GOAL KICKSTART

The name is bond (again) – rising bond yields weigh on portfolios

Last week, US inflation prints surprised to the upside while US activity data remained solid. Global bonds sold-off driven by the more reflationary macro backdrop and spillovers from UK and Japan (Exhibit 1). While there is little US macro data this week, there are several speaking engagements with Fed officials, including events with Governors Waller and Barr and Presidents Paulson and Barkin. In Europe there are inflation prints and flash PMIs.

The 2-month correlation between US equities and US 10y yields turned the most negative since the late 1990s (Exhibit 2). The equity market's response to rising bond yields has tended to be closely linked to the source, speed, and starting level of the yield move. Since the start of the Middle East war and the ensuing energy price shock, markets have seen inflation rather than growth as the main source of macro shocks: the relative vol of our PC1 "Global Growth" and PC2 "Monetary policy" factors dropped alongside more negative equity/bond yield correlations (Exhibit 3). Likewise, the equity correlations with front-end inflation pricing (which is directly affected by higher energy prices) have turned sharply negative similarly to that with 10y real rates, while the correlation with forward inflation remains positive (Exhibit 4). Rising yields due to better growth are usually digested well by equities as growth optimism can help buffer discount rate headwinds, whereas in an inflation-led rate environment the equity/bond yield correlation turns negative. Unlike the past, higher growth expectations due to micro (e.g. AI investment) rather than macro catalysts have supported equity prices since April.

Even when the source is benign, the pace of the rate move can itself become a headwind: historically, equities struggle to digest sharp, disorderly rises in yield. The duration sell-off had been largely orderly until recently, but last week's move — with US 10y yields rising more than 2 standard deviations — is a reminder not to fade right tail risk in rates too early (Exhibit 5). The level of rates plays a role too, albeit a weaker one: historically, US 10y yields above 5% or real yields above 2-2.5% have been associated with more negative equity/bond-year correlations. A more robust indicator is the gap between 10y real rates and LT consensus real GDP growth expectations (now 2.1%) — when positive, it signals tighter monetary policy, which is a more challenging backdrop for equities.

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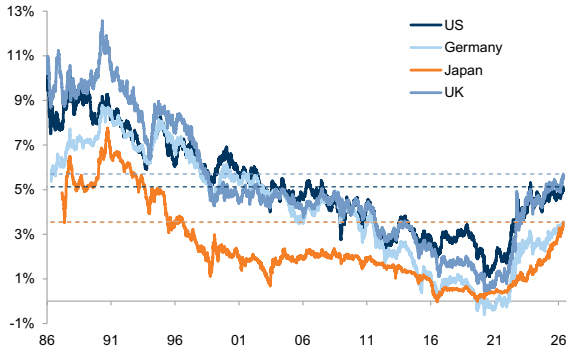
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We remain N bonds for 3M/12M in our Asset Allocation. While bonds look more attractive from a risk-premia point of view, the negative equity/bond-yield correlation regime might linger for longer. Equity down/rates up dual binaries look attractive to hedge an equity sell-off driven by a further yield increase, in particular as an overlay for balanced portfolios (Exhibit 6). While the implied equity/bond yield correlation has fallen since February, it still trades high compared to realised.

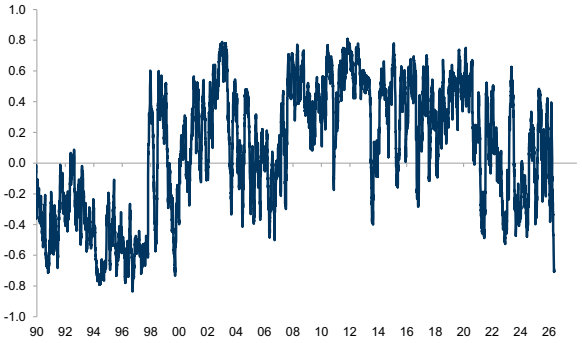
The name is bond (again) - rising bond yields weigh on portfolios

Exhibit 1: Long-dated bond yields have reached multi-decade highs
Average yield of 10y+ government bonds



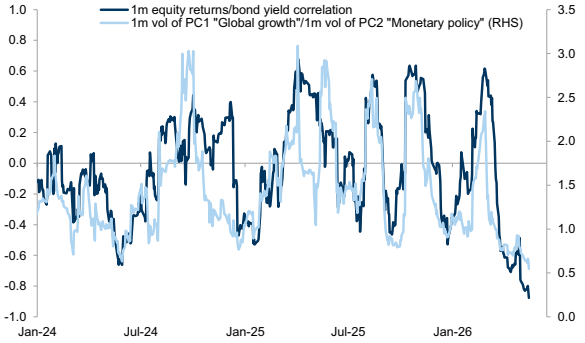
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 2: Equity/bond yield correlation has reached the most negative levels since the 1990s
2-month US equity/US 10y bond yield correlation



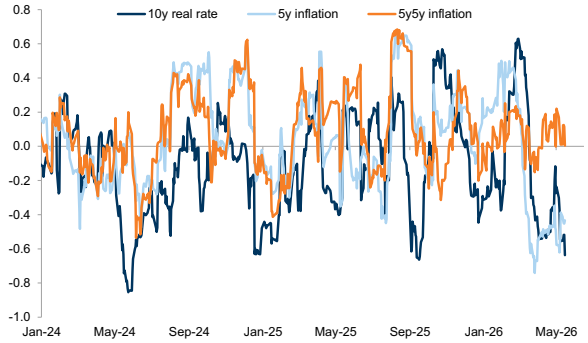
Source: Bloomberg, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 3: Inflation has been the driver of more negative equity/bond yield correlation



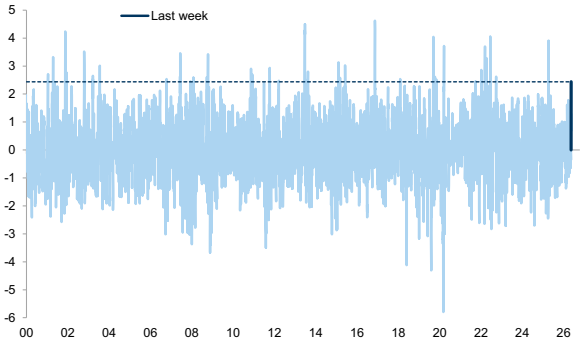
Source: Bloomberg, Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 4: The equity correlation has turned very negative with 10y real rates and front-end inflation
1-month correlation of S&P 500



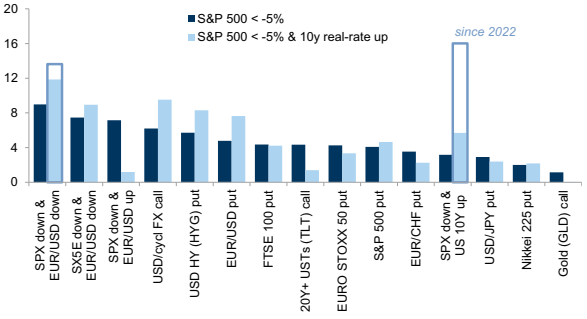
Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 5: US 10y yields sold off sharply last week
1-week change in US 10y rate in standard deviation terms



Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 6: Equity down/rates up hybrids look attractive to hedge a further rate shock
Average payout since 2007/ current price. 3-month 25-delta put/call options and double digital hybrid



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

Cross-asset: Forecasts

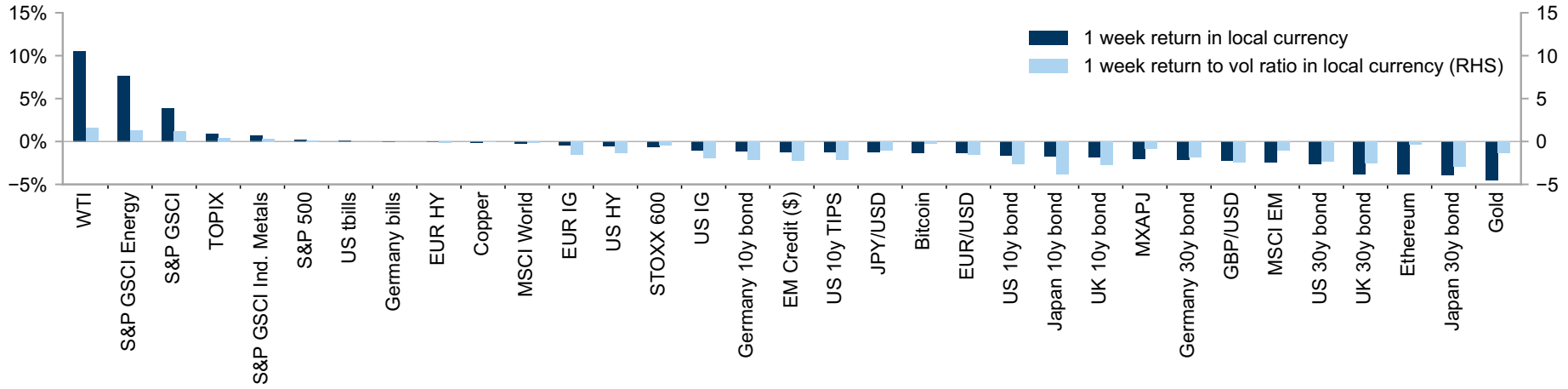
Exhibit 7: GOAL asset allocation recommendations and GS cross-asset forecasts

	Allocation Weighting		Current	Forecasts			Forecast Upside/Downside (%)		
	3m	12m	Level	3m	6m	12 m	3m	6m	12 m
Equities	**N**	**OW**			**Index level**			**Total Return**	
S&P 500 ($)	N	N	7409	7200	7400	7600	-2.5	0.5	3.7
Stoxx Europe 600 (€)	N	UW	607	605	615	625	0.5	3.0	6.4
MSCI Asia-Pacific ex. JP ($)	N	OW	860	900	940	990	5.1	9.8	16.4
Topix (¥)	N	OW	3864	3800	4000	4200	-1.1	4.6	10.9
10 Year Government Bonds	**N**	**N**			**Yield (%)**			**Total Return**	
US	OW	OW	4.60	4.25	4.10	4.07	4.0	6.6	9.4
Germany	UW	UW	3.15	2.92	3.00	3.00	2.9	3.2	5.0
Japan	N	N	2.72	2.50	2.53	2.45	2.9	3.7	6.3
UK	OW	OW	5.18	4.55	4.40	4.30	6.5	9.2	13.1
Corporate Bonds	**UW**	**UW**			**Spread**			**Total Return**	
Bloomberg USD IG	OW	OW	73	97	93	90	2.2	4.9	8.2
Bloomberg USD HY	OW	OW	267	340	330	315	0.4	2.7	6.5
iBoxx EUR IG	UW	UW	90	122	119	114	0.5	1.3	3.5
ICE-BAML EUR HY	UW	UW	260	379	372	360	-2.1	-0.9	1.8
EM Hard Currency Sovereign	N	N	237			300	2.9	4.5	6.1
Commodities	**N**	**N**			**Spot price**			**Spot Return**	
WTI ($/bbl)	N	N	109	86	83	82	-21.1	-23.8	-24.8
Brent ($/bbl)	N	N	106	93	90	86	-12.1	-14.9	-18.7
Copper ($/mt)	N	N	13,503	12,600	12,500	12,200	-6.7	-7.4	-9.7
Gold ($/troy oz)	N	N	4,553	5,065	5,305	5,675	11.2	16.5	24.6
FX	-	-			**Spot rate**			**Spot Return**	
EUR/USD	-	-	1.16	1.14	1.18	1.20	-2.0	1.5	3.2
USD/JPY	-	-	158.6	160	158	155	0.9	-0.4	-2.3
GBP/USD	-	-	1.33	1.33	1.34	1.33	-0.3	0.4	-0.3
AUD/USD	-	-	0.72	0.72	0.73	0.74	0.6	2.0	3.4
USD/BRL	-	-	5.07	4.90	5.00	5.00	-3.3	-1.3	-1.3
USD/INR	-	-	96.0	97.0	96.0	96.0	1.1	0.0	0.0
USD/CNY	-	-	6.80	6.80	6.70	6.50	-0.1	-1.5	-4.5
Cash	**OW**	**N**			**Spot rate**			**Total Return**	
US 3-month Tbill	-	-	-	-	-	-	0.92	1.87	3.82
Germany 3-month Bubills	-	-	-	-	-	-	0.50	1.14	2.54

Source: Bloomberg, Datastream, Bloomberg-Barclays, ICE-BAML, iBoxx, Goldman Sachs Global Investment Research

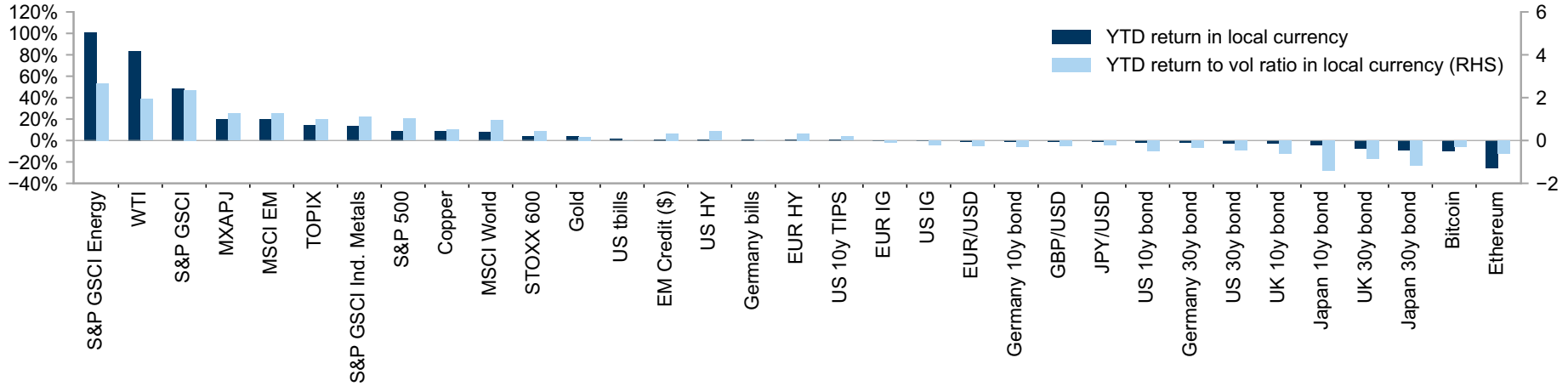
Cross-asset: Weekly and YTD performance, absolute and risk-adjusted

Exhibit 8: Local currency returns and return to vol ratios
1 week returns. Volatility of weekly returns in the previous 12m



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

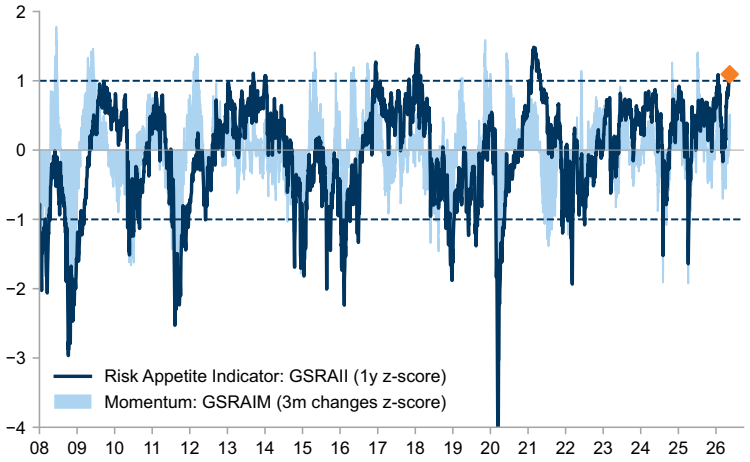
Exhibit 9: Local currency returns and return to vol ratios
YTD returns



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

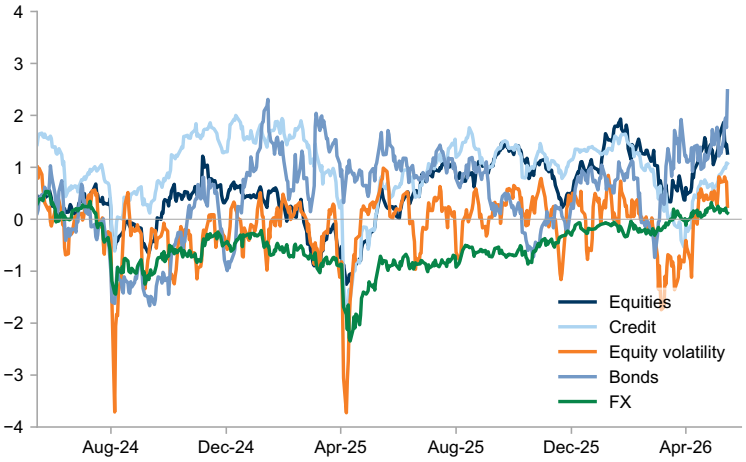
Cross-asset: Risk appetite indicator

Exhibit 10: Risk appetite indicator level and momentum factors
See July 2016 GOAL for construction details



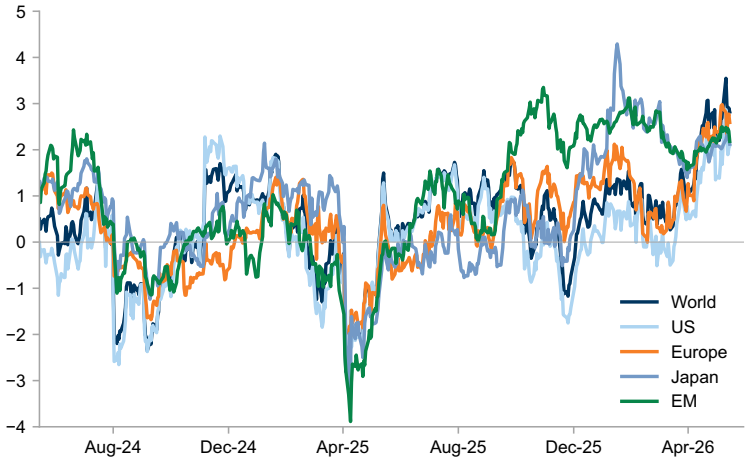
Source: Goldman Sachs Global Investment Research

Exhibit 11: Risk appetite indicators for different asset classes
See July 2016 GOAL for construction details



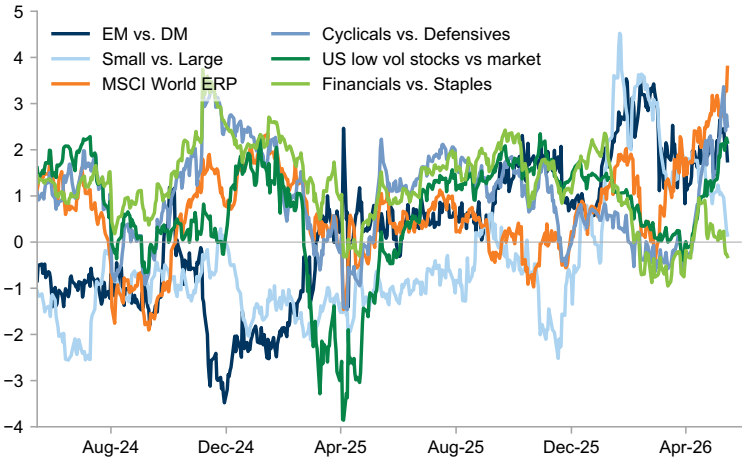
Source: Goldman Sachs Global Investment Research

Exhibit 12: Cyclicals vs. defensives 1-year rolling z-score across regions
See July 2016 GOAL for construction details



Source: Goldman Sachs Global Investment Research

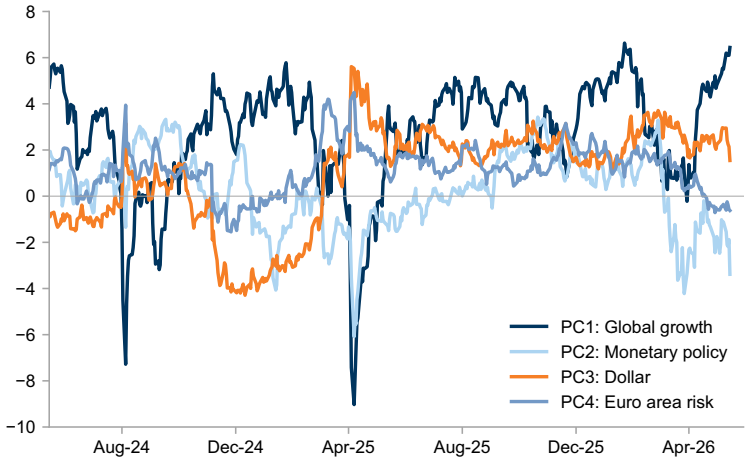
Exhibit 13: Sub-components of equity risk appetite indicator
See July 2016 GOAL for construction details



Source: Goldman Sachs Global Investment Research

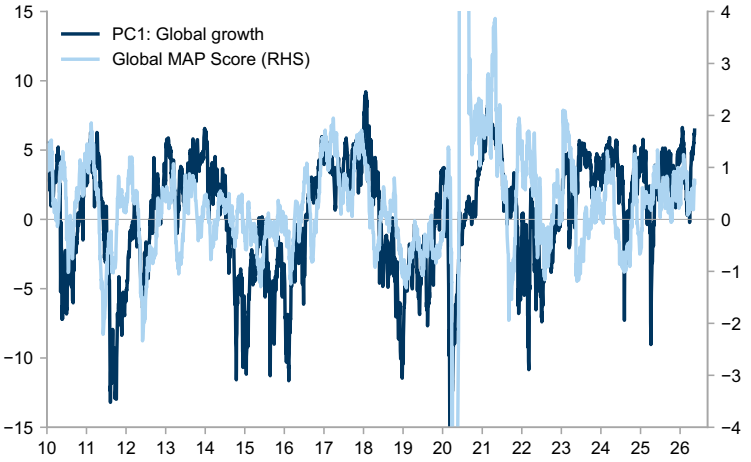
Cross-asset: Risk Appetite principal component analysis

Exhibit 14: GS RAI principal component
See April 2019 GOAL for construction details



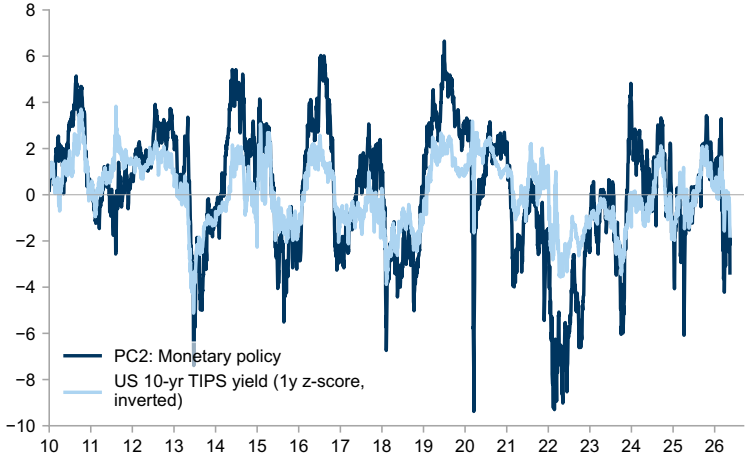
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 15: PC1: Global growth factor vs. Global MAP Score



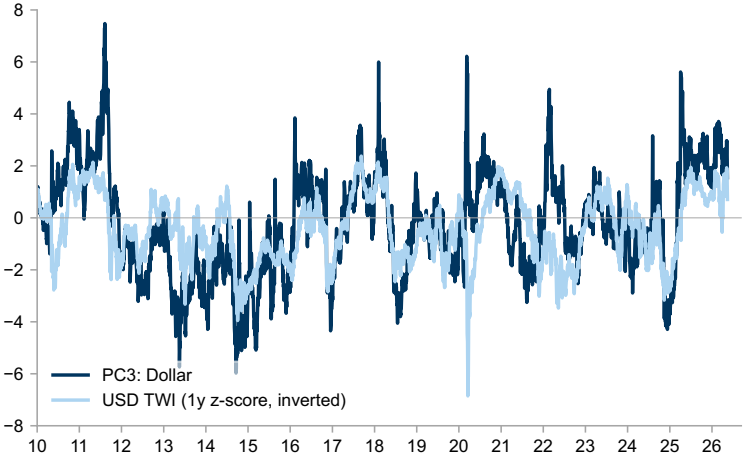
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 16: PC2: Monetary policy factor vs. US 10-year TIPS yield



Source: Datastream, Goldman Sachs Global Investment Research

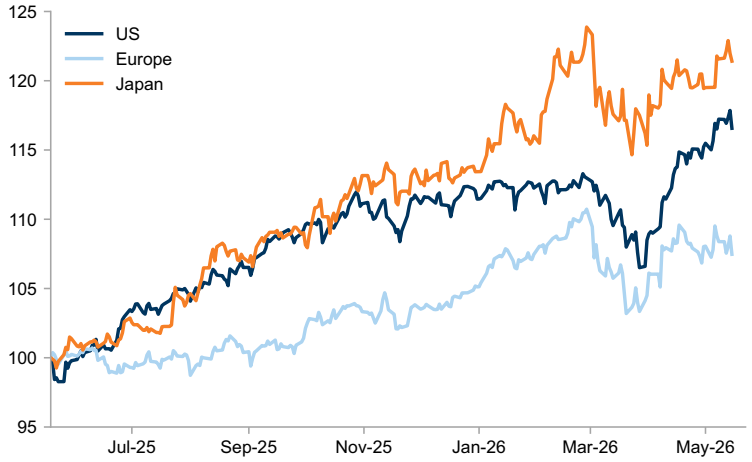
Exhibit 17: PC3: Dollar factor vs. USD TWI



Source: Datastream, Goldman Sachs Global Investment Research

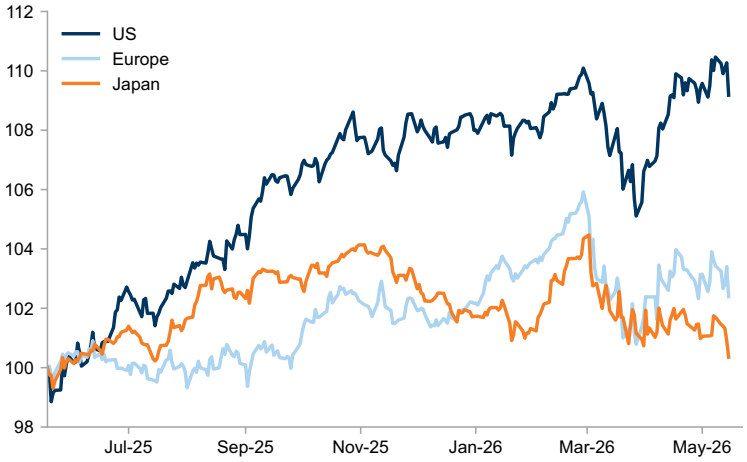
Cross-asset: Balanced portfolios and dynamic allocation strategies performance

Exhibit 18: 60/40 equity/bond portfolio performance across regions last 12m
Relative total return performance indexed to 100 12m ago



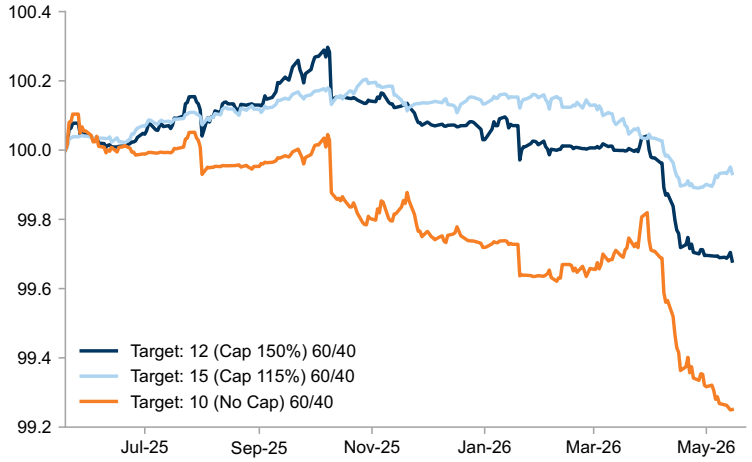
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 19: Risk parity portfolio performance across regions last 12m
Weighted inversely by 3m realised volatility of equity and 10y bonds



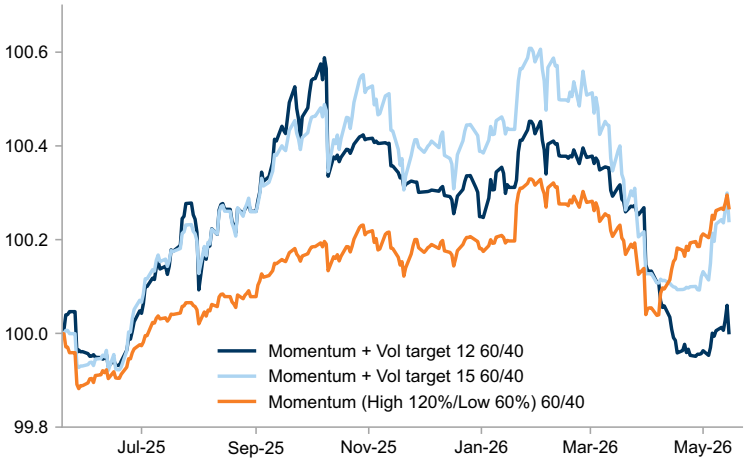
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 20: 60/40 portfolio with volatility target strategies overlay vs. US 60/40 portfolio
60% S&P 500, 40% US 10y bond; based on 1m realised S&P 500 volatility



Source: Datastream, Goldman Sachs Global Investment Research

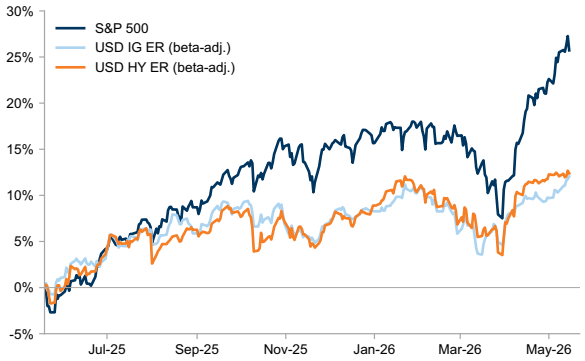
Exhibit 21: 60/40 portfolio with volatility target strategies and momentum overlay vs. US 60/40
60% S&P 500, 40% US 10y bond; Strategy methodology see: GOAL: The Balanced Bear - Part 2



Source: Datastream, Goldman Sachs Global Investment Research

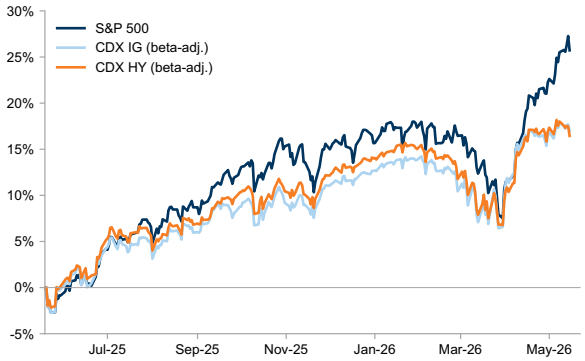
Cross-asset: Equity vs. credit monitor

Exhibit 22: USD cash credit vs. US equity
Cash credit excess returns (beta-adjusted) vs. S&P 500 total returns



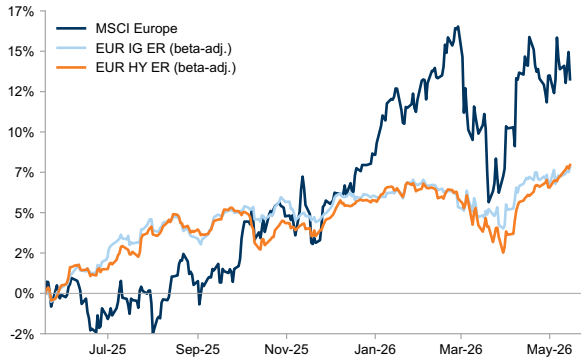
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 23: USD synthetic credit vs. US equity
Synthetic credit excess returns (beta-adjusted) vs. S&P 500 total returns



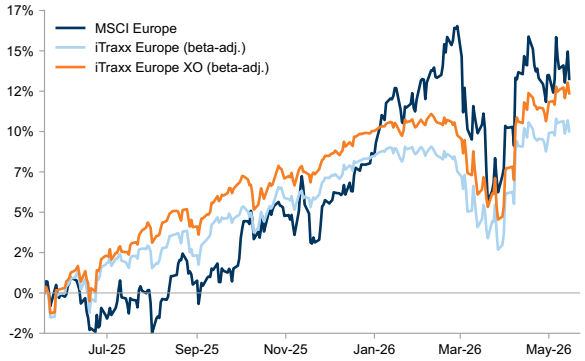
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 24: EUR cash credit vs. European equity
Cash credit excess returns (beta-adjusted) vs. MSCI Europe total returns



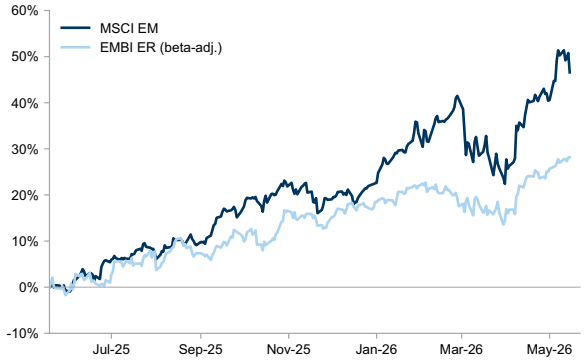
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 25: EUR synthetic credit vs. European equity
Synthetic credit excess returns (beta-adjusted) vs. MSCI Europe total returns



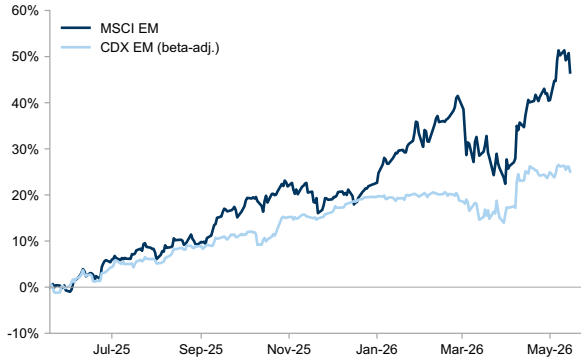
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 26: EM cash credit vs. EM equity
Cash credit excess returns (beta-adjusted) vs. MSCI EM total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 27: EM synthetic credit vs. EM equity
Synthetic credit excess returns (beta-adjusted) vs. MSCI EM total returns



Source: Datastream, Goldman Sachs Global Investment Research

Cross-asset: Valuation and risk premia

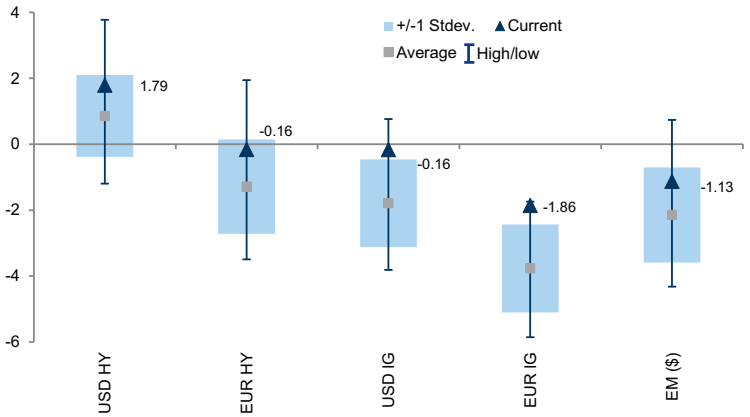
Exhibit 28: Cross-asset valuation table
A higher percentile means more expensive relative to 10y history

	Equity					Government bonds				Credit					FX (vs. USD)	
	S&P 500	Stoxx 600	MXAPJ	Topix	MSCI EM	US 10y	German 10y	Japan 10y	UK 10y	US IG	US HY	EUR IG	EUR HY	EM ($)	EUR	JPY
Valuation metric	12m forward P/E ratio					Yield				Spread					Actual - GS fair value	
Current:	21.0x	14.2x	12.7x	16.5x	11.6x	4.6%	3.1%	2.7%	5.2%	73bp	280bp	89bp	260bp	237bp	-3.1%	-41.1%
Expensiveness (last 10y percentile):	***70%***	***51%***	***19%***	***91%***	***22%***	***2%***	***0%***	***0%***	***0%***	***99%***	***96%***	***96%***	***97%***	***100%***	***83%***	***2%***
3M change:	0.6x	-0.4x	-0.5x	0.6x	-0.4x	0.3%	0.2%	0.4%	0.4%	-19bp	-48bp	-12bp	-48bp	-26bp	1.5%	0.7%
Average:	19.1x	14.3x	13.6x	14.1x	12.3x	2.8%	0.9%	0.4%	2.2%	112bp	395bp	130bp	379bp	95bp	-7.3%	-20.5%
95th:	22.4x	17.4x	16.2x	17.3x	14.8x	4.5%	2.8%	1.7%	4.7%	152bp	581bp	202bp	550bp	510bp	-1.2%	-7.1%
5th:	16.0x	11.9x	11.9x	12.0x	10.8x	0.7%	-0.5%	-0.1%	0.3%	78bp	282bp	89bp	267bp	268bp	-13.6%	-40.4%

Note: GSDEER is our fair value macro model for exchange rates.

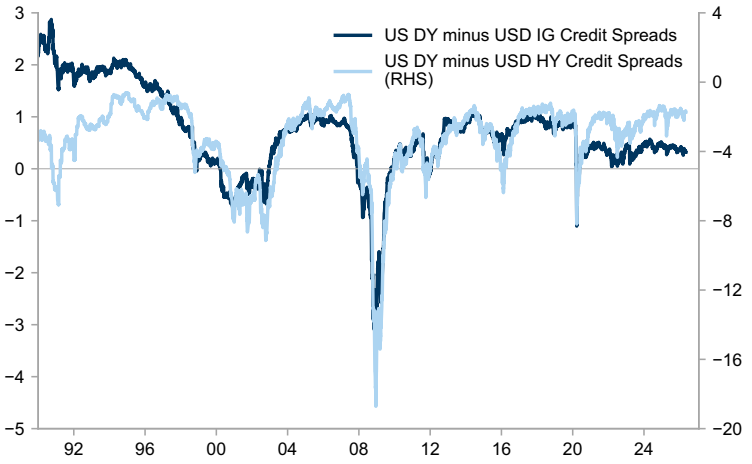
Source: Datastream, I/B/E/S, iBoxx, Goldman Sachs Global Investment Research

Exhibit 29: Credit spread minus equity risk premium estimates across markets
Equity risk premia based on 1-stage DDM using local 10-year yields and LT GDP consensus estimates. Using past 10 years of data.



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 30: Equity vs. credit relative valuation
US Dividend Yield minus Credit spreads



Source: Datastream, Goldman Sachs Global Investment Research

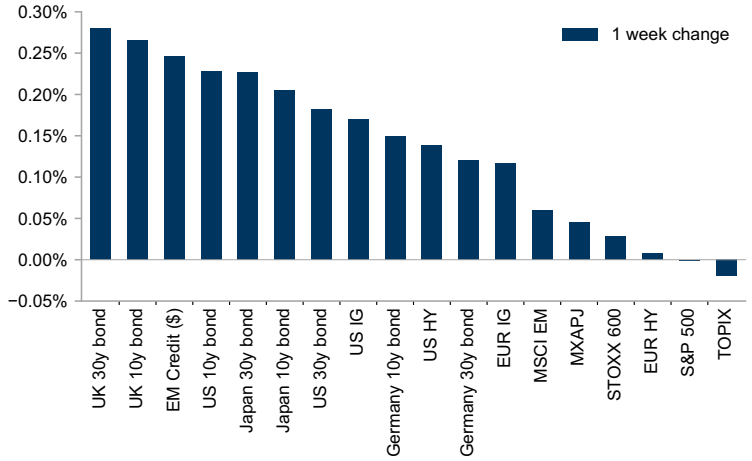
Cross-asset: Yields

Exhibit 31: Current yields across assets and their percentile to the past 10 years

	Equity					Government bonds				Credit				
	S&P 500	Stoxx 600	MXAPJ ($)	Topix	MSCI EM ($)	US 10y	German 10y	Japan 10y	UK 10y	US IG	EUR IG	US HY	EUR HY	EM Debt ($)
Valuation metric	Dividend Yield (NTM)					Yield				Yield				
Current:	1.1%	3.4%	2.2%	2.2%	2.4%	4.6%	3.1%	2.7%	5.2%	5.3%	3.9%	7.5%	5.8%	6.7%
Percentile (-10y):	***0%***	***25%***	***1%***	***24%***	***3%***	***98%***	***100%***	***100%***	***100%***	***83%***	***88%***	***68%***	***68%***	***63%***
Average:	1.7%	3.5%	2.9%	2.4%	2.9%	2.8%	0.9%	0.4%	2.2%	3.9%	2.1%	6.9%	4.9%	6.3%
95th:	2.2%	4.0%	3.4%	2.7%	3.4%	4.5%	2.8%	1.7%	4.7%	5.6%	4.3%	8.8%	7.5%	8.1%
5th:	1.2%	3.0%	2.3%	2.1%	2.4%	0.7%	-0.5%	-0.1%	0.3%	2.0%	0.5%	4.7%	3.0%	4.8%
3m real. ret. vol:	14.4%	18.0%	28.4%	25.5%	27.7%	5.7%	6.1%	4.6%	8.6%	4.8%	4.1%	3.7%	3.9%	5.5%
Percentile (-10y):	***58%***	***71%***	***90%***	***89%***	***89%***	***30%***	***75%***	***74%***	***79%***	***48%***	***91%***	***66%***	***61%***	***73%***
Yield/vol ratio	0.08	0.19	0.08	0.09	0.09	0.80	0.52	0.58	0.60	1.09	0.94	2.03	1.50	1.23

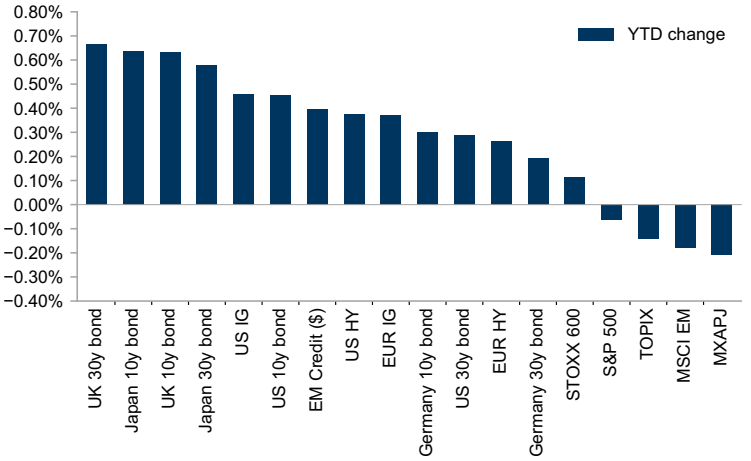
Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 32: Past week change in yields across assets



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

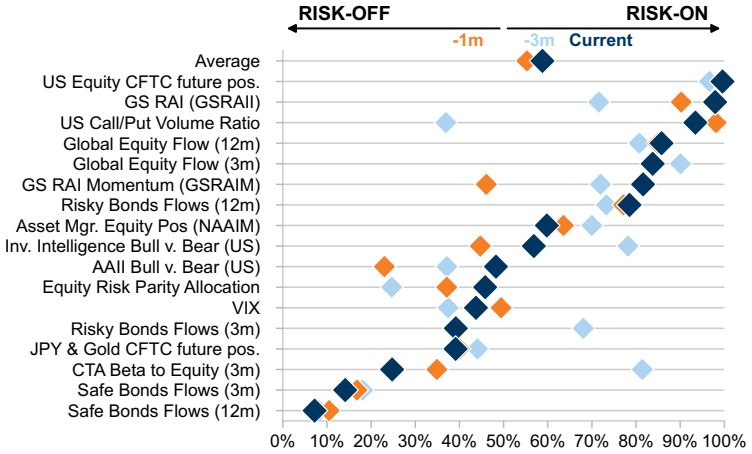
Exhibit 33: YTD change in yields across assets



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

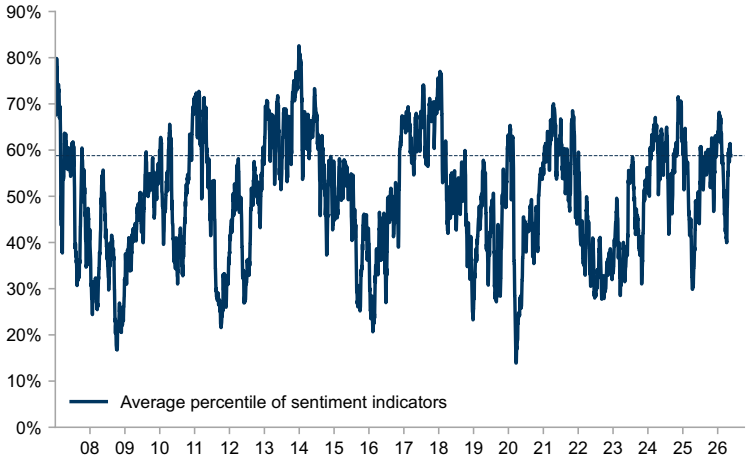
Cross-asset: Sentiment and Positioning

Exhibit 34: Percentile of sentiment indicators
Data since 2007



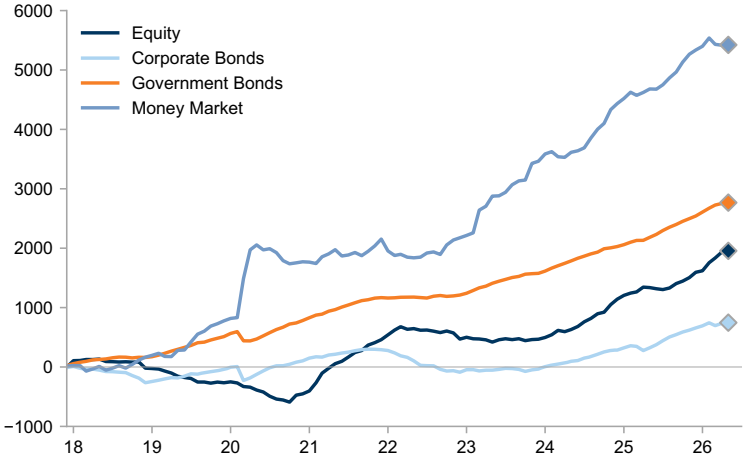
Source: Datastream, Haver Analytics, EPFR, Goldman Sachs Global Investment Research

Exhibit 35: Average percentile of sentiment indicators
Data since 2007



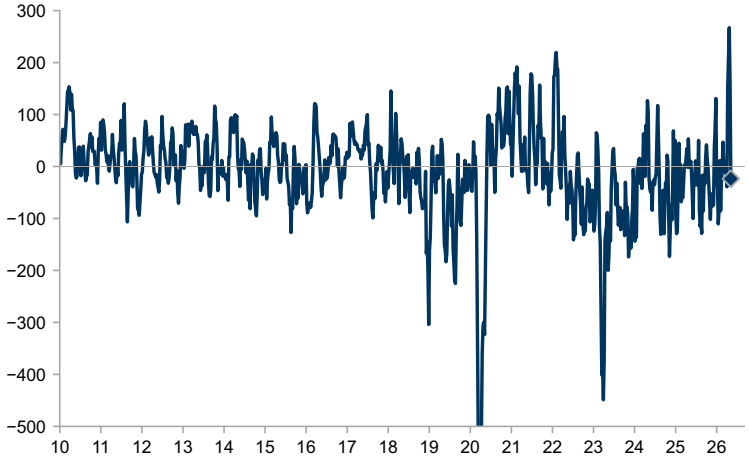
Source: Datastream, Haver Analytics, EPFR, Goldman Sachs Global Investment Research

Exhibit 36: Cumulative fund flows across assets
Monthly flows ($bn). MTD sum of weekly flows when monthly not yet available



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

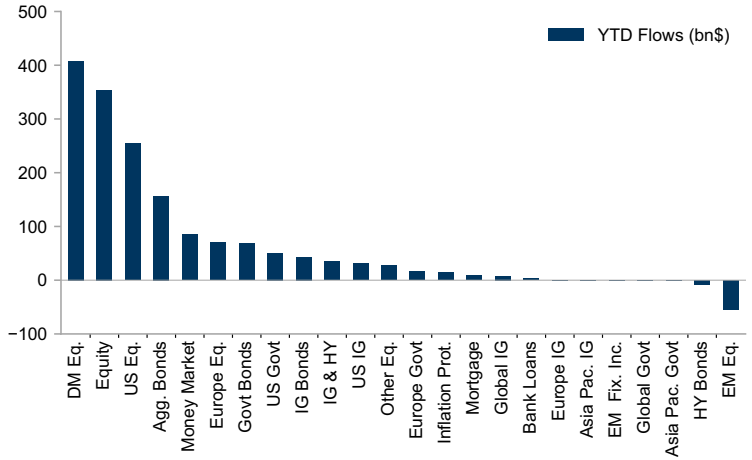
Exhibit 37: Risky vs. safe assets fund flows
4 weeks rolling flows, USD bn



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

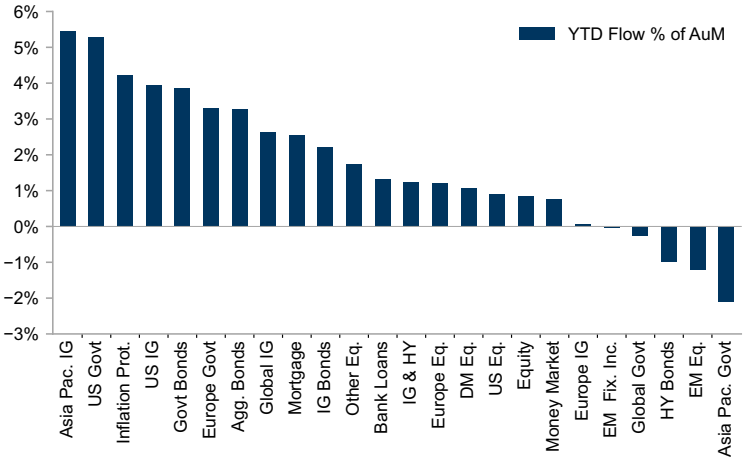
Cross-asset: Global Funds Flows

Exhibit 38: YTD cross-asset global fund flows
All funds reporting monthly. MTD sum of weekly flows when monthly not yet available ($bn)



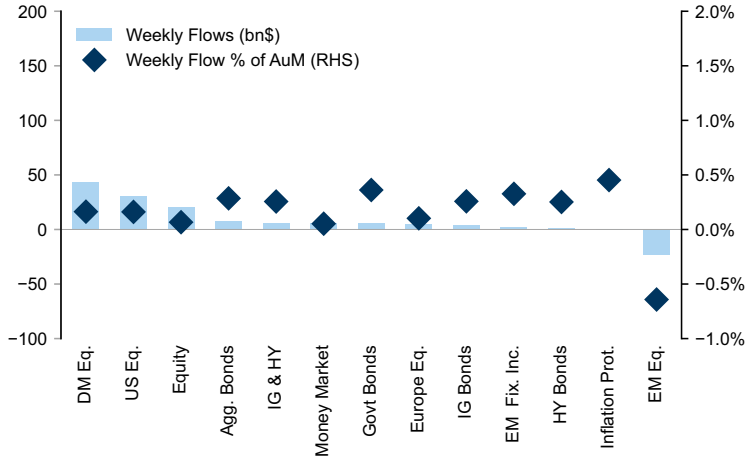
Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 39: YTD cross-asset global fund flows
All funds reporting monthly. MTD sum of weekly flows when monthly not yet available (% of AUM)



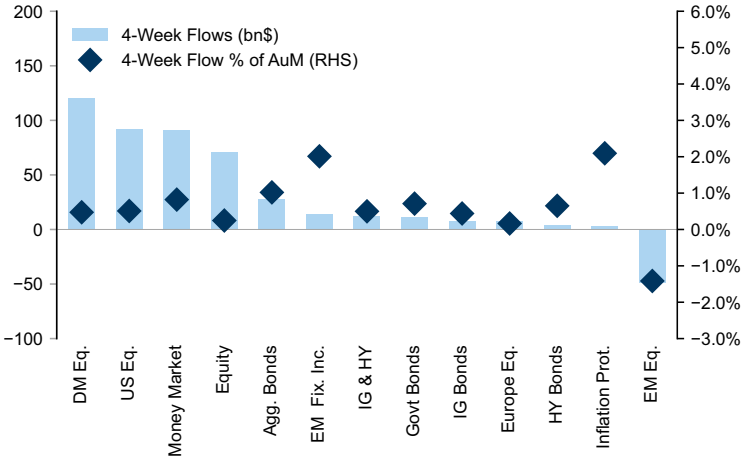
Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 40: 1-week cross-asset global fund flows
All funds reporting weekly



Source: EPFR, Goldman Sachs Global Investment Research

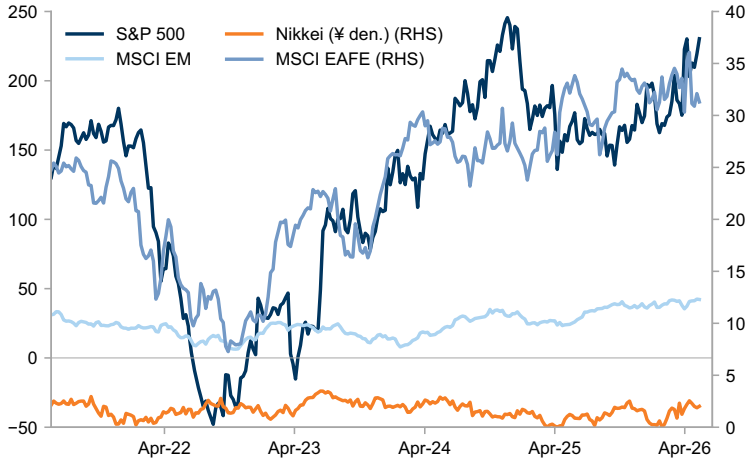
Exhibit 41: 4-week cross-asset global fund flows
All funds reporting weekly



Source: EPFR, Goldman Sachs Global Investment Research

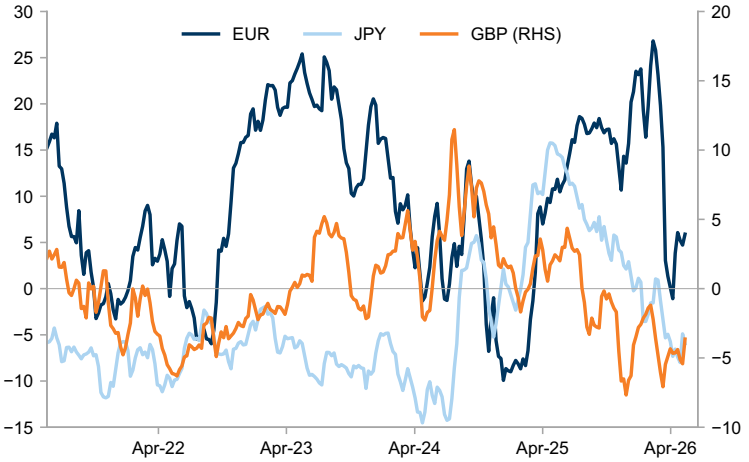
Cross-asset: CFTC positioning

Exhibit 42: Equity net long positioning
Leveraged funds and asset managers net future positions ($ bn)



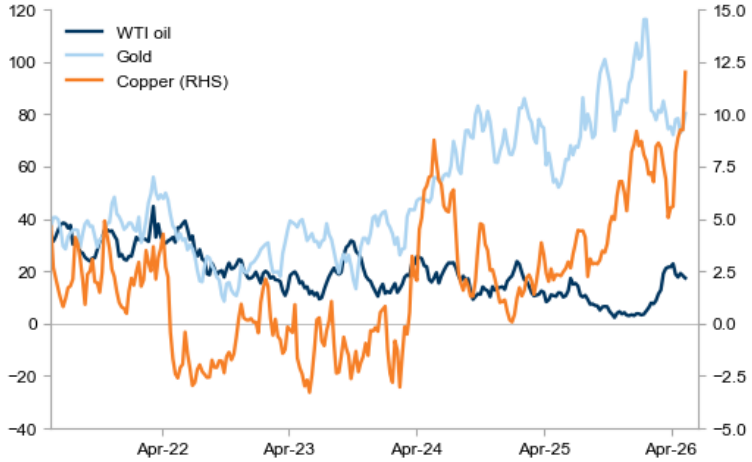
Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

Exhibit 43: Currency net long positioning
Net non-commercial positions ($ bn)



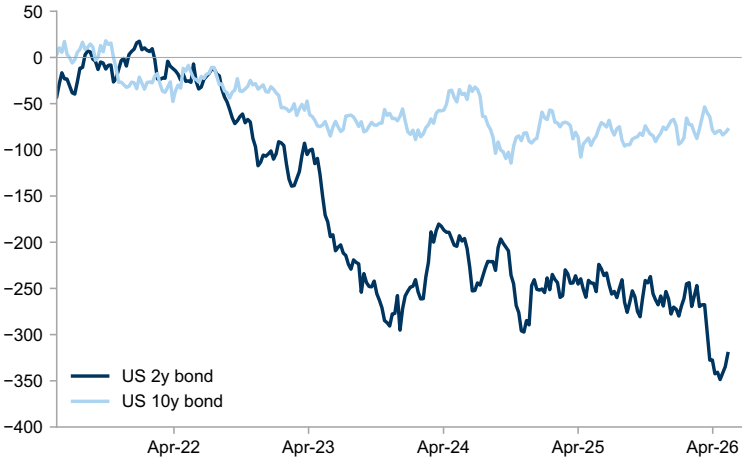
Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

Exhibit 44: Commodity net long positioning
Net non-commercial positions ($ bn)



Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

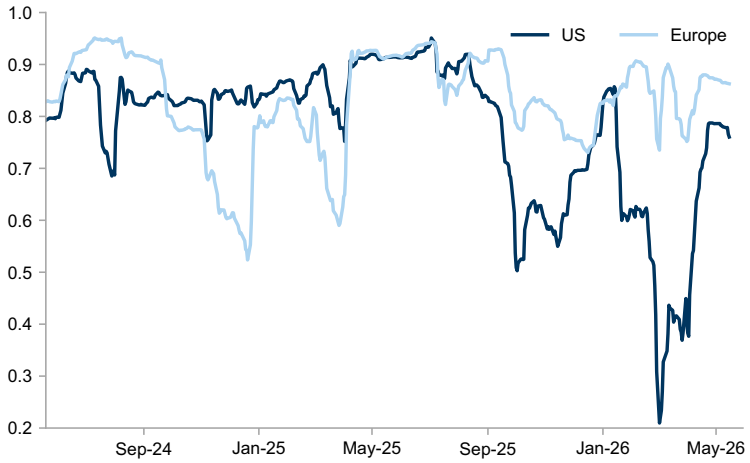
Exhibit 45: US Treasury net long positioning
Net non-commercial positions ($ bn)



Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

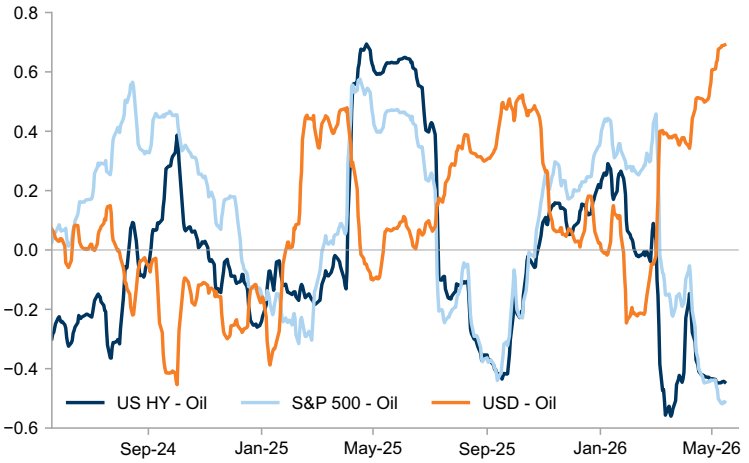
Cross-asset: Correlations: Equity vol/CDS, commodity prices/credit & FX, equity/bond, equity/FX

Exhibit 46: 3m rolling equity vol/CDS correlation of weekly level changes
CDX HY for the US, iTraxx Xover for Europe; ATM implied vol for S&P 500 and Euro Stoxx 50



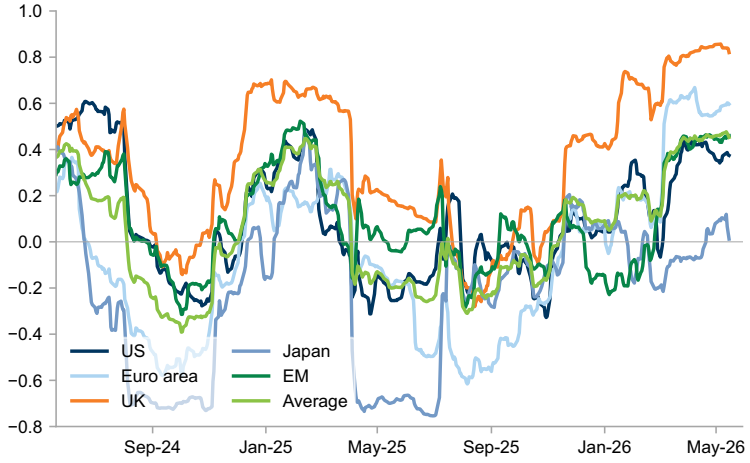
Source: Datastream, Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 47: 3m rolling commodity price correlations of weekly % changes with different assets



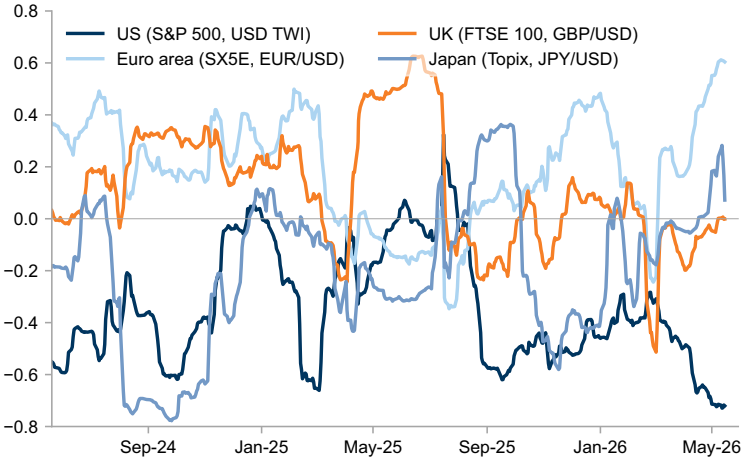
Source: Datastream, Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 48: 3m rolling equity/bond correlation of weekly returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 49: 3m rolling equity/FX correlation of weekly returns



Source: Datastream, Goldman Sachs Global Investment Research

Cross-asset: Correlation matrix

Exhibit 50: Cross-asset correlation matrix

Upper half of matrix: current 1-year correlation (black shading = more/less than 0.50/-0.50); lower half of matrix: percentile since 2001 (dark grey shading indicates above 75th percentile, orange shading indicates below 25th percentile); correlations are calculated on weekly, local currency returns.

	S&P 500	STOXX 600	MXAPJ	TOPIX	MSCI EM	US 10 yr	Germany 10 yr	Japan 10 yr	UK 10 yr	EUR/USD	USD/JPY	AUD/USD	iBoxx US IG	iBoxx EUR IG	BAML US HY	BAML EUR HY	EM Credit ($)	WTI Crude Oil	Copper	Gold	VIX
Current 1y correlation of weekly returns																					
S&P 500		0.67	0.58	0.35	0.60	0.16	0.18	0.24	0.36	0.37	-0.15	0.51	0.42	0.53	0.82	0.76	0.64	-0.31	0.53	0.17	-0.78
STOXX 600	0.13		0.55	0.50	0.58	0.24	0.32	0.08	0.50	0.32	-0.13	0.41	0.36	0.56	0.59	0.62	0.59	-0.46	0.65	0.32	-0.69
MXAPJ	0.40	0.21		0.51	0.99	0.19	0.26	0.22	0.38	0.52	-0.36	0.60	0.31	0.50	0.43	0.60	0.58	-0.53	0.56	0.24	-0.44
TOPIX	0.03	0.16	0.25		0.53	0.32	0.30	0.01	0.43	0.27	-0.03	0.21	0.34	0.40	0.27	0.47	0.51	-0.54	0.24	0.08	-0.39
MSCI EM	0.34	0.20	0.94	0.34		0.22	0.29	0.23	0.42	0.55	-0.36	0.61	0.34	0.54	0.47	0.63	0.62	-0.58	0.59	0.28	-0.47
US 10 yr	0.89	0.95	0.87	0.98	0.90		0.74	0.45	0.78	0.17	-0.19	0.02	0.88	0.66	0.43	0.27	0.63	-0.40	0.21	0.33	-0.06
Germany 10 yr	0.90	0.98	0.97	1.00	0.97	0.28		0.51	0.78	0.12	-0.19	0.04	0.67	0.84	0.31	0.31	0.48	-0.36	0.23	0.43	-0.08
Japan 10 yr	0.98	0.92	0.97	0.83	0.97	0.25	0.53		0.47	0.08	0.00	0.10	0.43	0.41	0.31	0.23	0.42	-0.10	0.01	0.24	-0.10
UK 10 yr	0.95	1.00	0.98	0.99	0.99	0.50	0.14	0.41		0.19	-0.18	0.13	0.74	0.78	0.51	0.52	0.69	-0.42	0.47	0.43	-0.25
EUR/USD	0.67	0.77	0.87	0.80	0.88	0.59	0.77	0.60	0.76		-0.67	0.73	0.29	0.32	0.41	0.38	0.41	-0.45	0.28	0.34	-0.39
USD/JPY	0.15	0.07	0.17	0.14	0.17	0.86	0.77	0.84	0.83	0.06		-0.57	-0.24	-0.27	-0.25	-0.18	-0.30	0.21	-0.17	-0.29	0.05
AUD/USD	0.56	0.57	0.42	0.31	0.49	0.60	0.70	0.81	0.77	0.89	0.06		0.12	0.32	0.45	0.47	0.46	-0.29	0.39	0.41	-0.48
iBoxx US IG	0.87	0.87	0.76	0.94	0.82	0.53	0.47	0.62	0.70	0.68	0.76	0.54		0.73	0.67	0.49	0.72	-0.37	0.28	0.31	-0.25
iBoxx EUR IG	0.93	0.98	0.93	0.99	0.95	0.67	0.62	0.69	0.78	0.87	0.39	0.83	0.60		0.62	0.68	0.76	-0.51	0.46	0.50	-0.29
BAML US HY	0.94	0.46	0.11	0.20	0.14	0.85	0.79	0.90	0.96	0.78	0.25	0.54	0.84	0.84		0.73	0.74	-0.31	0.45	0.23	-0.66
BAML EUR HY	0.94	0.47	0.57	0.38	0.69	0.88	0.89	0.91	0.96	0.87	0.23	0.71	0.79	0.85	0.24		0.70	-0.44	0.53	0.31	-0.53
EM Credit ($)	0.85	0.78	0.58	0.89	0.60	0.80	0.85	0.87	0.94	0.68	0.27	0.51	0.70	0.89	0.79	0.79		-0.54	0.49	0.40	-0.44
WTI Crude Oil	0.03	0.00	0.00	0.00	0.00	0.14	0.17	0.45	0.08	0.00	0.76	0.00	0.04	0.00	0.00	0.00	0.00		-0.36	-0.18	0.36
Copper	0.74	0.97	0.75	0.42	0.76	0.98	0.98	0.80	1.00	0.37	0.22	0.24	0.94	0.96	0.81	0.92	0.88	0.00		0.45	-0.38
Gold	0.73	0.90	0.43	0.72	0.48	0.69	0.88	0.72	0.91	0.29	0.60	0.48	0.71	0.96	0.62	0.92	0.75	0.01	0.81		0.02
VIX	0.71	0.60	0.71	0.88	0.71	0.08	0.06	0.05	0.04	0.08	0.86	0.29	0.15	0.07	0.17	0.20	0.30	0.99	0.34	0.51	

Current correlation's percentile since 2001

Current 1y correlation of weekly returns

Current correlation's percentile since 2001

Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Cross-asset: Implied and realised vol, call and put skew

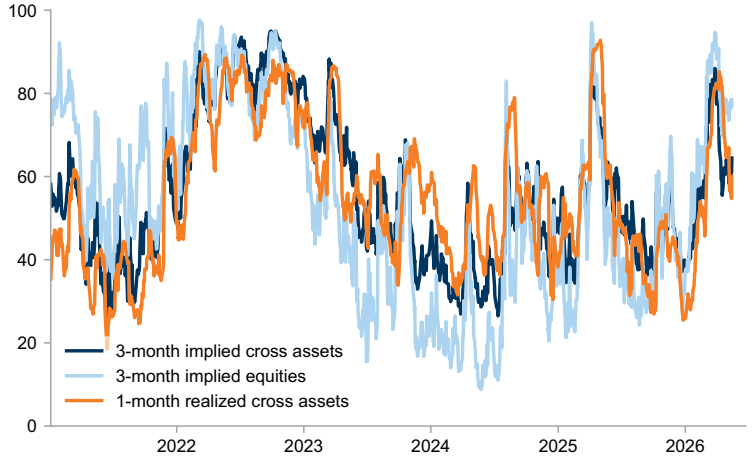
Exhibit 51: Cross-asset volatility, current and historical percentiles, implied 3m and realised 1m

	Equities						Rates				Credit			Commodities			Currencies		
	S&P 500	EURO STOXX 50	Nikkei 225	FTSE 100	MSCI EM	MSCI EAFE	USD 2-year	USD 10-year	EUR 2-year	EUR 10-year	CDX IG	CDX HY	iTraxx Europe	WTI	Gold	Copper	EUR/ USD	JPY/ USD	GBP/ USD
Implied (3-month ATM, %)																			
Current:	15.7	18.6	27.9	14.3	26.9	18.0	6.1	5.0	5.8	4.4	41.3	38.0	48.1	59.3	22.7	27.1	5.9	7.7	7.5
Percentile:	***62%***	***72%***	***97%***	***65%***	***96%***	***79%***	***66%***	***54%***	***81%***	***70%***	***24%***	***43%***	***54%***	***96%***	***96%***	***82%***	***21%***	***36%***	***32%***
1M change:	0.8	1.2	2.1	1.0	3.1	-0.1	1.2	0.6	0.4	0.4	1.6	0.8	1.4	3.9	-2.0	0.6	-0.3	-0.5	0.6
Average:	16.0	17.1	19.0	14.1	19.1	15.3	4.9	5.2	3.2	4.0	48.5	42.9	50.9	36.1	14.7	22.0	7.2	8.9	8.7
95th:	25.5	25.5	26.3	22.3	26.2	22.8	9.7	7.9	8.5	7.7	69.8	65.9	69.9	56.1	22.0	29.9	10.2	12.7	12.6
5th:	10.0	12.2	13.7	10.0	14.5	10.4	1.3	3.5	0.9	2.2	37.8	30.5	38.6	23.8	9.7	16.0	5.1	5.6	6.3
Realised (%)																			
1-month:	11.6	20.7	26.9	15.8	21.9	14.3	5.1	4.0	4.9	4.0	22.3	22.9	32.3	73.4	22.7	20.7	4.3	10.7	6.5
Percentile:	***43%***	***82%***	***88%***	***78%***	***90%***	***72%***	***63%***	***38%***	***82%***	***72%***	***9%***	***28%***	***41%***	***95%***	***92%***	***61%***	***7%***	***76%***	***23%***
Average:	15.2	16.3	19.2	13.3	14.9	13.2	4.6	5.0	2.5	3.6	39.4	33.2	39.8	39.0	14.5	20.1	7.2	8.7	8.7

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

Exhibit 52: 10y percentile for cross-asset average volatility

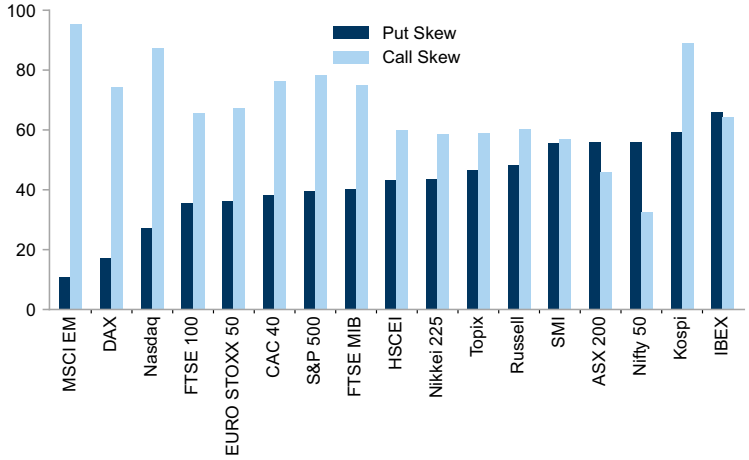
Using 16 assets across equity, government bonds, credit, commodities and FX



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

Exhibit 53: Putwing and Callwing normalised skew 5y percentile

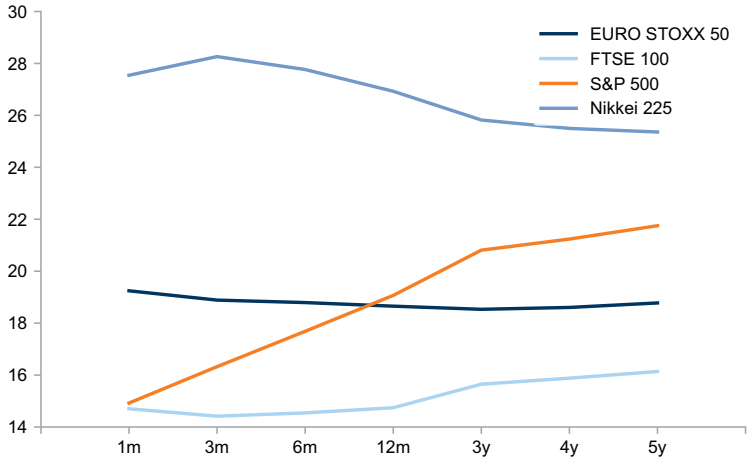
Normalised skew = (impl. vol 25 delta put/call minus implied vol 50 delta call)/50 delta call



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

Cross-asset: Volatility, skew, CDS with equity vol, rate vol

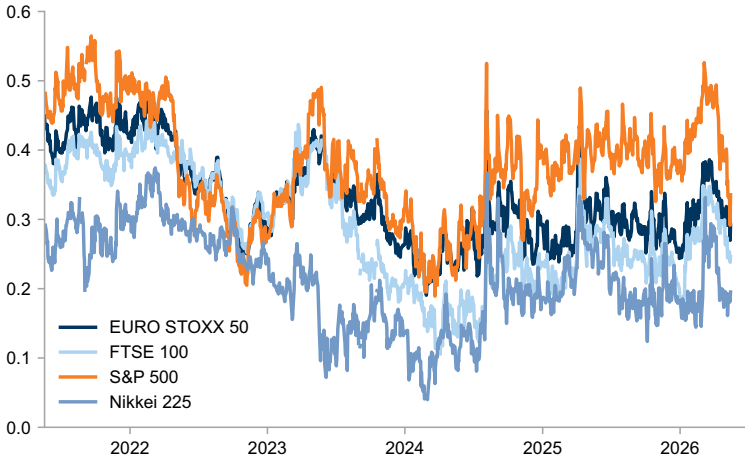
Exhibit 54: ATM implied volatility term structure for equity indices



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

Exhibit 55: Normalised implied volatility skew across regions

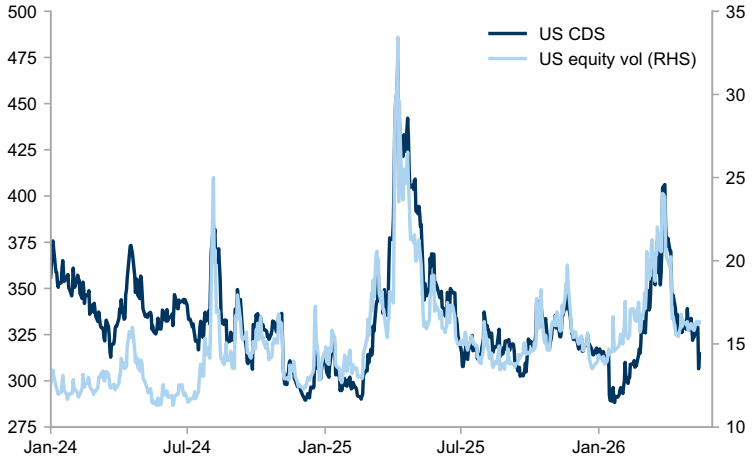
3m 25 delta put vol minus 25 delta call vol scaled by ATM implied vol



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

Exhibit 56: CDS and equity vol levels in the US

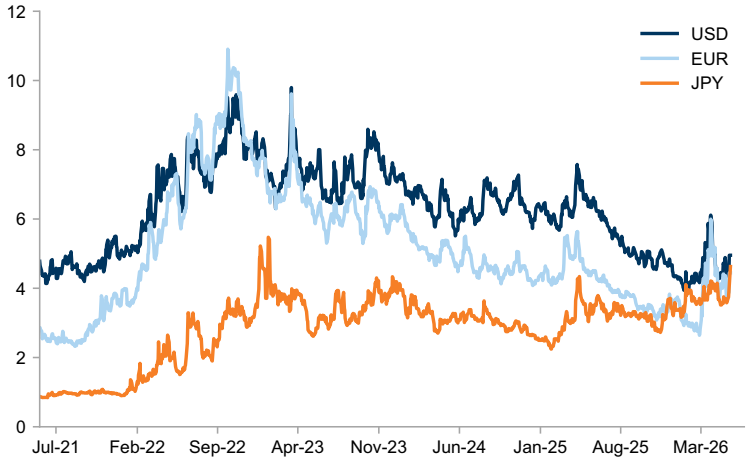
CDX HY, 3m ATM S&P 500 implied vol



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

Exhibit 57: 3m ATM implied rate volatility across regions

3-month implied volatility of 10-year rates (bp/day)

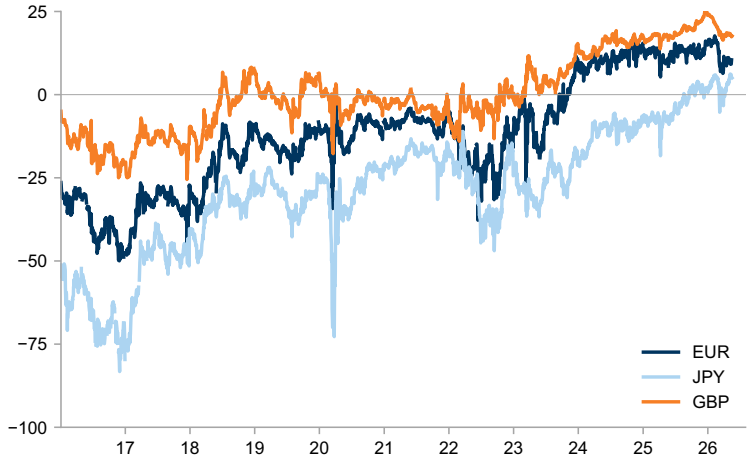


Source: Goldman Sachs FICC and Equities, Goldman Sachs Global Investment Research

Cross-asset: Liquidity indicators

Exhibit 58: 1-year cross-currency basis

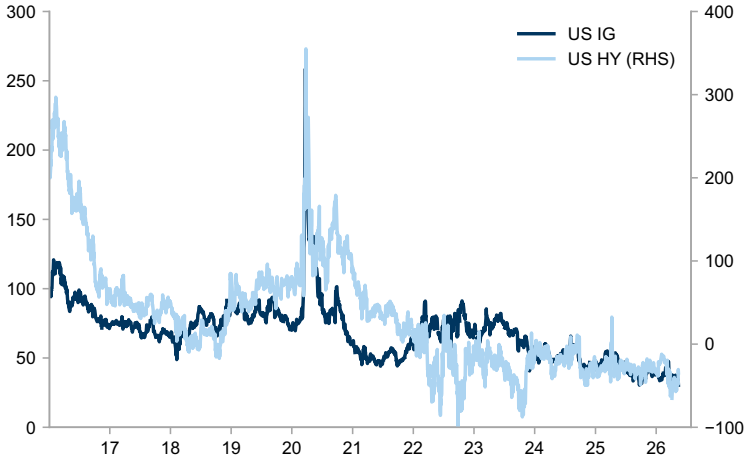
Basis points



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

Exhibit 59: Cash credit versus CDS spread

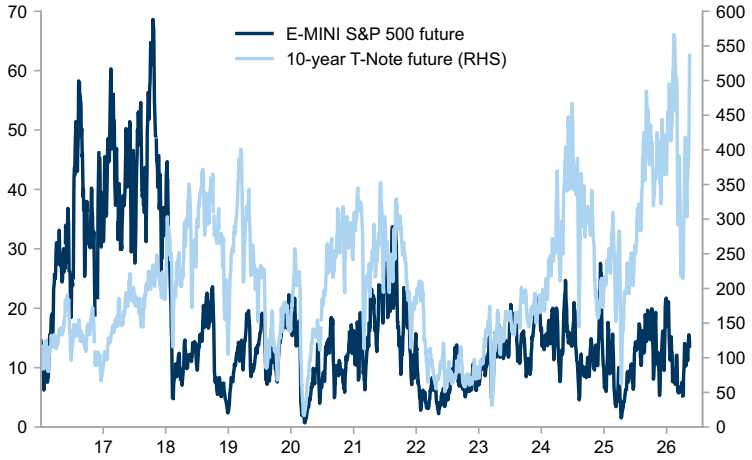
Basis points



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

Exhibit 60: Top-of-book depth

5-day average, $ mln

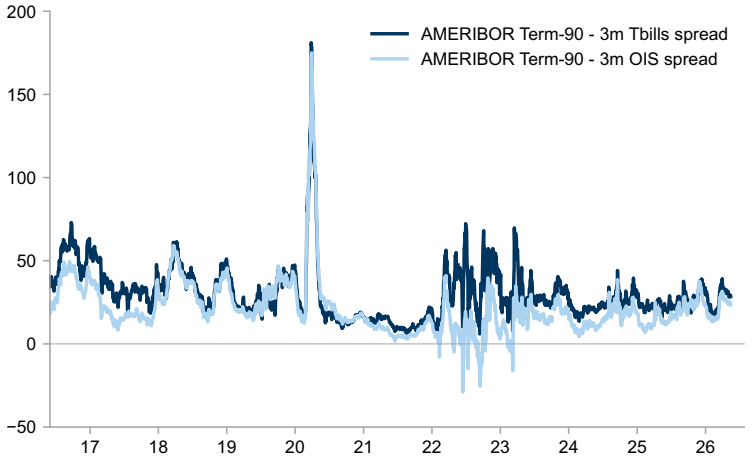


E-MINI S&P 500 = 5d avg. # of contracts * S&P 500 price * $50. 10-year T-note = 5d avg. # of contracts * $100,000

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

Exhibit 61: US financial institutions wholesale funding cost

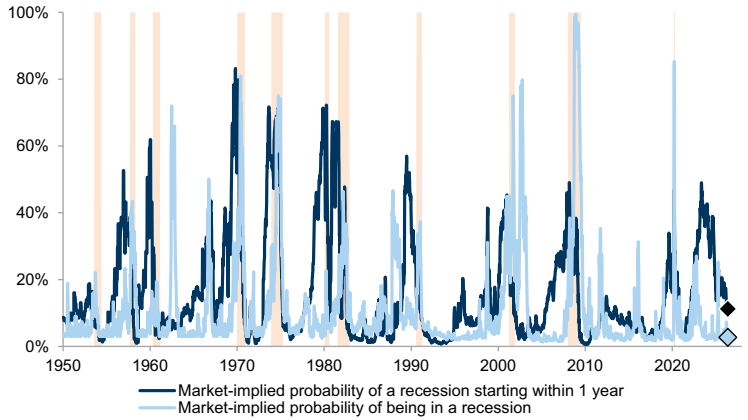
Basis points



Source: Bloomberg, Goldman Sachs Global Investment Research

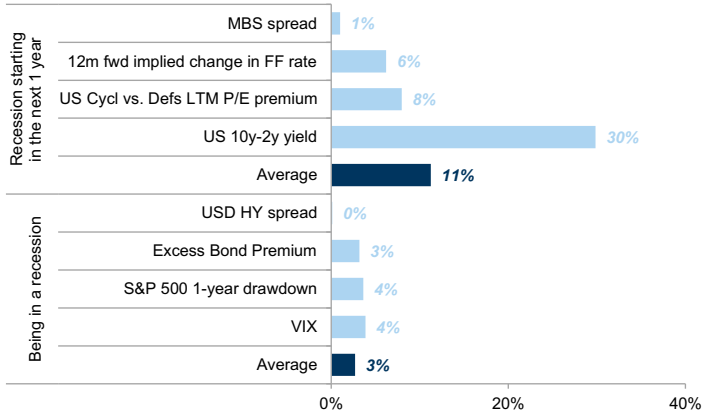
Cross-asset: Market pricing of US recession risk

Exhibit 62: Market-implied US recession probability
Average of univariate logit models on the right. Orange shade: NBER recession



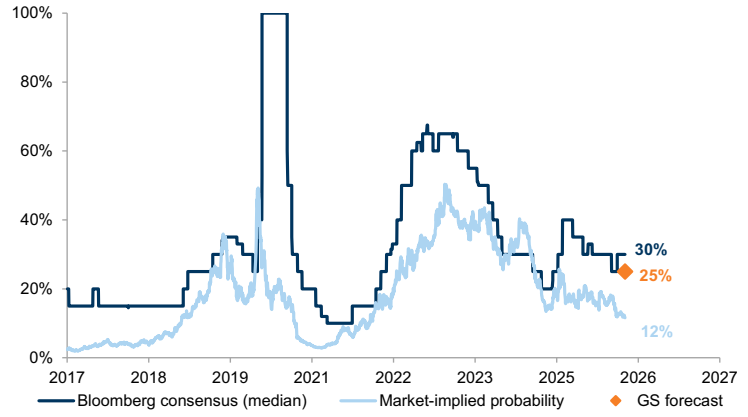
Source: Haver Analytics, Datastream, Worldscope, Goldman Sachs Global Investment Research

Exhibit 63: Market-implied US recession probability by indicator
Univariate logit models. Maximum history since 1950



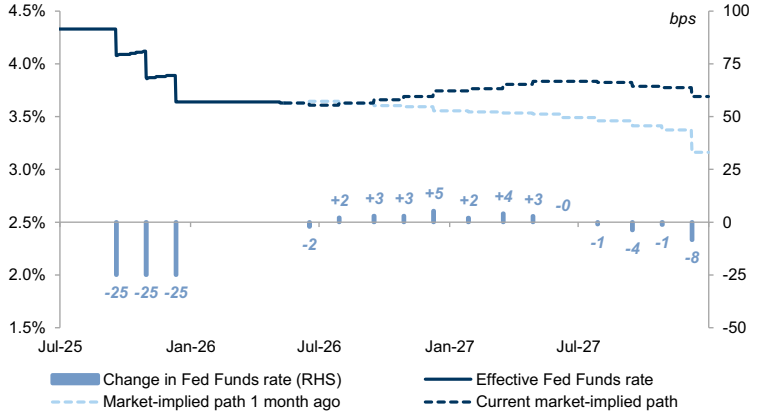
Source: Haver Analytics, Datastream, Worldscope, Goldman Sachs Global Investment Research

Exhibit 64: Probability of a US recession in the next 1 year



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

Exhibit 65: Market-implied path of the Fed Funds rate
Based on 30-day Fed Funds futures

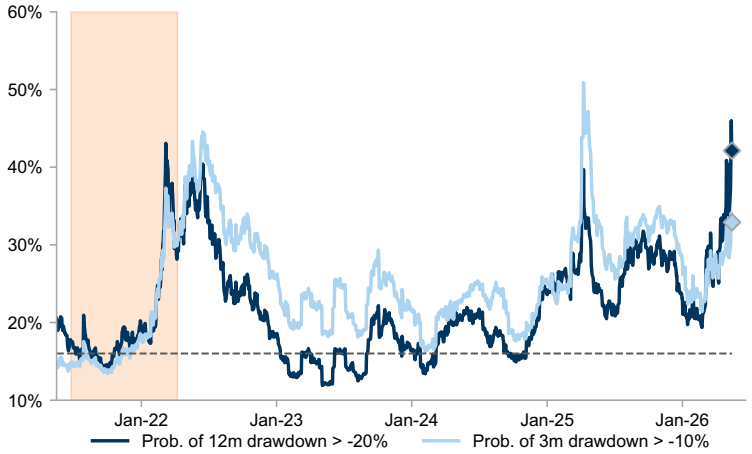


Source: Haver Analytics, Goldman Sachs Global Investment Research

Equity: Drawdown probability

Exhibit 66: Implied probability of S&P 500 drawdown based on multi-variate logit model

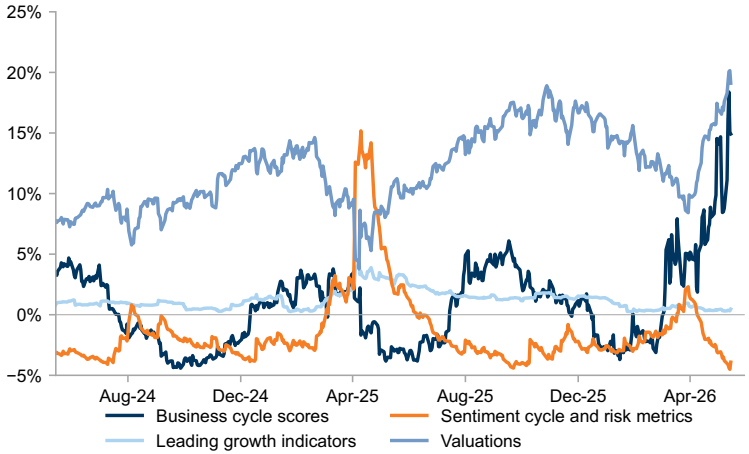
Orange shading = S&P 500 subsequent drawdown >20%. Dashed line = unconditional probability



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

Exhibit 67: Contribution to the probability of a drawdown >20% in 12m

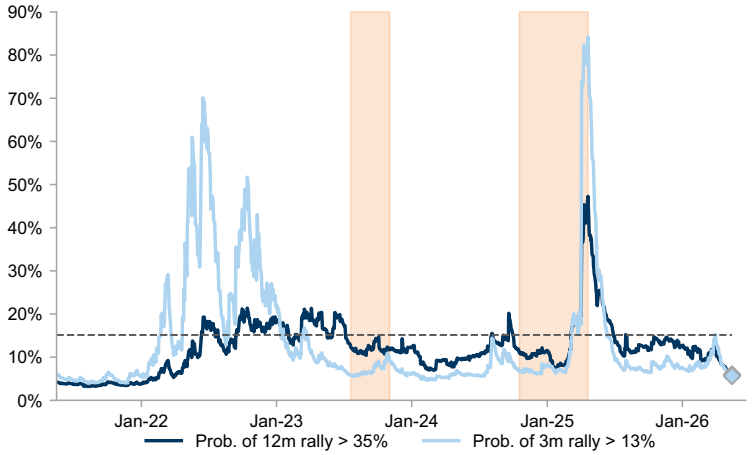
Based on Shapley values. Inputs aggregated by type



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

Exhibit 68: Implied probability of S&P 500 rally based on multi-variate logit model

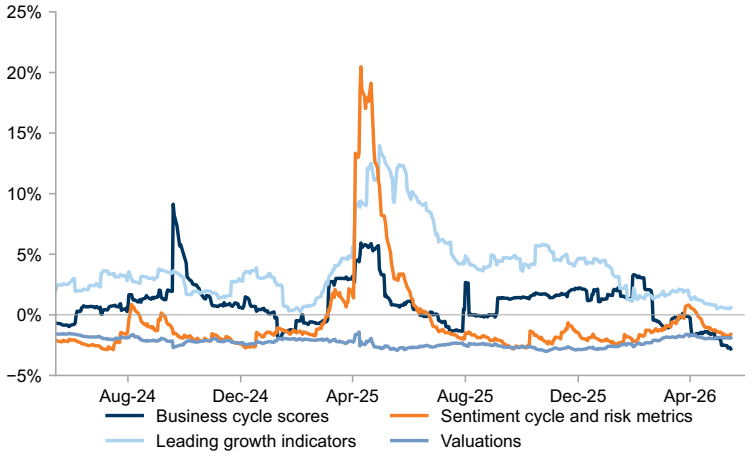
Orange shading = S&P 500 subsequent rally >35%. Dashed line = unconditional probability



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

Exhibit 69: Contribution to the probability of a rally >35% in 12m

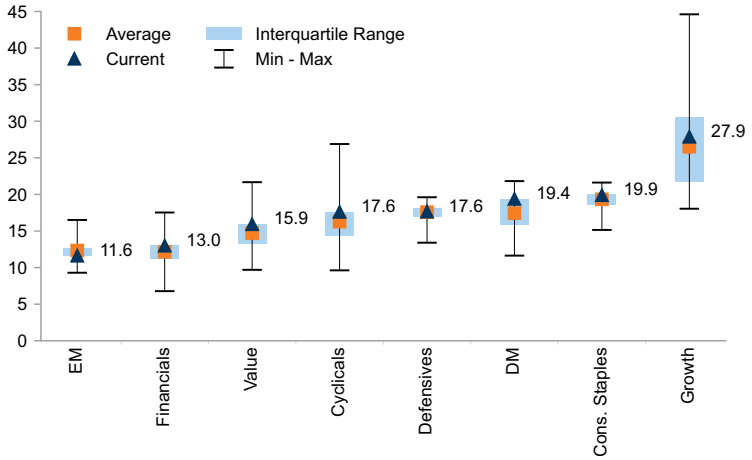
Based on Shapley values. Inputs aggregated by type



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

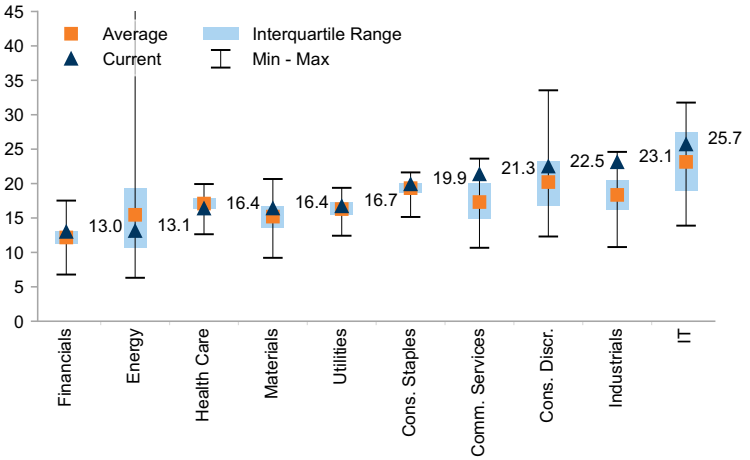
Equity: Valuation and styles

Exhibit 70: Valuation ranges of MSCI World styles indices
12-month forward P/Es relative to the last 10 years



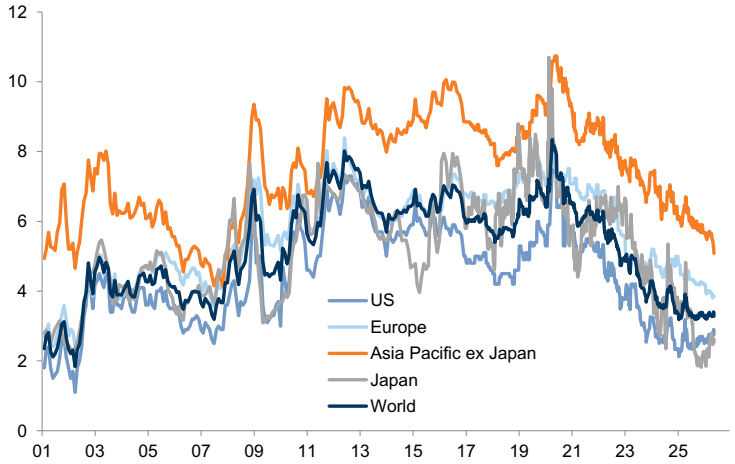
Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

Exhibit 71: MSCI World sector valuations
12-month forward P/Es relative to the last 10 years



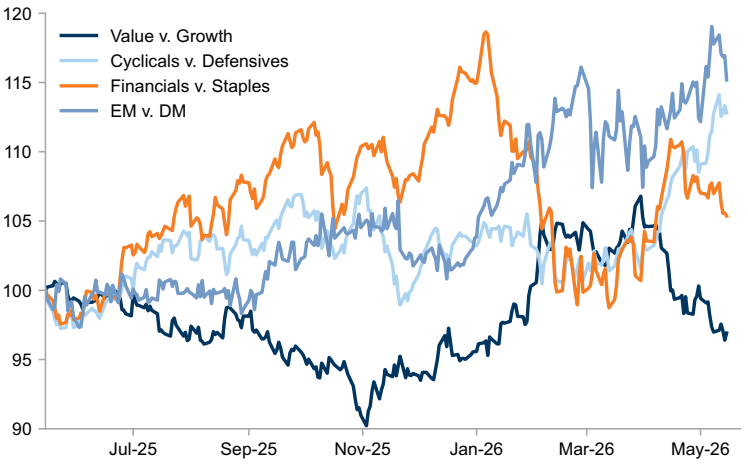
Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

Exhibit 72: Global market implied ERPs (%)
Implied ERPs are calculated by each regional strategy team. While specific assumptions differ between regions, all are calculated using similar frameworks



Source: Datastream, Goldman Sachs Global Investment Research

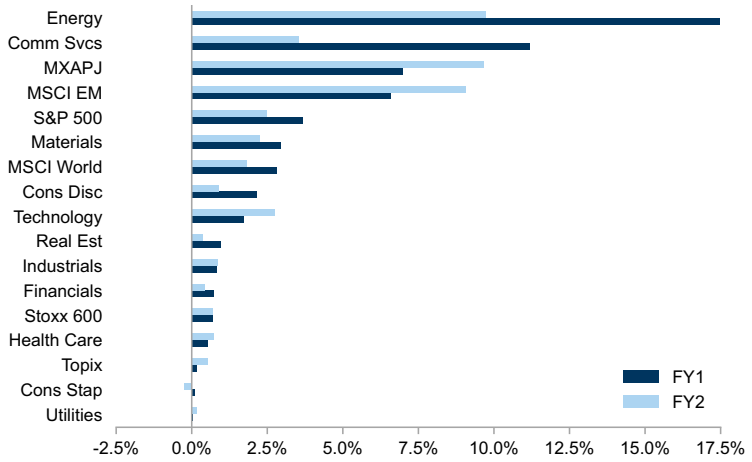
Exhibit 73: MSCI World style index performance
Performance indexed to 100 12m ago



Source: Datastream, Goldman Sachs Global Investment Research

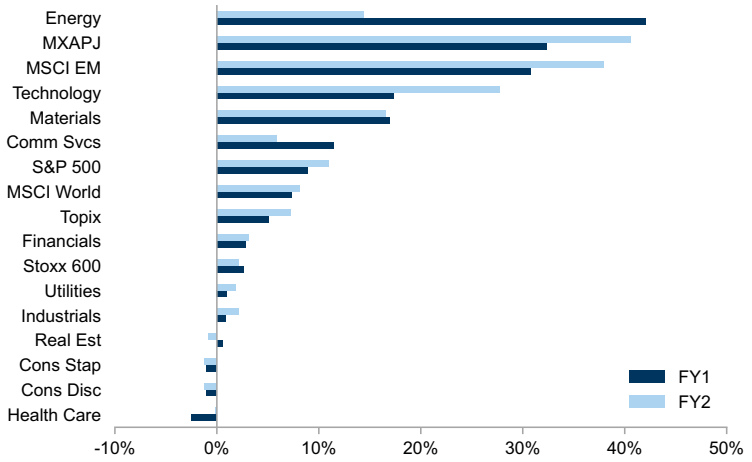
Equity: Earnings

Exhibit 74: 1-month revision to I/B/E/S consensus earnings
MSCI World sectors, other global equity index aggregates



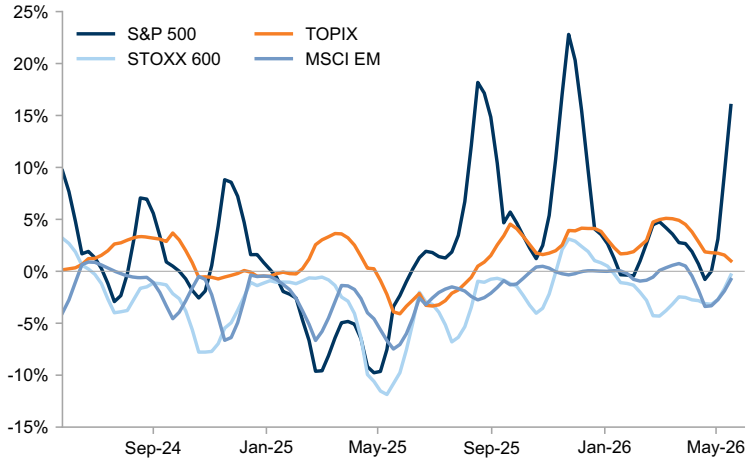
Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

Exhibit 75: 6-month revision to I/B/E/S consensus earnings
MSCI World sectors, other global equity index aggregates



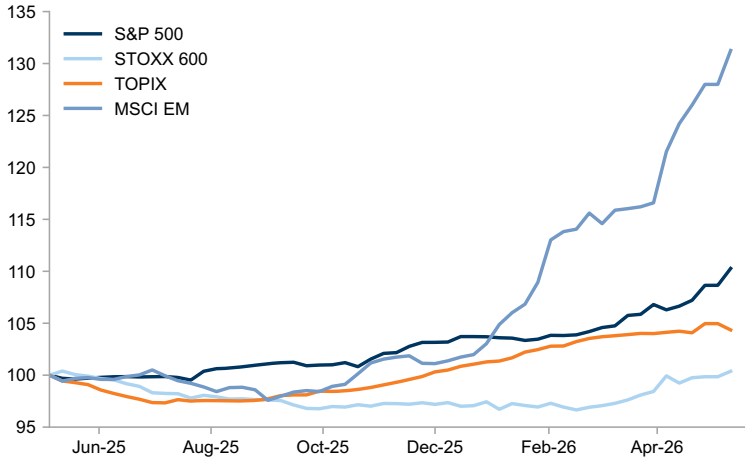
Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

Exhibit 76: Earnings sentiment: Analyst upgrades minus downgrades (scaled by total analysts) across markets
1-month moving average of net monthly upgrades



Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

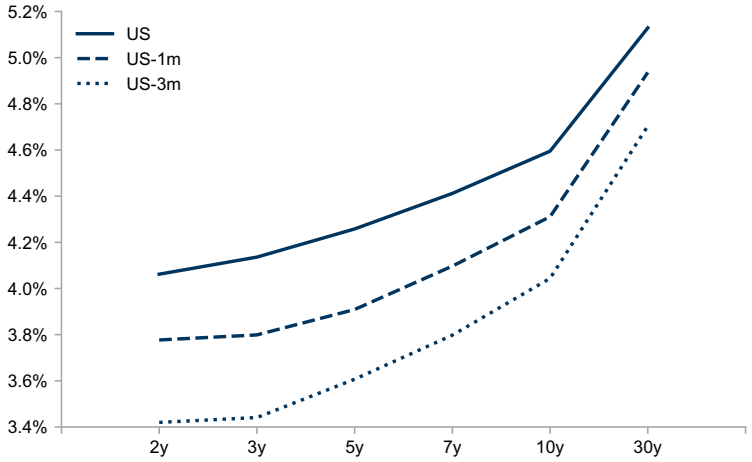
Exhibit 77: FY1 consensus earnings expectations over the past 12 months
Earnings indexed to 100 12 months ago



Source: Datastream, I/B/E/S, Goldman Sachs Global Investment Research

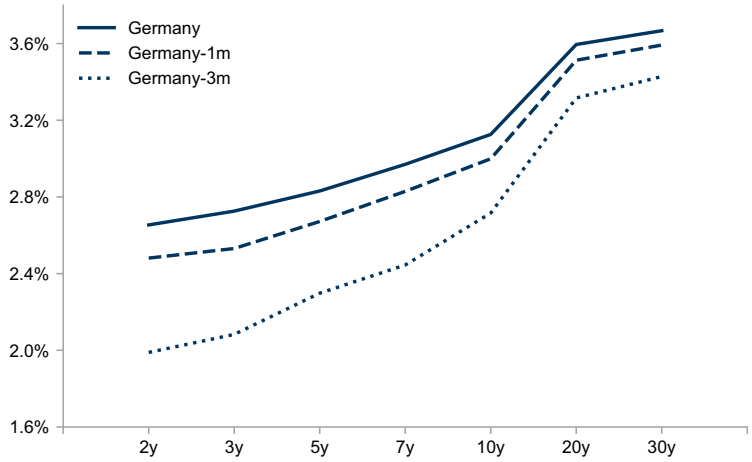
Government bonds: Yield curves

Exhibit 78: US yield curve dynamics
Current relative to 1 month and 3 months ago



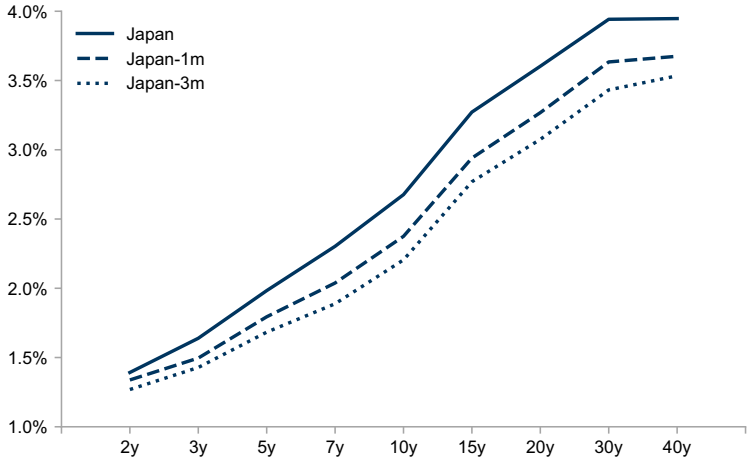
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 79: German yield curve dynamics
Current relative to 1 month and 3 months ago



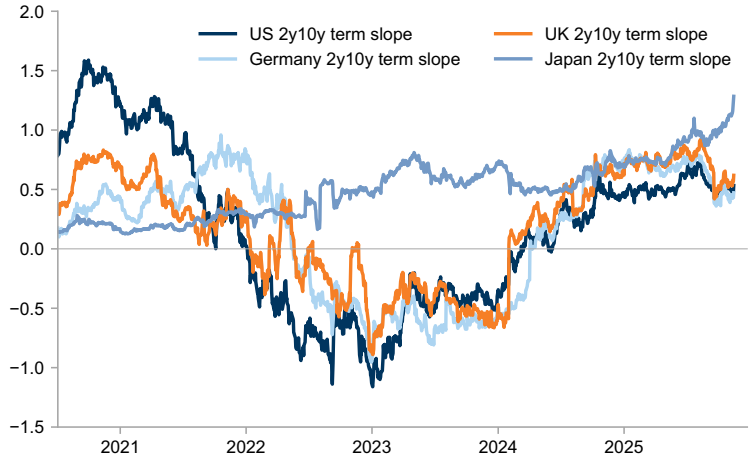
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 80: Japan yield curve dynamics
Current relative to 1 month and 3 months ago



Source: Datastream, Goldman Sachs Global Investment Research

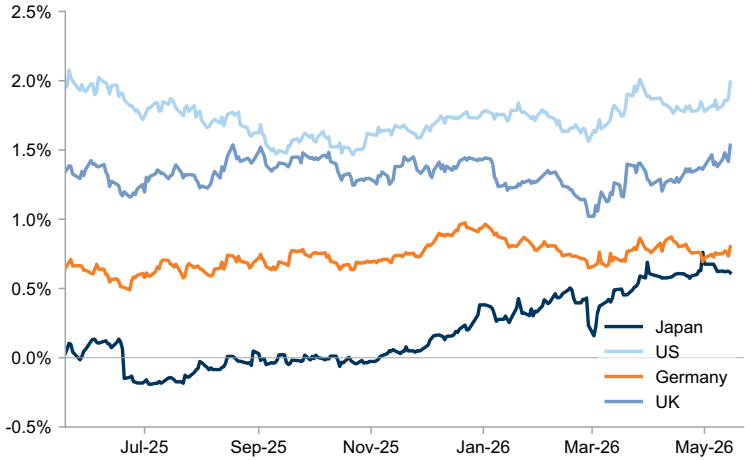
Exhibit 81: Yield curve term slope across regions



Source: Datastream, Goldman Sachs Global Investment Research

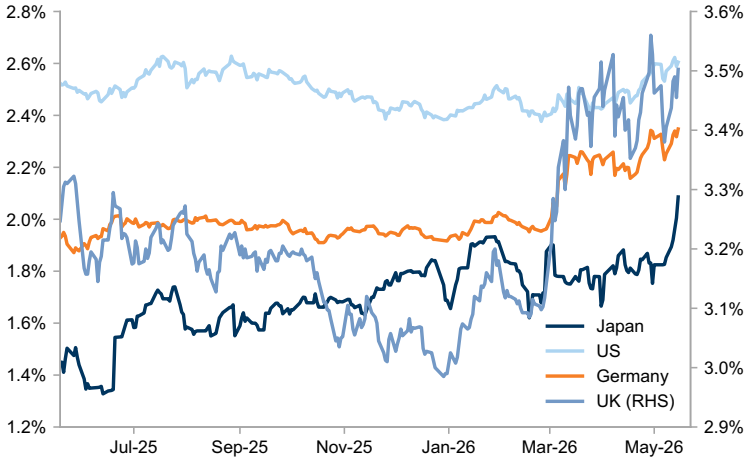
Government bonds: Real yields, inflation, breakevens, 10y IR differentials

Exhibit 82: 10y real yields across regions
Nominal bond yield minus CPI inflation swap (RPI for the UK)



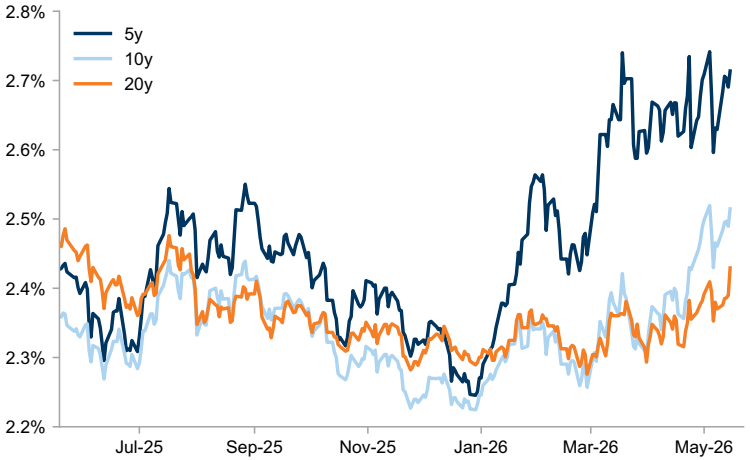
Source: Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 83: 10y inflation swaps across regions
CPI inflation swap (RPI for the UK)



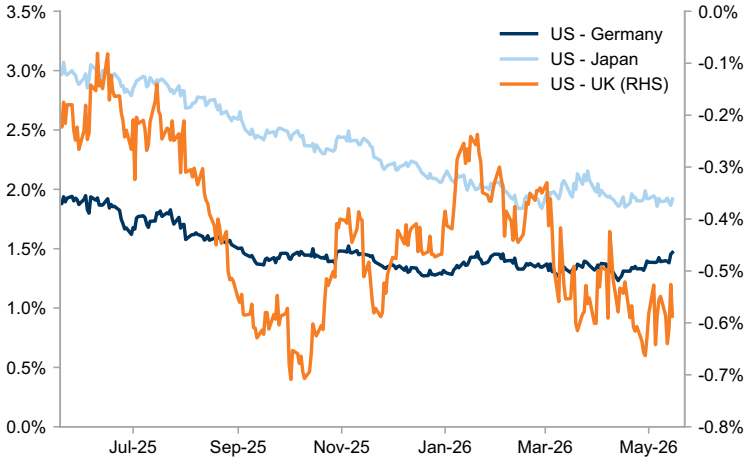
Source: Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 84: US breakeven inflation
Nominal yield minus TIPS yield



Source: Bloomberg, Goldman Sachs Global Investment Research

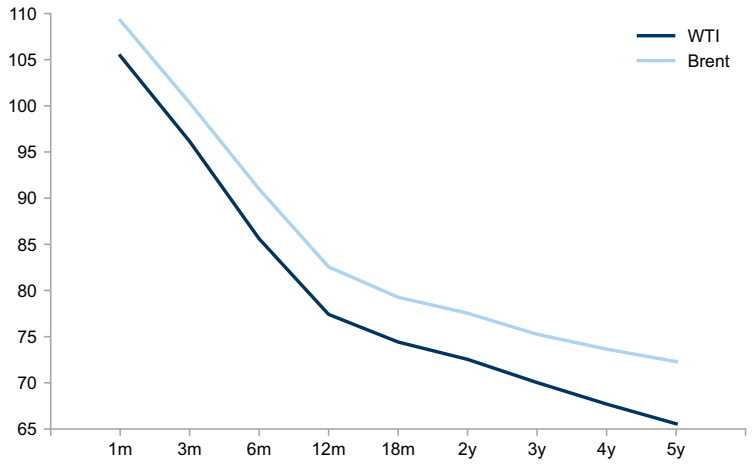
Exhibit 85: 10y nominal bond yield differentials



Source: Datastream, Goldman Sachs Global Investment Research

Commodities: Curve shapes and roll yields

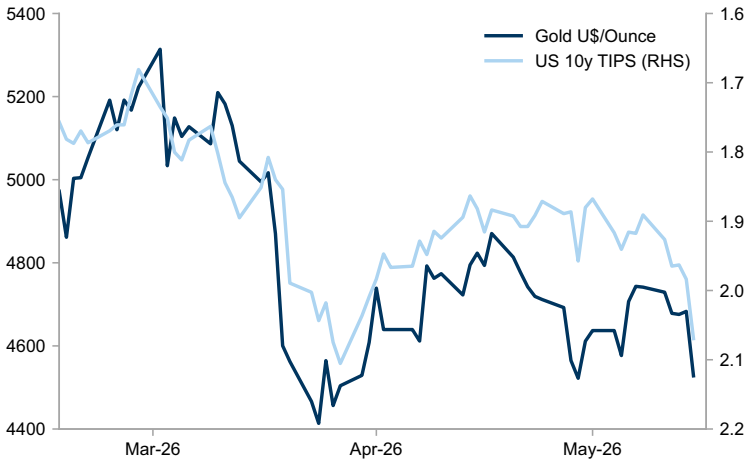
Exhibit 86: WTI and Brent oil forward curves



Source: Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 87: Gold price and US real yields

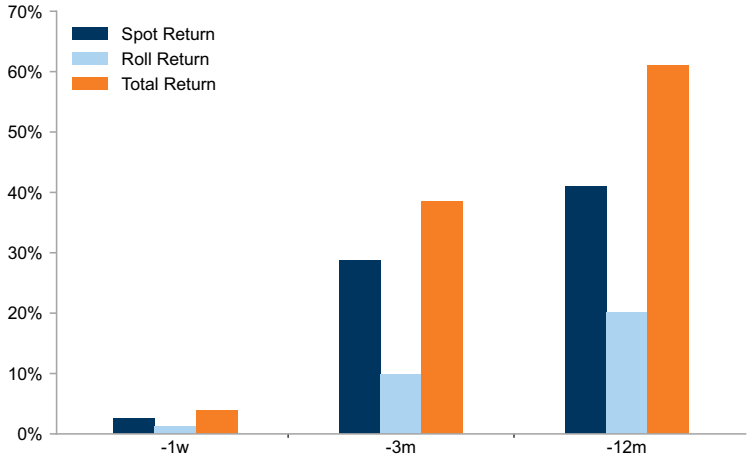
US 10-year TIPs yield, Gold U$/ounce



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 88: S&P GSCI spot, roll and total returns

Returns over the past 1 week, 3 months and 1 year



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 89: Recent performance of S&P GSCI sectors

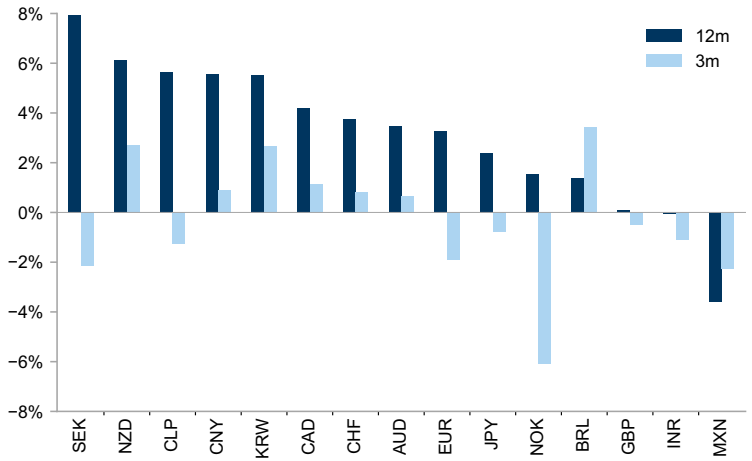
Weight signifies contribution to the S&P GSCI index

	Current Weight	Returns (%)		
	(%)	-1w	-1m	-1y
S&P GSCI	**100**	**3.8**	**9.6**	**61.1**
Energy	56.8	7.7	18.5	106.2
Industrial Metals	12.0	0.7	1.3	41.6
Precious Metals	9.0	-3.6	-4.9	47.2
Agriculture	12.4	-1.5	1.6	-3.1
Livestock	9.8	0.8	-0.8	21.4

Source: Goldman Sachs, Goldman Sachs Global Investment Research

FX: Forecasts and forwards, recent performance and positioning

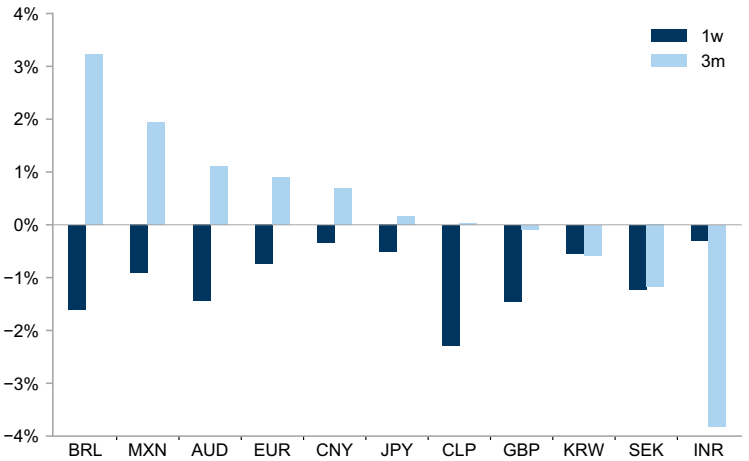
Exhibit 90: Our 3- and 12-month forecasts for dollar crosses



Source: Datastream, Goldman Sachs Global Investment Research

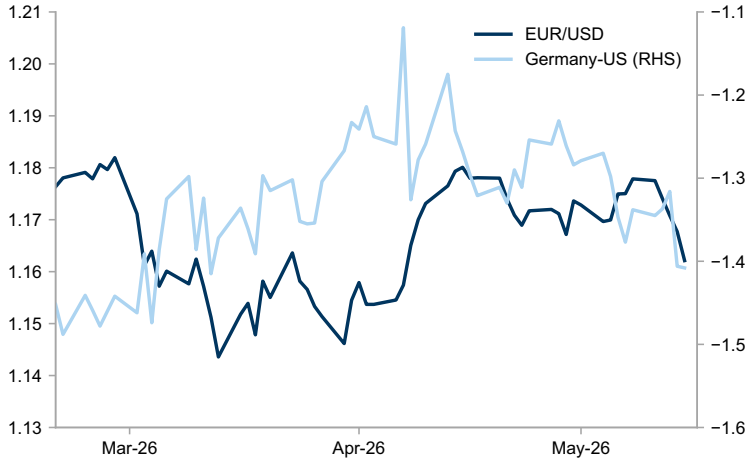
Exhibit 91: Recent performance of dollar crosses

Percentage change over past 1 week, 3 months



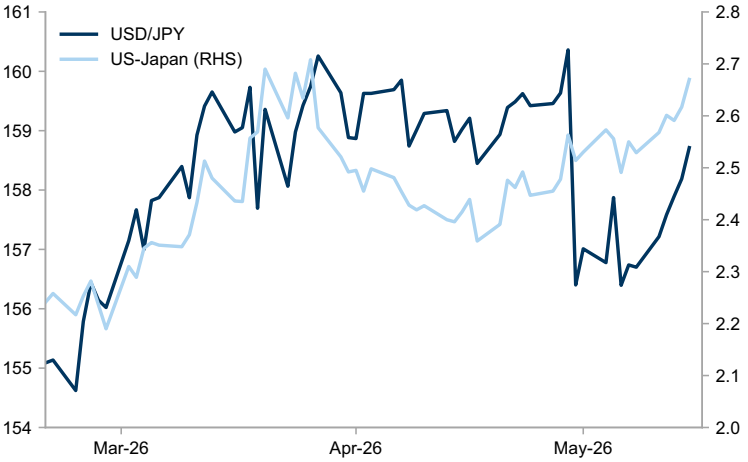
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 92: EUR/USD against German - US 2y interest rate differentials past 3m



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 93: USD/JPY against US - Japan 2y interest rate differentials past 3m



Source: Datastream, Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Andrea Ferrario, Christian Mueller-Glissmann, CFA, Alessandro Giglio, Giovanni Ferrannini 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.

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