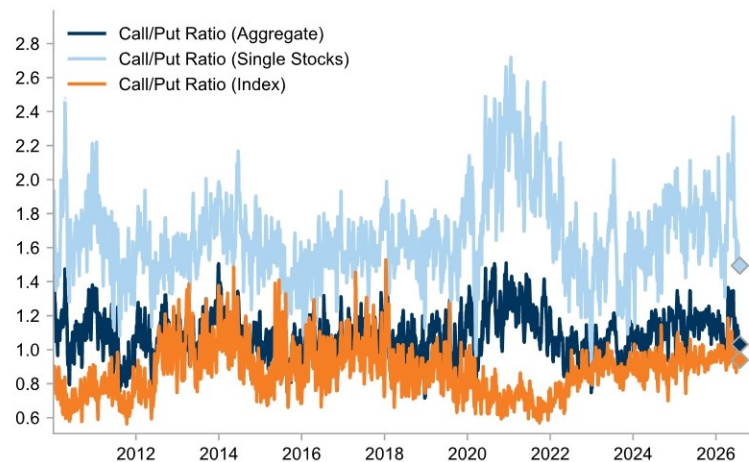
Exhibit 57: Single stock and S&P 500 skew



Source: Goldman Sachs Global Investment Research

Exhibit 58: US equity call/put volumes ratio

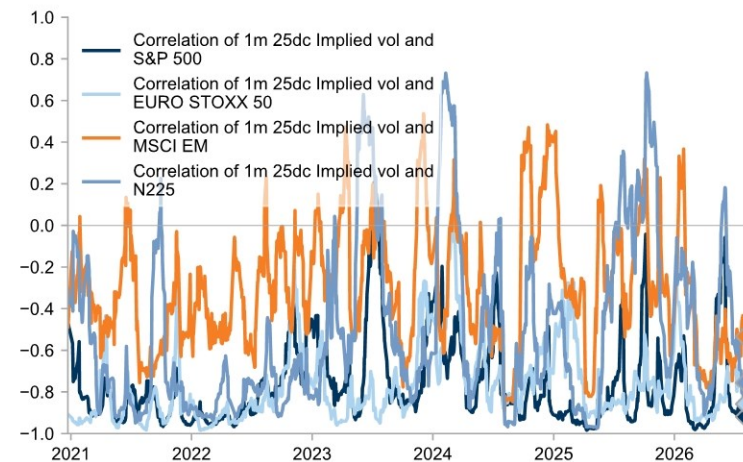
CBOE Index



Source: Haver, Goldman Sachs Global Investment Research

Exhibit 59: Spot/vol correlation across indices

1m rolling correlation of daily change/return

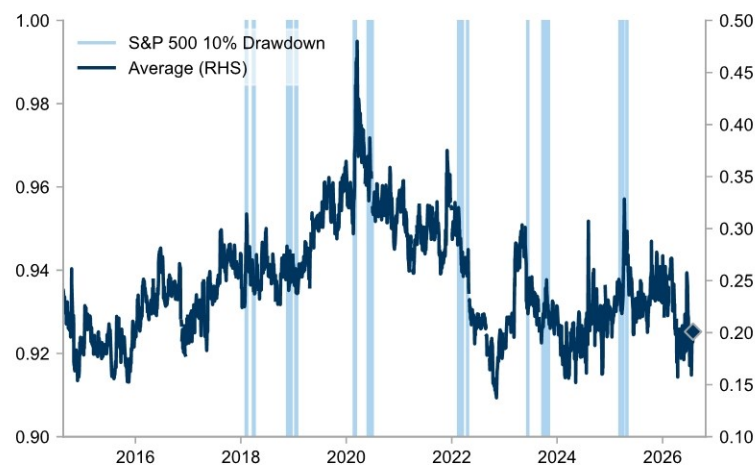


Source: Goldman Sachs Global Investment Research

Cross-Asset Skew Monitor

Exhibit 60: Average cross-asset skew

3m 25d normalised skew across assets

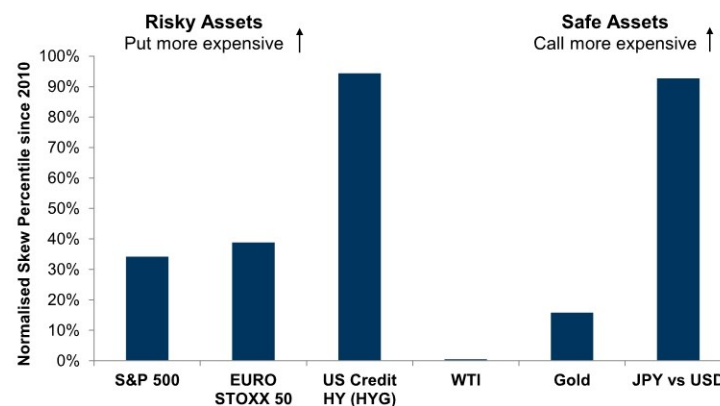


Assets: S&P 500, EURO STOXX 50, US Credit HY (HYG), WTI, Gold, JPY vs USD

Source: Goldman Sachs Global Investment Research

Exhibit 61: Percentile of skew across assets

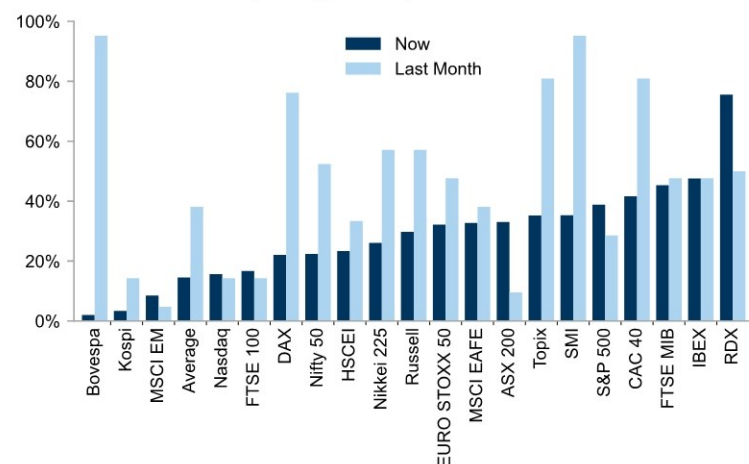
Percentile since 2010. 3m 25-delta normalised skew



Source: Goldman Sachs Global Investment Research

Exhibit 62: Put skew across equity indices

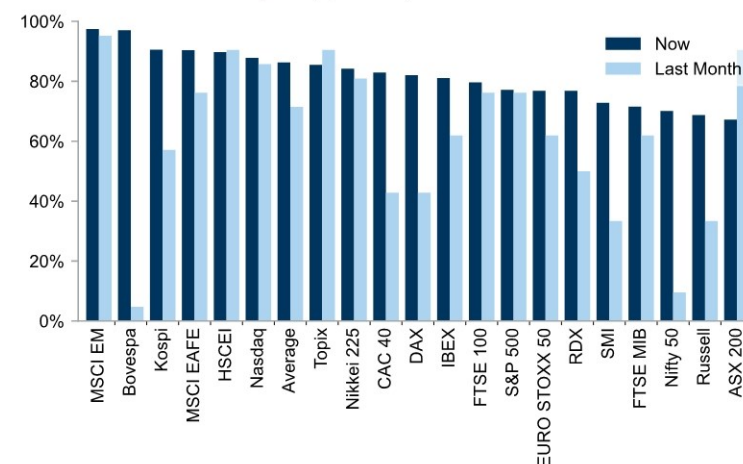
3m 25-delta normalised skew (last 10y percentile)



Source: Goldman Sachs Global Investment Research

Exhibit 63: Call skew across equity indices

3m 25-delta normalised skew (last 10y percentile)

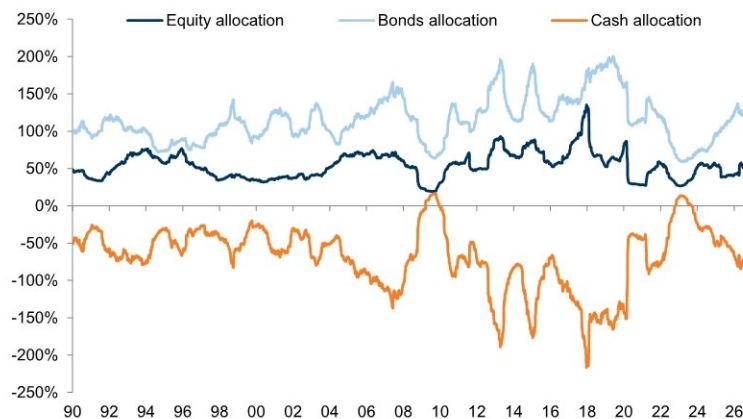


Source: Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

Risk Parity, Hedge Fund Leverage and Surveys

Exhibit 64: US risk parity allocation

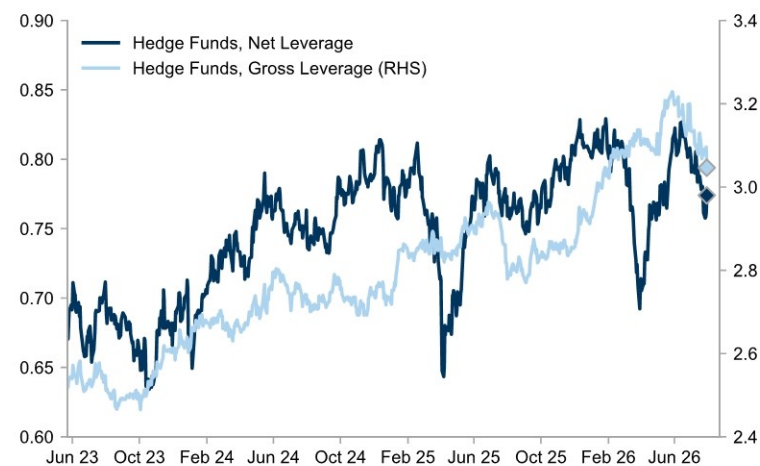
US risk parity strategy allocation based on: vol target at 10%, volatility lookback period 1y, using leverage, assets: S&P 500 and US 10y bonds



Source: Haver, Goldman Sachs Global Investment Research

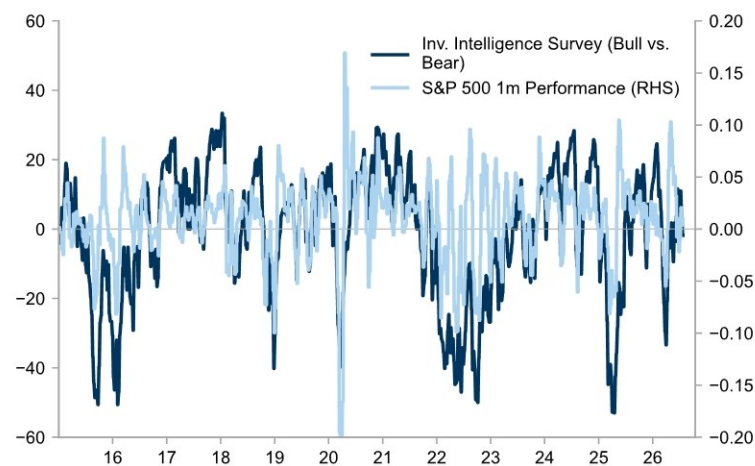
Exhibit 65: Hedge fund net and gross leverage (ex. options)

Aggregated data from Goldman Sachs Prime Services, should not be relied upon as a comprehensive view of the market.



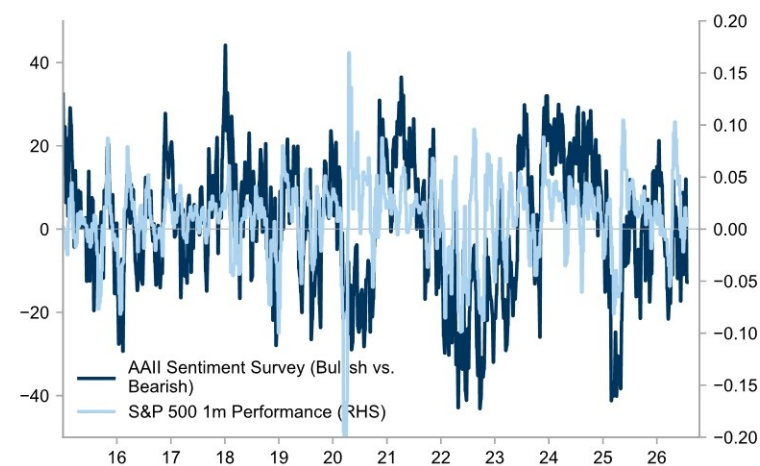
Source: Goldman Sachs Prime Services, Goldman Sachs Global Investment Research

Exhibit 66: Investor Intelligence Survey Indicator



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 67: American Association of Individual Investors



Source: Bloomberg, Goldman Sachs Global Investment Research

Appendix

Investors Intelligence Survey: Created in 1963. The survey is carried out by the investment services provider Investors Intelligence and covers the market views of 130 independent newsletters (brokerage house letters excluded), most of which are published weekly. The list of advisers is reviewed thanks to Barron's or web searches. The survey reports the findings as the percentage of advisers who are bullish/ bearish/ expect a correction, and is based on the question "are you telling their readers to buy or sell?" The survey is released each Wednesday morning, with most of the opinions written prior to the previous Friday's market close.

AAll Sentiment Survey: Sentiment of individual investors (bullish or bearish) towards the stock market over the next 6 months. The data are weekly since 1987 and are collected by the AAll (The American Association of Individual Investors) via a survey of a subset of their members. Response rates vary, but on average they obtained 315 responses each week from the start of 2013, for example, with the weekly period defined as from Thursday to Wednesday. During this window, AAll members participate by visiting the Sentiment Survey page on AAll.com and voting. The survey is open to all members, although a weekly email is sent to a rotating group of members reminding them to participate. Results are published online early each Thursday morning. Prior to the year 2000, members responded by physically mailing a postcard back to the AAll offices. The typical AAll member is a male in his mid-60s with a bachelor's or graduate degree. AAll members tend to be affluent with a median portfolio size in excess of \$1 million. The typical member self-describes as having a moderate level of investment knowledge and engaging primarily in fundamental analysis. AAll has in excess of 160,000 members and, simply due to the sheer size of membership, there are wide variances in wealth, investment knowledge and investing styles.

CBOE Put/Call Ratio: Calculated as the ratio of put options volume traded relative to the call options volume traded as reported at the end of each day. It is compiled at a daily frequency and comprises single stock and index options. It excludes exchange-traded products.

CFTC Future data: CFTC reports are published on Friday each week, reflecting current positioning as of the close on the previous Tuesday for markets in which 20 or more traders hold positions equal to or above the reporting levels established by the CFTC.

EPFR Fund Flows Data: Fund flows data track more than \$25trn AuM of global mutual funds and ETFs. We collect data with a weekly frequency, and they reflect fund flows as of Wednesday's close.

Disclosure Appendix

Reg AC

We, Christian Mueller-Glissmann, CFA, Alessandro Giglio, Andrea Ferrario, Elena Porfidia and Peter Oppenheimer, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

Contributing Authors: Christian Mueller-Glissmann, CFA Goldman Sachs International, Alessandro Giglio Goldman Sachs International, Andrea Ferrario Goldman Sachs International, Elena Porfidia Goldman Sachs International, Peter Oppenheimer Goldman Sachs International.

Unless otherwise stated, the individuals listed in the Contributing Authors disclosure of this report are analysts in Goldman Sachs' Global Investment Research division.

Disclosures

MSCI Disclosure

All MSCI data used in this report is the exclusive property of MSCI, Inc. (MSCI). Without prior written permission of MSCI, this information and any other MSCI intellectual property may not be reproduced or disseminated in any form and may not be used to create any financial instruments or products or any indices. This information is provided on an "as is" basis, and the user of this information assumes the entire risk of any use made of this information. Neither MSCI, any of its affiliates nor any third party involved in, or related to, computing or compiling the data makes any express or implied warranties or representations with respect to this information (or the results to be obtained by the use thereof), and MSCI, its affiliates and any such third party hereby expressly disclaim all warranties of originality, accuracy, completeness, merchantability or fitness for a particular purpose with respect to any of this information. Without limiting any of the foregoing, in no event shall MSCI, any of its affiliates or any third party involved in, or related to, computing or compiling the data have any liability for any direct, indirect, special, punitive, consequential or any other damages (including lost profits) even if notified of the possibility of such damages. MSCI and the MSCI indexes are service marks of MSCI and its affiliates. The Global Industry Classification Standard (GICS) were developed by and is the exclusive property of MSCI and Standard & Poor's. GICS is a service mark of MSCI and S&P and has been licensed for use by The Goldman Sachs Group.

Marquee disclosure

Marquee is a product of Goldman Sachs FICC and Equities. Any Marquee content linked in this report is not necessarily representative of GS Research views. If you need access to Marquee, please contact your GS salesperson or email the Marquee team at gs-marquee-sales@gs.com

Regulatory disclosures

Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs trades or may trade as a principal in debt securities (or in related derivatives) of issuers discussed in this report.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage. **Analyst compensation:** Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy generally prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director or advisor of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman Sachs & Co. LLC and therefore may not be subject to FINRA Rule 2241 or FINRA Rule 2242 restrictions on communications with a subject company, public appearances and trading in securities covered by the analysts.

Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of Global Investment Research of Goldman Sachs Australia may attend site visits and other meetings hosted by the companies and other entities which are the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. To the extent that the contents of this document contains any financial product advice, it is general advice only and has been prepared by Goldman Sachs without taking into account a client's objectives, financial situation or needs. A client should, before acting on any such advice, consider the appropriateness of the advice having regard to the client's own objectives, financial situation and needs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests and a copy of Goldman Sachs' Australian Sell-Side Research Independence Policy Statement are available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Brazil:** Disclosure information in relation to CVM Resolution n. 20 is available at <https://www.gs.com/worldwide/brazil/area/gir/index.html>. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 20 of CVM Resolution n. 20, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** This information is being provided to you for information purposes only and is not, and under no circumstances should be construed as, an advertisement, offering or solicitation by Goldman Sachs & Co. LLC for purchasers of securities in Canada to trade in any Canadian security. Goldman Sachs & Co. LLC is not registered as a dealer in any jurisdiction in Canada under applicable Canadian securities laws and generally is not permitted to trade in Canadian securities

and may be prohibited from selling certain securities and products in certain jurisdictions in Canada. If you wish to trade in any Canadian securities or other products in Canada please contact Goldman Sachs Canada Inc., an affiliate of The Goldman Sachs Group Inc., or another registered Canadian dealer. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited, Research Analyst - SEBI Registration Number INH000001493, 10th Floor, Ascent-Worli, Sudam Kalu Ahire Marg, Worli, Mumbai-400 025, India, Corporate Identity Number U74140MH2006FTC160634, Phone +91 22 6616 9000, Fax +91 22 6616 9001. Goldman Sachs may beneficially own 1% or more of the securities (as such term is defined in clause 2 (h) the Indian Securities Contracts (Regulation) Act, 1956) of the subject company or companies referred to in this research report. Registration granted by SEBI and certification from NISM in no way guarantee performance of the intermediary or provide any assurance of returns to investors. Goldman Sachs (India) Securities Private Limited compliance officer and investor grievance contact details, a copy of the annual compliance audit report and other relevant information and disclosures can be found at this link: <https://www.goldmansachs.com/worldwide/india/research-analyst>. **Japan:** See below. **Korea:** This research, and any access to it, is intended only for “professional investors” within the meaning of the Financial Services and Capital Markets Act, unless otherwise agreed by Goldman Sachs. Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither “registered banks” nor “deposit takers” (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for “wholesale clients” (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests is available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. Research reports do not constitute a personalized investment recommendation as defined in Russian laws and regulations, are not addressed to a specific client, and are prepared without analyzing the financial circumstances, investment profiles or risk profiles of clients. Goldman Sachs assumes no responsibility for any investment decisions that may be taken by a client or any other person based on this research report. **Singapore:** Goldman Sachs (Singapore) Pte. (Company Number: 198602165W), which is regulated by the Monetary Authority of Singapore, accepts legal responsibility for this research, and should be contacted with respect to any matters arising from, or in connection with, this research. **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are available from Goldman Sachs International on request.

European Union and United Kingdom: Disclosure information in relation to Article 6 (2) of the European Commission Delegated Regulation (EU) (2016/958) supplementing Regulation (EU) No 596/2014 of the European Parliament and of the Council (including as that Delegated Regulation is implemented into United Kingdom domestic law and regulation following the United Kingdom's departure from the European Union and the European Economic Area) with regard to regulatory technical standards for the technical arrangements for objective presentation of investment recommendations or other information recommending or suggesting an investment strategy and for disclosure of particular interests or indications of conflicts of interest is available at <https://www.gs.com/disclosures/europeanpolicy.html> which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

Japan: Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan Type II Financial Instruments Firms Association, and Investment Management Association of Japan. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

Global product; distributing entities

Goldman Sachs Global Investment Research produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Public Communication Channel Goldman Sachs Brazil: 0800 727 5764 and / or contatogoldmanbrasil@gs.com. Available Weekdays (except holidays), from 9am to 6pm. Canal de Comunicação com o Público Goldman Sachs Brasil: 0800 727 5764 e/ou contatogoldmanbrasil@gs.com. Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom.

Goldman Sachs International (“GSI”), authorised by the Prudential Regulation Authority (“PRA”) and regulated by the Financial Conduct Authority (“FCA”) and the PRA, has approved this research in connection with its distribution in the United Kingdom.

European Economic Area: Goldman Sachs Bank Europe SE (“GSBE”) is a credit institution incorporated in Germany and, within the Single Supervisory Mechanism, subject to the supervision of the European Central Bank and in other respects supervised by German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and disseminates research within the European Economic Area.

General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not warrant its completeness, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without notice. To update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of our research is published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business lines that serve a substantial percentage of the companies covered by Global Investment Research. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (<https://www.sipc.org/>).



Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

We and our affiliates, officers, directors, and employees will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research, unless otherwise prohibited by regulation or Goldman Sachs policy.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is focused on investment themes across markets, industries and sectors. It does not attempt to distinguish between the prospects or performance of, or provide analysis of, individual companies within any industry or sector we describe.

Any trading recommendation in this research relating to an equity or credit security or securities within an industry or sector is reflective of the investment theme being discussed and is not a recommendation of any such security in isolation.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options and futures disclosure documents which are available from Goldman Sachs sales representatives or at <https://www.theocc.com/about/publications/character-risks.jsp> and https://www.goldmansachs.com/disclosures/cftc_fcm_disclosures. Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

Differing Levels of Service provided by Global Investment Research: The level and types of services provided to you by Goldman Sachs Global Investment Research may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to <https://research.gs.com>.

Disclosure information is also available at <https://www.gs.com/research/hedge.html> or from Research Compliance, 200 West Street, New York, NY 10282.

© 2026 Goldman Sachs.

You are permitted to store, display, analyze, modify, reformat, and print the information made available to you via this service only for your own use. You may not resell or reverse engineer this information to calculate or develop any index for disclosure and/or marketing or create any other derivative works or commercial product(s), data or offering(s) without the express written consent of Goldman Sachs. You are not permitted to publish, transmit, or otherwise reproduce this information, in whole or in part, in any format to any third party without the express written consent of Goldman Sachs. This foregoing restriction includes, without limitation, using, extracting, downloading or retrieving this information, in whole or in part, to train or finetune a machine learning or artificial intelligence system, or to provide or reproduce this information, in whole or in part, as a prompt or input to any such system.