

GOAL Kickstart

Vol re-set continues but macro vol remains a speed limit

Implied equity vol has declined further with the VIX closing at 16.4 on Friday, just above the 1-year low of 16.3 reached in April. While the VIX is still high compared to the pre COVID-19 period, a regression based on macro variables suggests that the current level is in line with the macro backdrop, with elevated macro volatility having been a speed limit for further normalisation ([Exhibit 1](#)).

Still, recent realised S&P 500 volatility has been remarkably low with 10-day realised at 7.2 - below the 10th percentile since 1970 ([Exhibit 2](#)). In February, equity volatility normalised alongside rising rates implied volatility, closing the gap from earlier this year ([Exhibit 3](#)). [High and rising inflation has pushed up rates vol](#) and resulted in [positive equity/bond correlations](#), which also kept equity volatility elevated. However, rates volatility has recently started to decline - [our economists expect the Fed to exit only very gradually from the easy current policy stance and near term, post the NFP, rates volatility might decline further](#).

Since the beginning of the year equity downside protection has been somewhat expensive - OTM S&P 500 puts have traded as more expensive vs. ATM, keeping normalised put

skew close to all-time highs ([Exhibit 4](#)). Recently skew has started to come down due to demand for calls. This is particularly evident for single stock options, where the CBOE put/call ratio (the ratio between the traded volumes of puts versus calls options) is drifting towards all-time lows again ([Exhibit 5](#)). More sustained declines in equity volatility could drive increased positioning from systematic investors: elevated equity volatility YTD and the positive equity/bond correlations have likely constrained equity allocations for risk parity and vol-targeting investors. Likewise, the beta of CTAs to equities has declined, suggesting that they have reduced their exposure during recent range-bound markets ([Exhibit 35](#)).

We remain broadly pro-risk in our asset allocation although [the macro backdrop is worsening with peak growth momentum and lingering high inflation](#) - a continued vol-reset might increase vulnerability to both growth and rate shocks. We think the hurdle rate for a correction has declined with sentiment and positioning indicators picking up further - [low put/call ratios point to a worsening risk/reward for equities in the near term](#). Risk reversals (sell puts to buy calls) look more attractive to get equity

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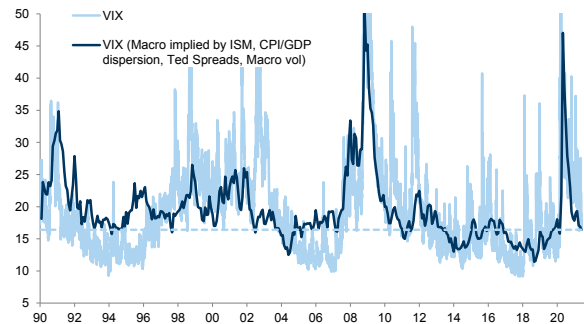
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exposure due to high skew - compared to history they screen particularly cheaply for European equities (Exhibit 6). Alternatively, put spreads can help hedge correction risk, especially as we would not expect a sustained equity drawdown.

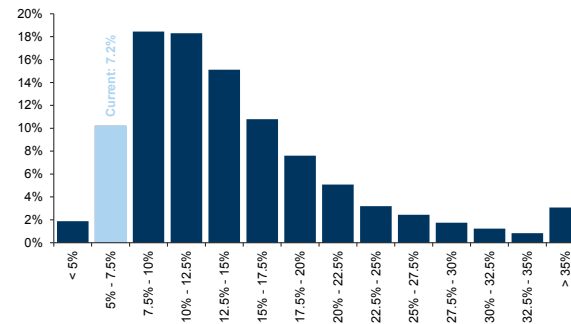
Vol re-set continues but macro vol remains a speed limit

Exhibit 1: VIX has come down materially and is in line with macro variables



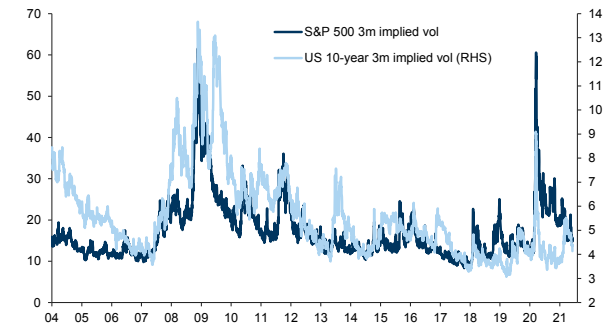
Source: Datastream, Consensus Economics, Goldman Sachs Global Investment Research

Exhibit 2: Realised volatility has been low
S&P 500 10-day realised volatility since 1970



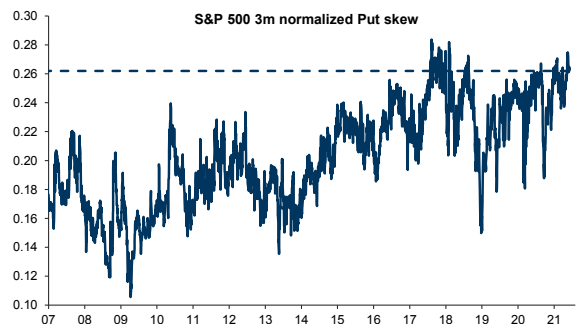
Source: Bloomberg, Goldman Sachs Global Investment Research

Exhibit 3: Equity volatility has come down alongside rates volatility



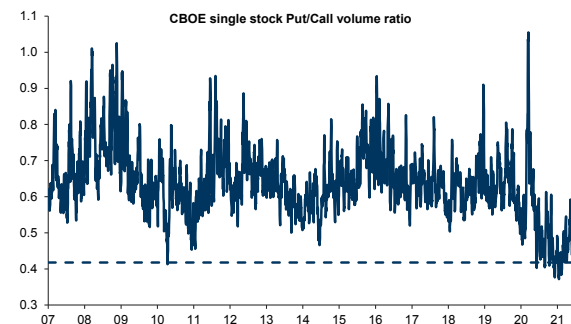
Source: Goldman Sachs Global Investment Research

Exhibit 4: Equity put skew is still very elevated



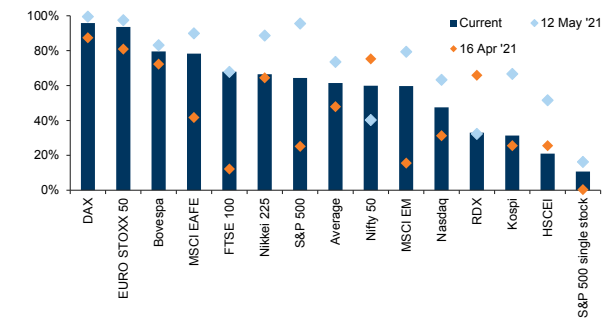
Source: Goldman Sachs Global Investment Research

Exhibit 5: The decrease in skew has been driven by high single stock call volumes



Source: Haver Analytics, Goldman Sachs Global Investment Research

Exhibit 6: Equity index skew remains elevated, particularly in Europe
10y percentile of 3m normalised skew



Source: Goldman Sachs Global Investment Research

Cross-asset: Forecasts

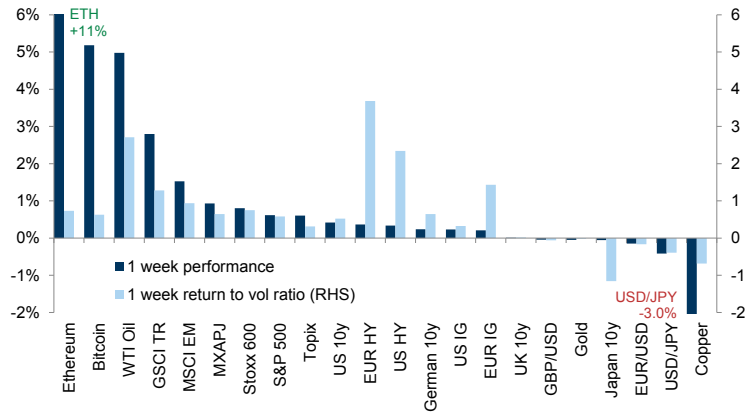
Exhibit 7: GOAL asset allocation recommendations and GS cross-asset forecasts

	Allocation Weighting		Current Level	Forecasts			Forecast Upside/Downside (%)		
	3m	12m		3m	6m	12 m	3m	6m	12 m
Equities	OW	OW			Index level			Total Return	
S&P 500 (\$)	N	N	4230	4300	4300	4450	2.0	2.4	6.7
Stoxx Europe 600 (€)	OW	N	453	450	460	470	0.2	3.1	6.8
MSCI Asia-Pacific Ex-Japan (\$)	OW	N	705	700	725	770	-0.4	3.4	10.6
Topix (¥)	OW	N	1959	2050	2100	2150	5.2	8.2	11.9
10 Year Government Bonds	UW	UW			Yield (%)			Total Return	
US	N	N	1.56	1.87	1.90	1.99	-1.4	-1.3	-1.2
Germany	N	N	-0.21	-0.04	0.00	0.00	-0.9	-1.3	-1.4
Japan	N	N	0.09	0.29	0.30	0.30	-1.6	-1.7	-1.6
UK	-	-	0.79	1.09	1.10	1.19	-1.6	-1.5	-1.9
Corporate Bonds	N	N			Spread			Total Return	
Bloomberg Barclays US IG	UW	UW	85	91	89	88	-1.4	-0.6	0.4
Bloomberg Barclays US HY	OW	OW	295	306	301	300	-0.6	0.3	2.6
iBoxx EUR IG	N	N	98	89	86	85	0.4	0.7	1.4
BAML EUR HY	N	N	294	301	296	295	-0.2	0.5	1.8
JP Morgan EMBI Div.	N	OW	333	330	328	325	-0.1	1.0	3.0
Commodities	OW	OW			Spot price			Spot Return	
WTI (\$/bbl)	-	-	70	72.5	77	72	4.1	10.6	3.4
Brent (\$/bbl)	-	-	72	75	80	75	4.2	11.1	4.2
Copper (\$/mt)	-	-	9940	10500	11000	11500	5.6	10.7	15.7
Gold (\$/troy oz)	-	-	1894	2000	2000	2000	5.6	5.6	5.6
FX	-	-			Spot rate			Spot Return	
EUR/USD	-	-	1.22	1.25	1.27	1.28	2.8	4.4	5.2
USD/JPY	-	-	109.52	108.00	106.00	103.00	-1.4	-3.2	-5.9
GBP/USD	-	-	1.42	1.42	1.44	1.45	0.2	1.6	2.3
USD/BRL	-	-	5.07	5.30	5.10	5.00	4.6	0.7	-1.3
USD/RUB	-	-	72.88	71.00	70.00	68.00	-2.6	-4.0	-6.7
USD/INR	-	-	73.01	72.50	72.00	71.00	-0.7	-1.4	-2.7
USD/CNY	-	-	6.41	6.40	6.30	6.20	-0.1	-1.7	-3.3
Cash	N	N			Spot rate			Total Return	
US 3-month Tbill	-	-	0.02	-	-	-	0.01	0.01	0.03
Germany 3-month Bubills	-	-	-0.62	-	-	-	-0.21	-0.41	-0.82

Source: Bloomberg, Datastream, iBoxx, Yieldbook Citi, Goldman Sachs Global Investment Research.

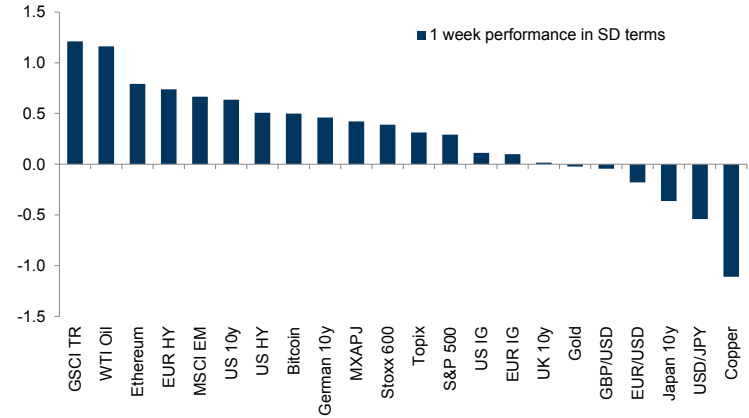
Cross-asset: Weekly and YTD performance, absolute and risk-adjusted

Exhibit 8: Local currency total returns and return to vol ratios over the past week
Weekly returns, return to vol ratios based on weekly volatility



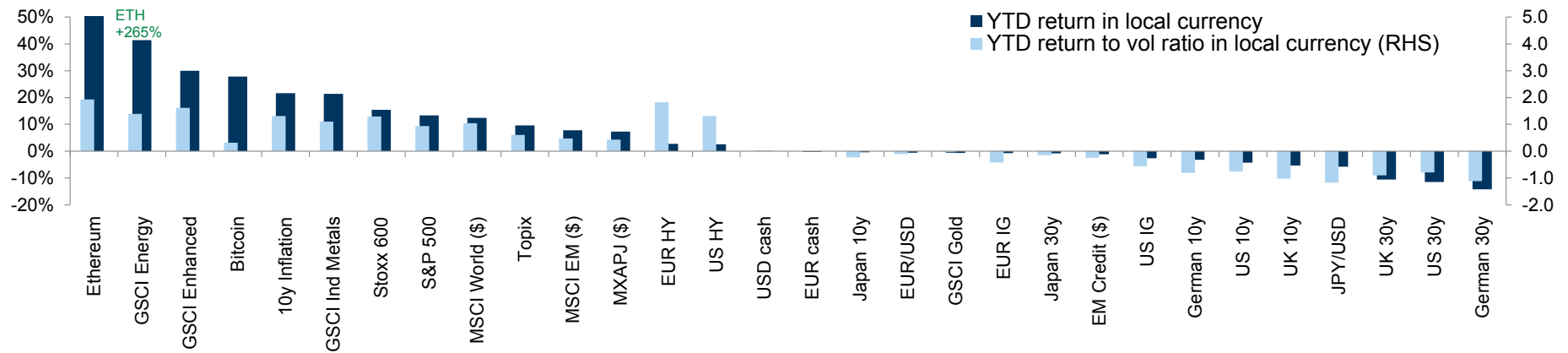
Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 9: Local currency total returns in standard deviation terms
1-week performance in rolling 12m standard deviation terms



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 10: Local currency returns and return to vol ratios
YTD returns

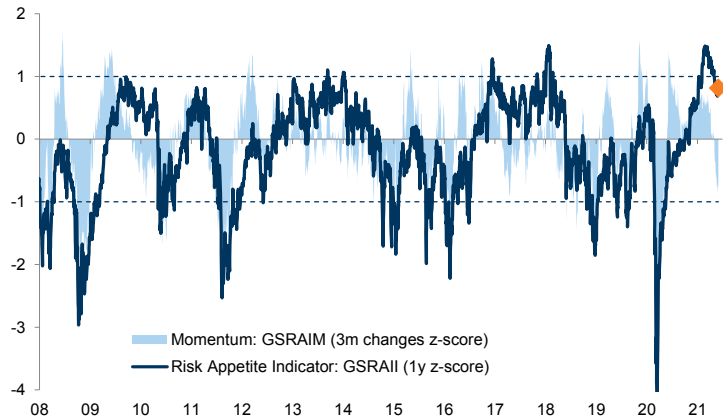


Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Cross-asset: Risk appetite indicator

Exhibit 11: Risk appetite indicator level and momentum factors

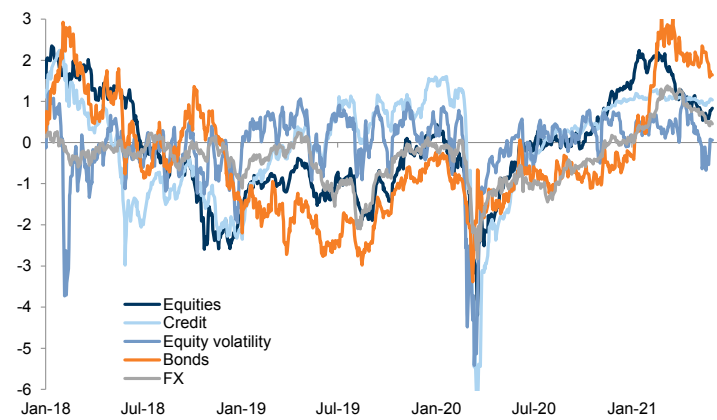
See July 2016 GOAL for construction details



Source: Goldman Sachs Global Investment Research

Exhibit 12: Risk appetite indicators for different asset classes

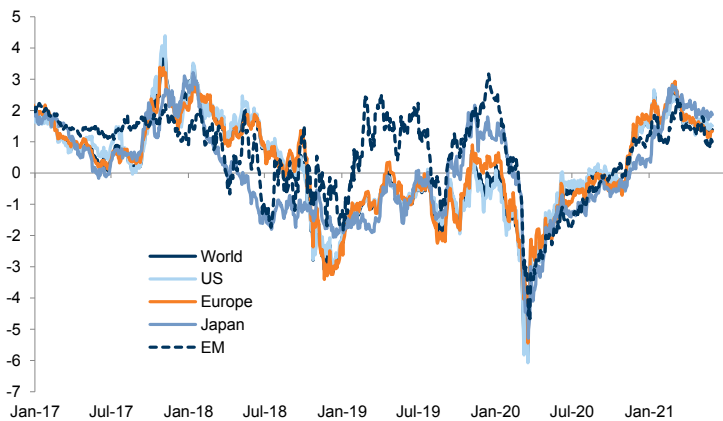
See July 2016 GOAL for construction details



Source: Goldman Sachs Global Investment Research

Exhibit 13: Cyclical vs. defensives 1-year rolling z-score across regions

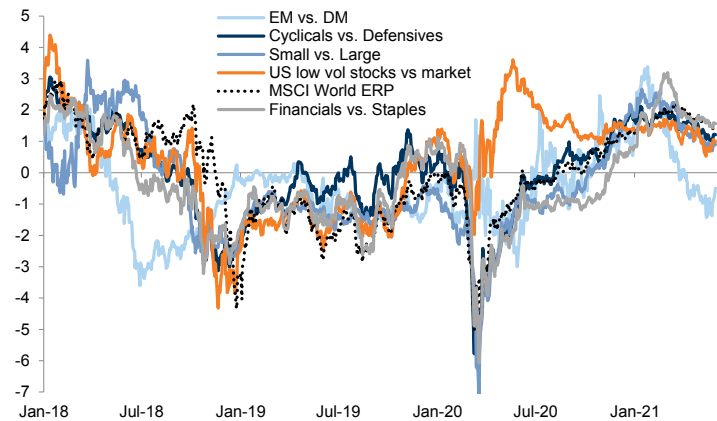
See July 2016 GOAL for construction details



Source: Goldman Sachs Global Investment Research

Exhibit 14: 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

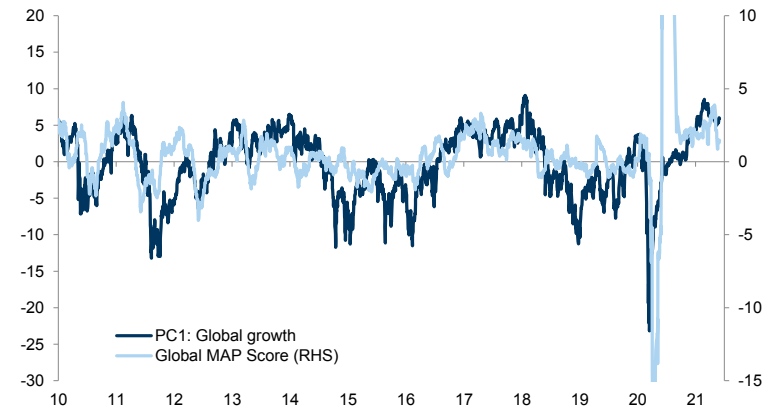
Exhibit 15: GS RAI principal component

See April 2019 GOAL for construction details



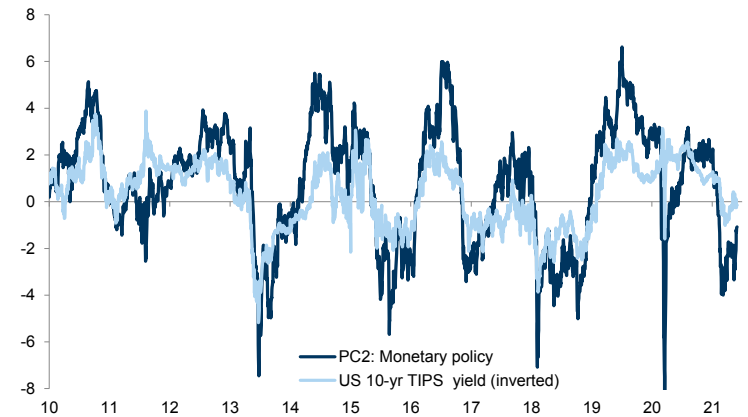
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 16: PC1: Global growth factor vs. Global CAI innovations



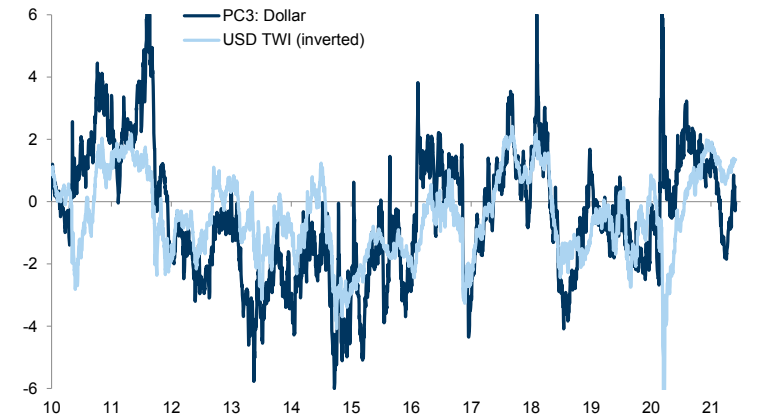
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 17: PC2: Monetary policy factor vs. US 10-year TIPS yield



Source: Datastream, Goldman Sachs Global Investment Research

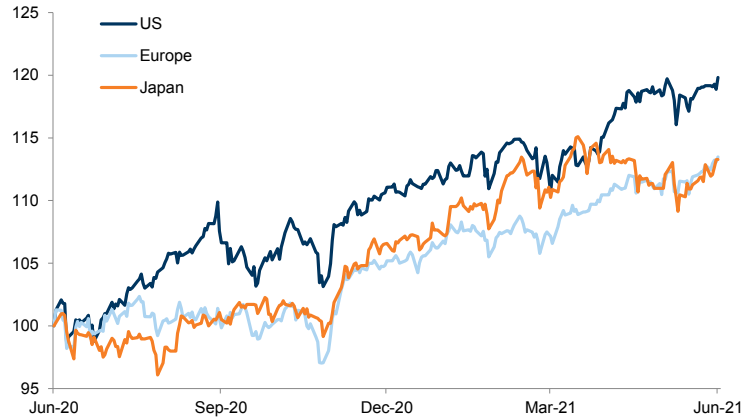
Exhibit 18: PC3: Dollar factor vs. USD TWI



Source: Datastream, Goldman Sachs Global Investment Research

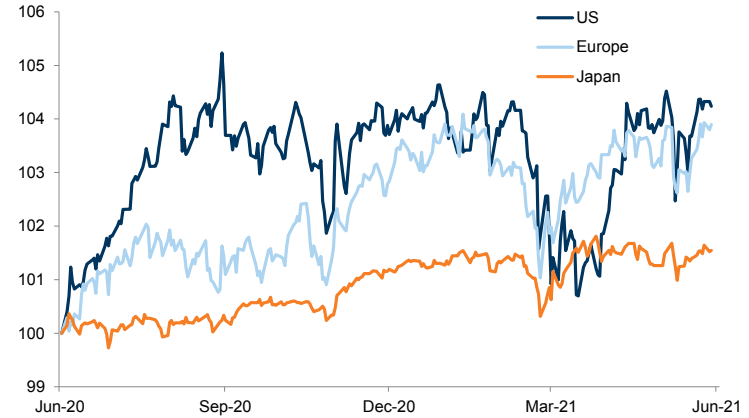
Cross-asset: Balanced portfolios and dynamic allocation strategies performance

Exhibit 19: 60/40 equity/bond portfolio performance across regions last 12m
Relative total return performance indexed to 100 12m ago (data since 2010)



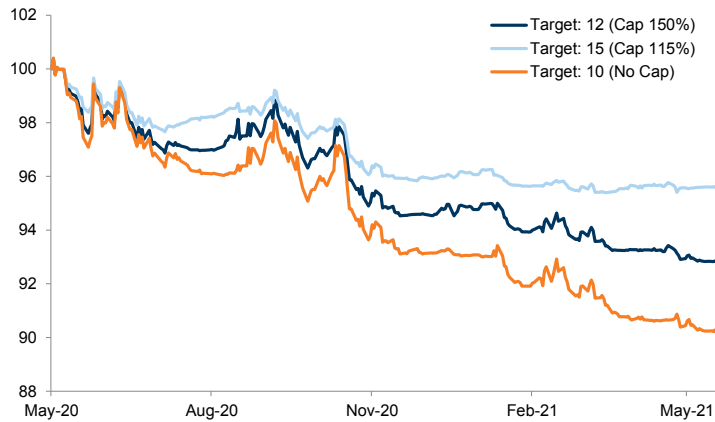
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 20: Risk parity portfolio performance across regions last 12m
Weighted inversely by 3m realised volatility of equity and 10y bonds



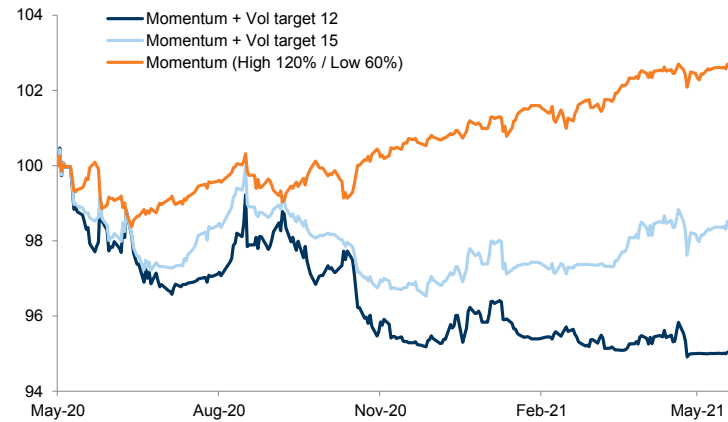
Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 21: 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 22: 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

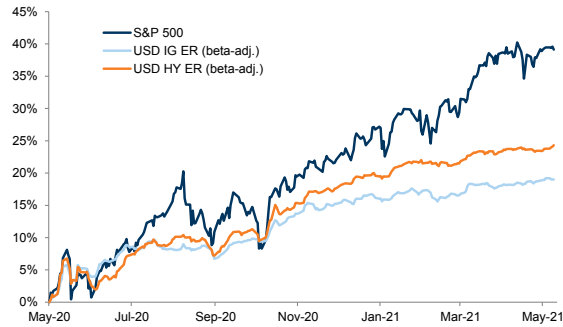


Source: Datastream, Goldman Sachs Global Investment Research

Cross-asset: Equity vs. credit monitor

Exhibit 23: USD cash credit vs. US equity

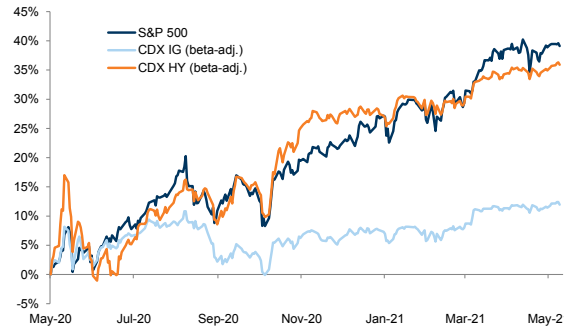
Cash credit excess returns (beta-adjusted) vs. S&P 500 total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 24: USD synthetic credit vs. US equity

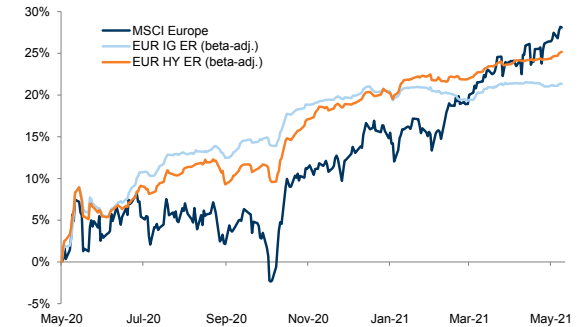
Synthetic credit excess returns (beta-adjusted) vs. S&P 500 total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 25: EUR cash credit vs. European equity

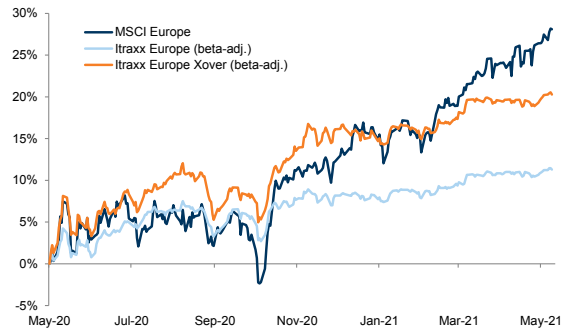
Cash credit excess returns (beta-adjusted) vs. MSCI Europe total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 26: EUR synthetic credit vs. European equity

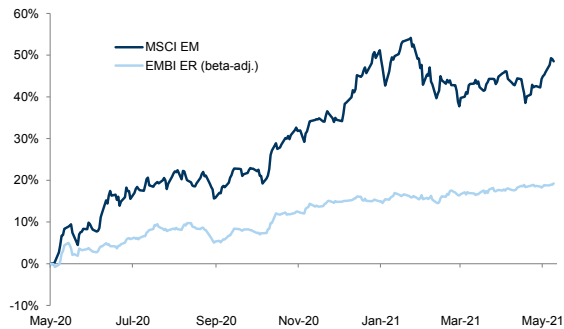
Synthetic credit excess returns (beta-adjusted) vs. MSCI Europe total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 27: EM cash credit vs. EM equity

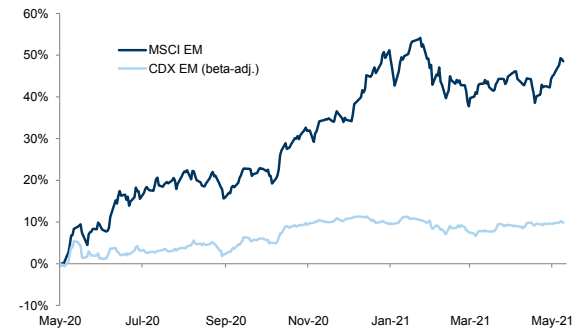
Cash credit excess returns (beta-adjusted) vs. MSCI EM total returns



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 28: 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 29: Cross-asset valuation table

A higher percentile means more expensive relative to 10y history

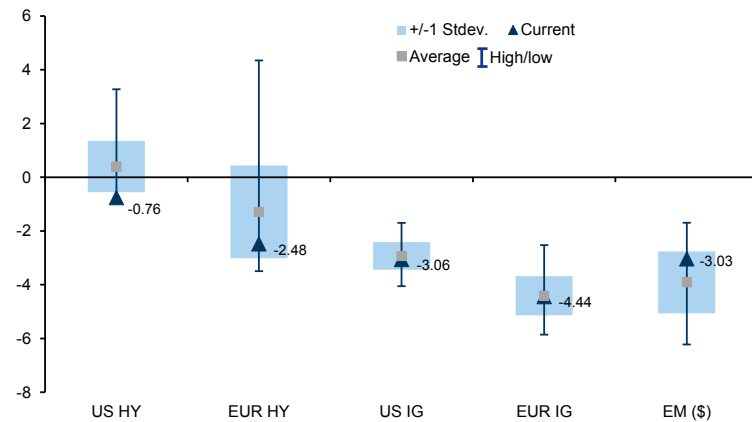
Valuation metric	12m forward P/E ratio					Government bonds				Credit					FX	
	S&P 500	Stoxx 600	MXAPJ	Topix	MSCI EM	US 10y	German 10y	Japan 10y	UK 10y	US IG	US HY	EUR IG	EUR HY	EM (\$)	EUR/USD	USD/JPY
Current:	21.5x	17.1x	15.9x	16.1x	14.2x	1.6%	-0.2%	0.1%	0.8%	98bp	328bp	98bp	294bp	335bp	-0.06 €//\$	12.7 \$/¥
Expensiveness (last 10y percentile):	91%	92%	93%	91%	92%	86%	81%	53%	80%	100%	99%	96%	92%	56%	62%	50%
3M change:	0.1x	0.3x	-0.7x	-0.7x	-0.9x	0.0%	0.1%	0.0%	0.1%	-12bp	-32bp	-1bp	-30bp	-28bp	0.03 €//\$	-0.9 \$/¥
Average:	16.3x	13.8x	12.7x	13.7x	11.5x	2.1%	0.6%	0.3%	1.5%	154bp	486bp	147bp	460bp	347bp	-0.06 €//\$	6.9 \$/¥
95th:	22.1x	17.4x	16.2x	17.3x	14.8x	3.0%	1.9%	1.0%	2.8%	224bp	750bp	272bp	850bp	453bp	0.14 €//\$	22.9 \$/¥
5th:	11.9x	9.7x	10.5x	11.3x	9.4x	0.7%	-0.5%	-0.1%	0.3%	111bp	341bp	98bp	279bp	270bp	-0.21 €//\$	-22.1 \$/¥

Note: GSDEER is our fair value macro model for exchange rates. US IG spread is from iBoxx. EM (\$) is JPM EMBI.

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

Exhibit 30: Credit spread minus equity risk premium estimates across markets

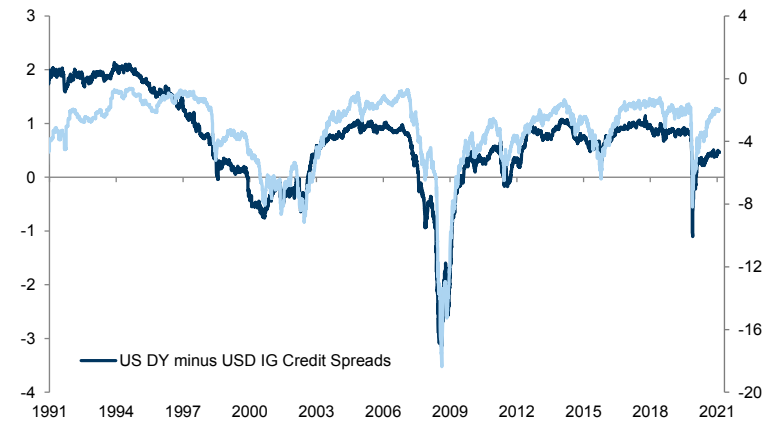
Equity risk premia based on 1-stage DDM using local 10-year yields and LT GDP consensus estimates. Using past 10 years of data.



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 31: Equity vs. credit relative valuation

US Dividend Yield minus Credit spreads



Source: Datastream, Goldman Sachs Global Investment Research

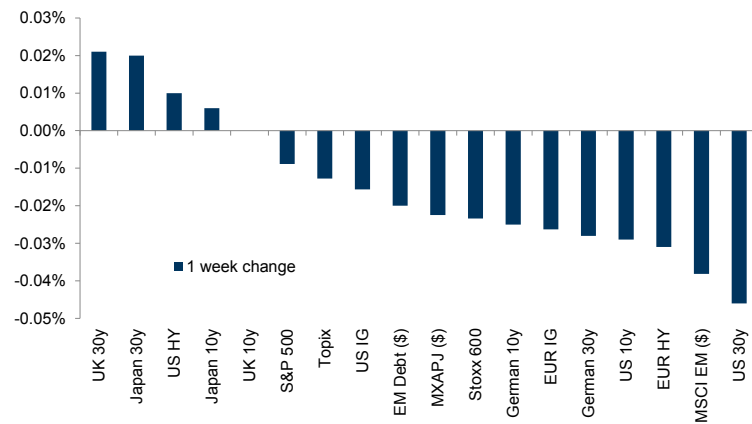
Cross-asset: Yields

Exhibit 32: Current yields across assets and their percentile to the past 10 years

Valuation metric	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 (\$)
Current:	1.5%	2.9%	2.4%	2.1%	2.5%	1.6%	-0.2%	0.1%	0.8%	1.4%	0.3%	4.7%	2.9%	4.9%
Percentile (-10y):	0%	0%	5%	34%	5%	15%	19%	46%	22%	8%	7%	0%	1%	16%
Average:	2.1%	3.8%	3.2%	2.3%	3.0%	2.1%	0.6%	0.3%	1.5%	2.6%	1.4%	6.8%	4.8%	5.5%
95th:	2.4%	4.6%	3.7%	2.8%	3.4%	3.0%	1.9%	1.0%	2.9%	3.8%	4.3%	8.6%	8.6%	6.6%
5th:	1.6%	3.1%	2.4%	1.9%	2.5%	0.8%	-0.6%	-0.1%	0.2%	1.3%	0.3%	5.1%	3.0%	4.6%
3m real. ret. vol:	12.7%	11.8%	16.2%	13.6%	13.9%	5.6%	3.6%	1.8%	4.7%	4.4%	1.5%	2.1%	1.2%	4.5%
Percentile (-10y):	51%	35%	46%	56%	51%	45%	1%	42%	11%	66%	10%	23%	8%	66%
Yield/vol ratio	0.11	0.25	0.15	0.16	0.18	0.28	-0.06	0.05	0.18	0.32	0.20	2.30	2.39	1.10

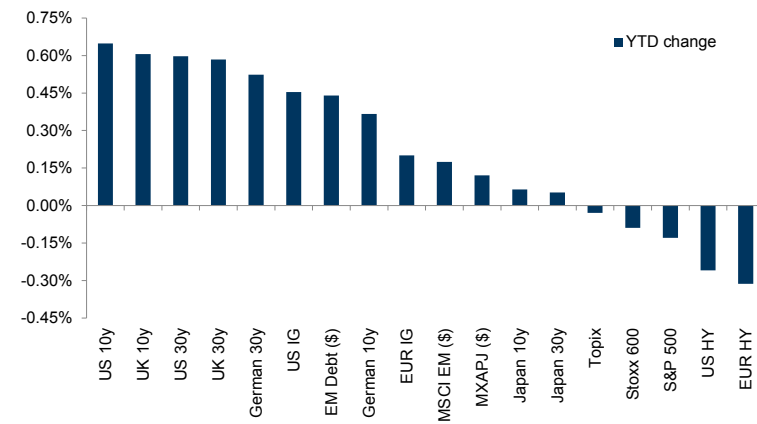
Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 33: Past week change in yields across assets



Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Exhibit 34: YTD change in yields across assets

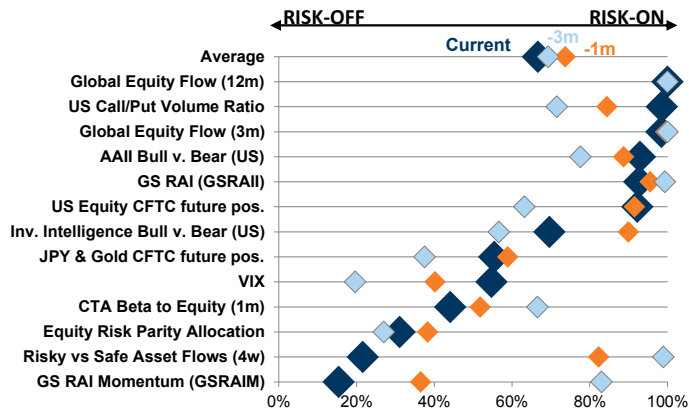


Source: Datastream, iBoxx, Goldman Sachs Global Investment Research

Cross-asset: Sentiment and Positioning

Exhibit 35: Percentile of sentiment indicators

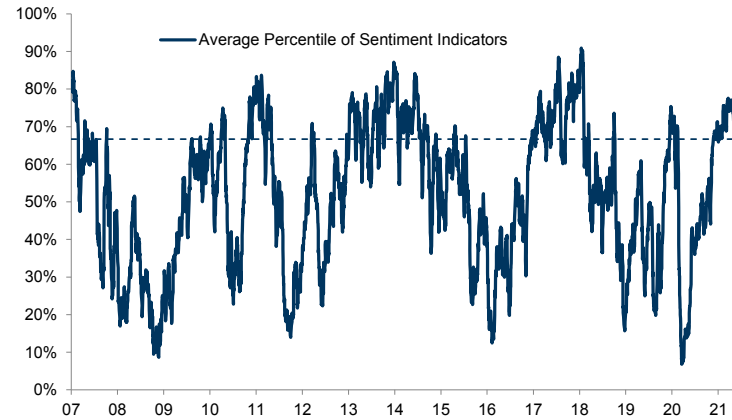
Data since 2007



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

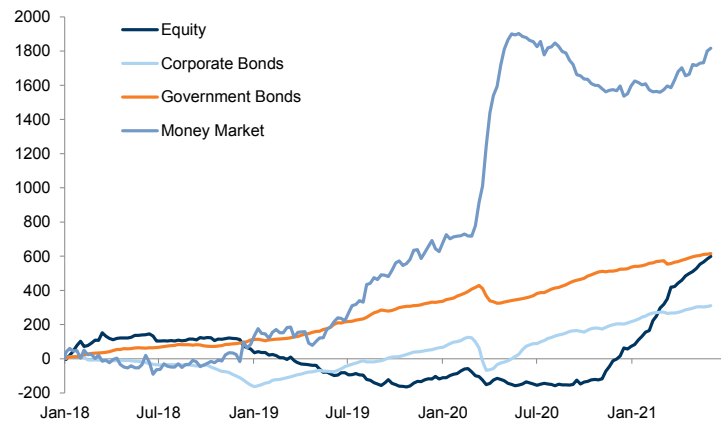
Exhibit 36: Average percentile of sentiment indicators

Data since 2007



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

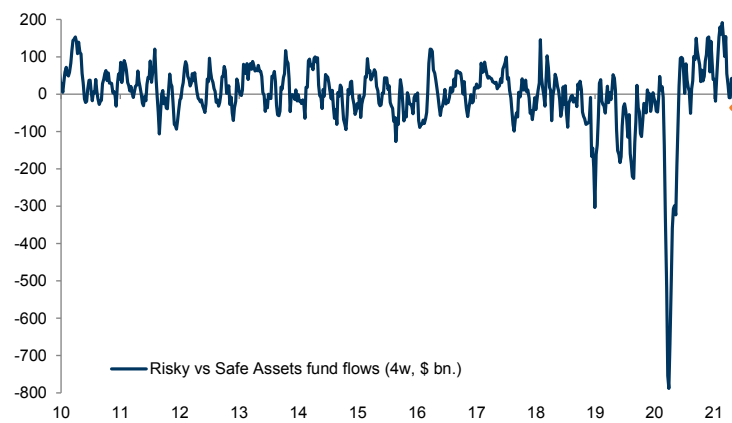
Exhibit 37: Cumulative fund flows across assets



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

Exhibit 38: Risky vs. safe assets fund flows

4 weeks rolling flows, USD bn

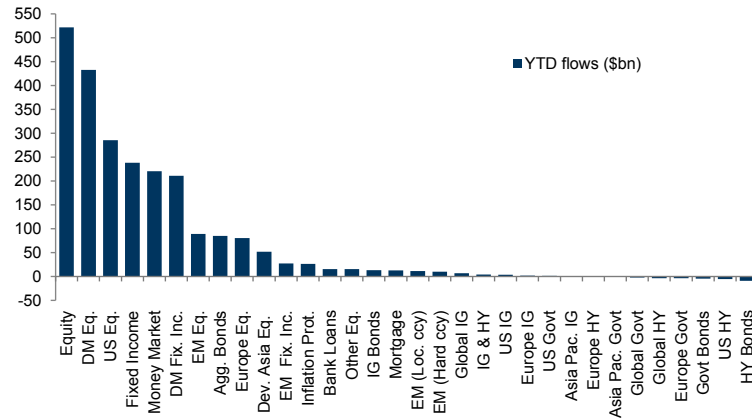


Source: Datastream, Haver Analytics, EPFR, Goldman Sachs Global Investment Research

Cross-asset: Global Funds Flows

Exhibit 39: YTD cross-asset global fund flows

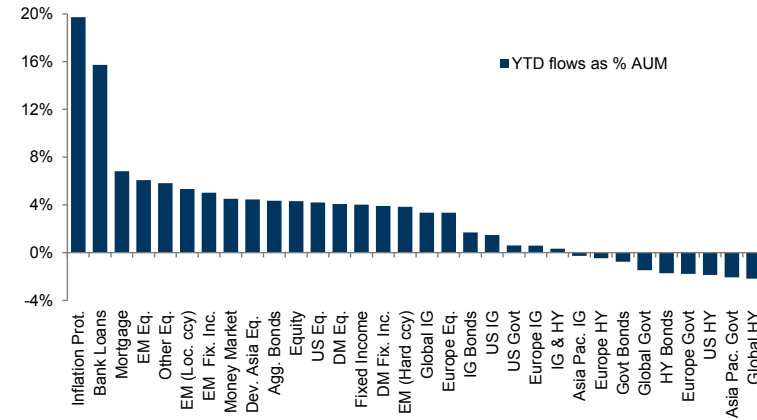
All reporting funds. \$ Bn



Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 40: YTD cross-asset global fund flows

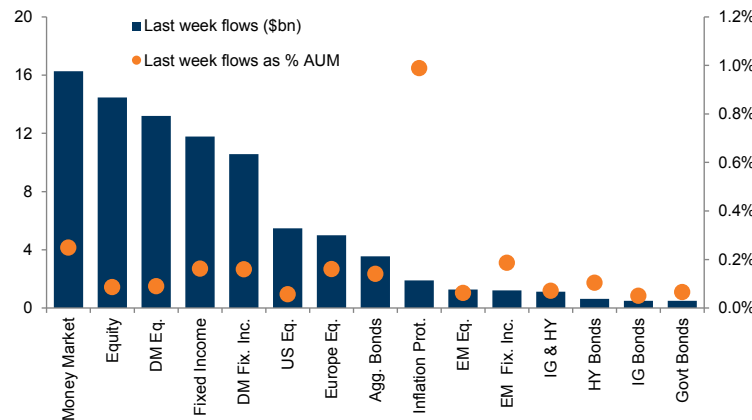
All reporting funds. % of AUM



Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 41: 1-week cross-asset global fund flows

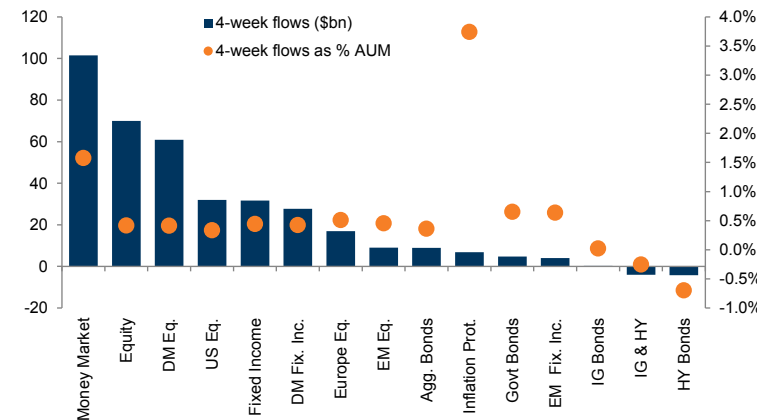
All reporting funds



Source: EPFR, Goldman Sachs Global Investment Research

Exhibit 42: 4-week cross-asset global fund flows

All reporting funds

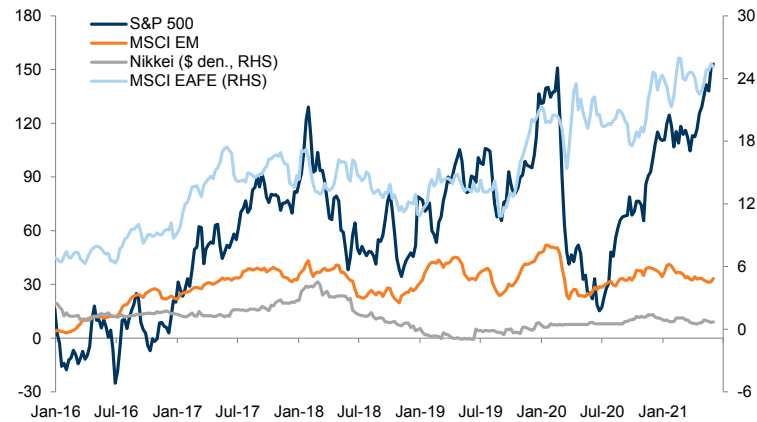


Source: EPFR, Goldman Sachs Global Investment Research

Cross-asset: CFTC positioning

Exhibit 43: Equity net long positioning

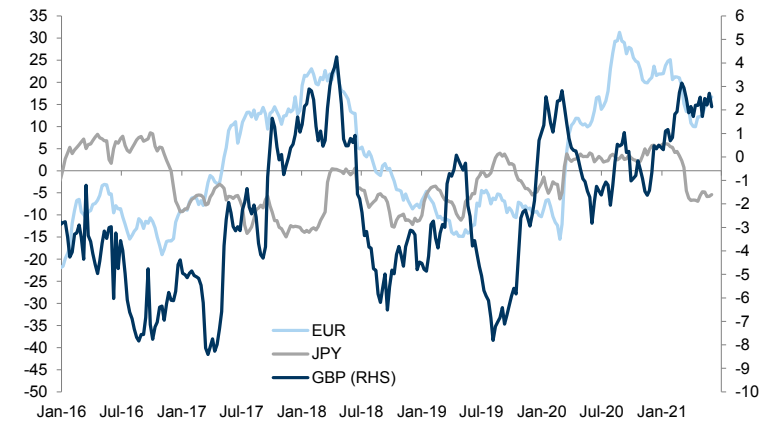
Leveraged funds and asset managers net future positions (\$ bn)



Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

Exhibit 44: Currency net long positioning

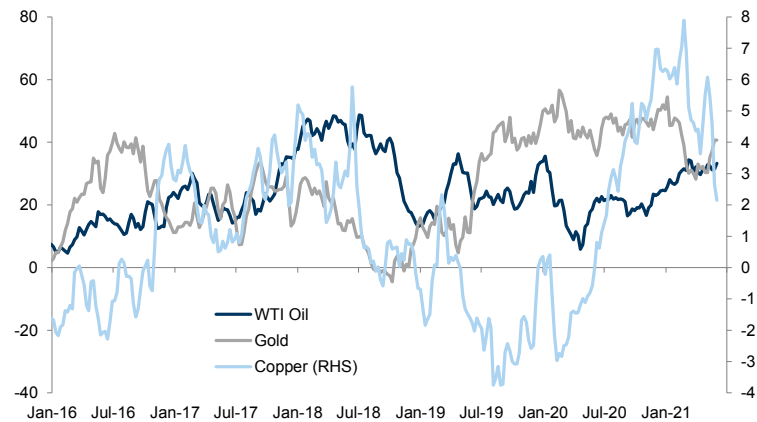
Net non-commercial positions (\$ bn)



Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

Exhibit 45: Commodity net long positioning

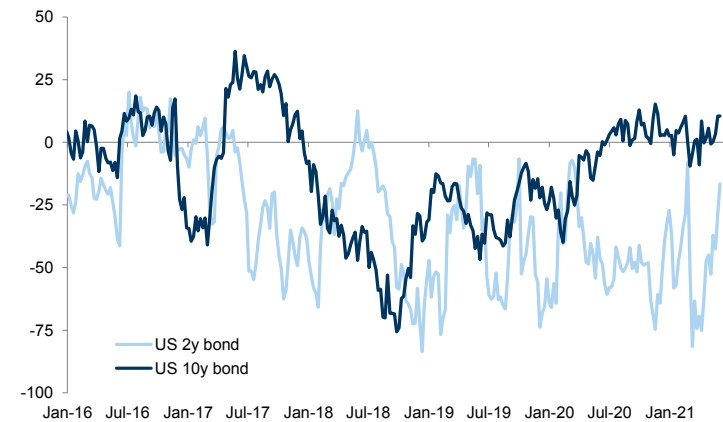
Net non-commercial positions (\$ bn)



Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

Exhibit 46: US Treasury net long positioning

Net non-commercial positions (\$ bn)

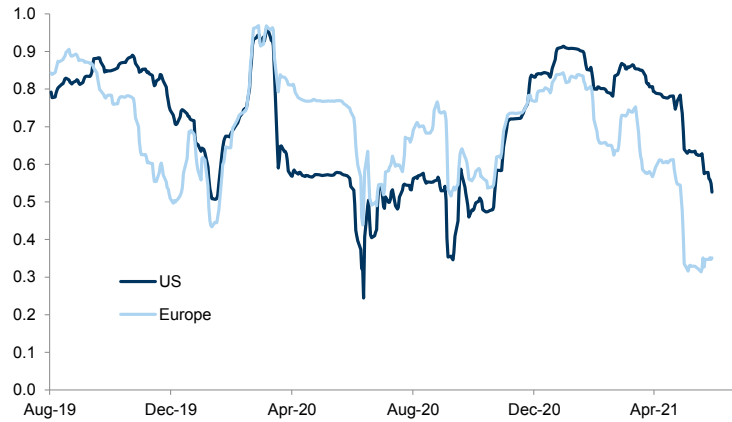


Source: Bloomberg, CFTC, Goldman Sachs Global Investment Research

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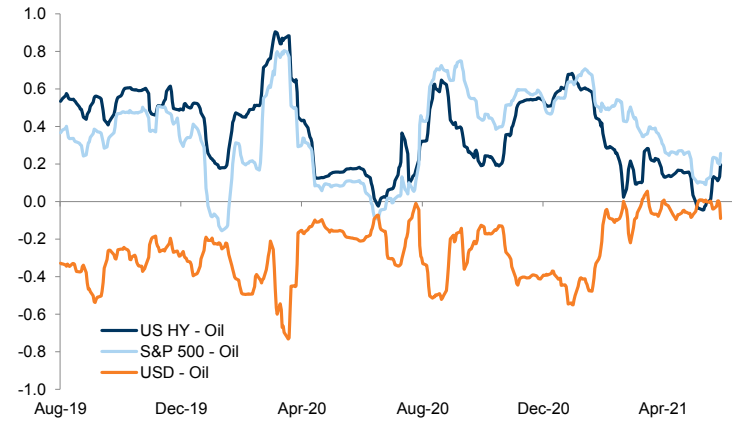
Cross-asset: Correlations: Equity vol/CDS, commodity prices/credit & FX, equity/bond, equity/FX

Exhibit 47: 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



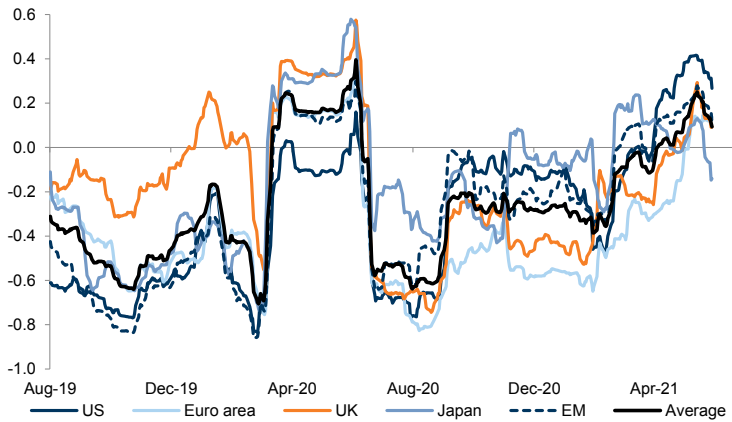
Source: Datastream, Goldman Sachs, Goldman Sachs Global Investment Research

Exhibit 48: 3m rolling commodity price correlations of weekly % changes with different assets



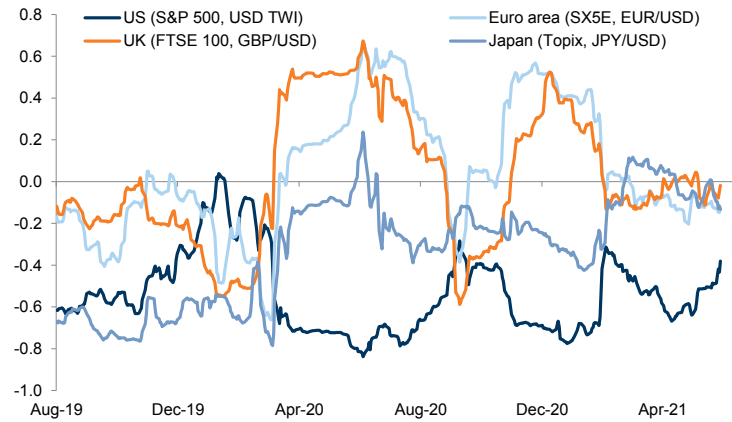
Source: Datastream, Goldman Sachs, Goldman Sachs Global Investment Research

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



Source: Datastream, Goldman Sachs Global Investment Research

Exhibit 50: 3m rolling equity/FX correlation of weekly returns



Source: Datastream, Goldman Sachs Global Investment Research

Cross-asset: Correlation matrix

Exhibit 51: 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		0.82	0.76	0.52	0.75	-0.31	-0.42	-0.10	-0.33	0.45	0.10	0.59	0.18	0.37	0.74	0.71	0.42	0.58	0.32	0.10	-0.81
STOXX 600	0.54		0.71	0.72	0.70	-0.41	-0.54	-0.13	-0.38	0.36	0.20	0.64	0.19	0.39	0.71	0.83	0.40	0.59	0.35	-0.02	-0.75
MXAPJ	0.79	0.64		0.53	0.99	-0.30	-0.29	-0.08	-0.21	0.47	-0.10	0.71	0.25	0.53	0.68	0.72	0.47	0.51	0.44	0.15	-0.66
TOPIX	0.36	0.76	0.26		0.53	-0.33	-0.32	-0.09	-0.23	0.13	0.15	0.38	-0.01	0.31	0.37	0.59	0.24	0.40	0.21	-0.15	-0.59
MSCI EM	0.72	0.54	0.98	0.32		-0.28	-0.28	-0.06	-0.20	0.48	-0.12	0.72	0.28	0.54	0.69	0.73	0.47	0.49	0.44	0.18	-0.65
US 10 yr	0.57	0.43	0.33	0.41	0.44		0.74	0.52	0.77	-0.14	-0.54	-0.31	0.56	0.01	-0.30	-0.47	0.14	-0.38	-0.23	0.40	0.19
Germany 10 yr	0.32	0.18	0.38	0.37	0.47	0.26		0.59	0.85	-0.35	-0.36	-0.46	0.30	0.20	-0.42	-0.54	-0.09	-0.45	-0.26	0.23	0.33
Japan 10 yr	0.66	0.62	0.59	0.83	0.59	0.61	0.78		0.70	-0.26	-0.30	-0.27	0.29	0.19	-0.14	-0.21	0.10	-0.23	-0.21	0.29	-0.02
UK 10 yr	0.40	0.42	0.50	0.67	0.59	0.45	0.59	0.97		-0.21	-0.40	-0.29	0.43	0.25	-0.28	-0.39	0.13	-0.37	-0.25	0.31	0.20
EUR/USD	0.88	0.89	0.76	0.70	0.73	0.10	0.10	0.04	0.19		-0.35	0.76	0.23	0.22	0.61	0.53	0.50	0.21	0.54	0.50	-0.30
USD/JPY	0.30	0.34	0.31	0.32	0.29	0.42	0.53	0.45	0.57	0.56		-0.17	-0.39	-0.01	0.04	0.17	-0.21	0.18	-0.15	-0.59	-0.10
AUD/USD	0.72	0.75	0.64	0.69	0.71	0.13	0.05	0.13	0.15	0.99	0.57		0.24	0.41	0.76	0.74	0.47	0.36	0.55	0.32	-0.43
iBoxx US IG	0.88	0.91	0.84	0.73	0.84	0.09	0.01	0.30	0.05	0.55	0.47	0.68		0.51	0.45	0.28	0.60	0.03	0.03	0.47	-0.15
iBoxx EUR IG	0.94	0.93	0.94	0.84	0.94	0.02	0.01	0.24	0.09	0.78	0.85	0.88	0.09		0.63	0.63	0.52	0.26	0.17	0.07	-0.25
BAML US HY	0.87	0.87	0.77	0.40	0.83	0.21	0.08	0.17	0.19	0.96	0.43	0.95	0.72	0.88		0.89	0.58	0.52	0.32	0.21	-0.50
BAML EUR HY	0.93	1.00	0.88	0.72	0.88	0.02	0.00	0.26	0.09	0.95	0.49	0.95	0.64	0.88	0.73		0.57	0.57	0.39	0.00	-0.54
EM Credit (\$)	0.69	0.64	0.54	0.41	0.52	0.51	0.14	0.39	0.43	0.91	0.32	0.69	0.76	0.71	0.47	0.52		0.26	0.25	0.41	-0.22
WTI Crude Oil	0.92	0.95	0.86	0.95	0.80	0.15	0.07	0.15	0.11	0.59	0.82	0.75	0.51	0.97	0.86	0.99	0.67		0.39	-0.26	-0.50
Copper	0.42	0.45	0.44	0.38	0.40	0.46	0.34	0.30	0.31	0.94	0.18	0.70	0.71	0.87	0.60	0.78	0.73	0.72		0.07	-0.22
Gold	0.66	0.57	0.42	0.43	0.40	0.78	0.65	0.78	0.74	0.63	0.16	0.33	0.87	0.42	0.60	0.39	0.84	0.00	0.24		-0.09
VIX	0.55	0.30	0.20	0.22	0.25	0.28	0.59	0.07	0.34	0.13	0.76	0.30	0.14	0.09	0.34	0.15	0.55	0.08	0.67	0.27	
Current correlation's percentile since 2001																					

Source: Datastream, iBoxx, Goldman Sachs Global Investment Research