

S&P Dow Jones Indices

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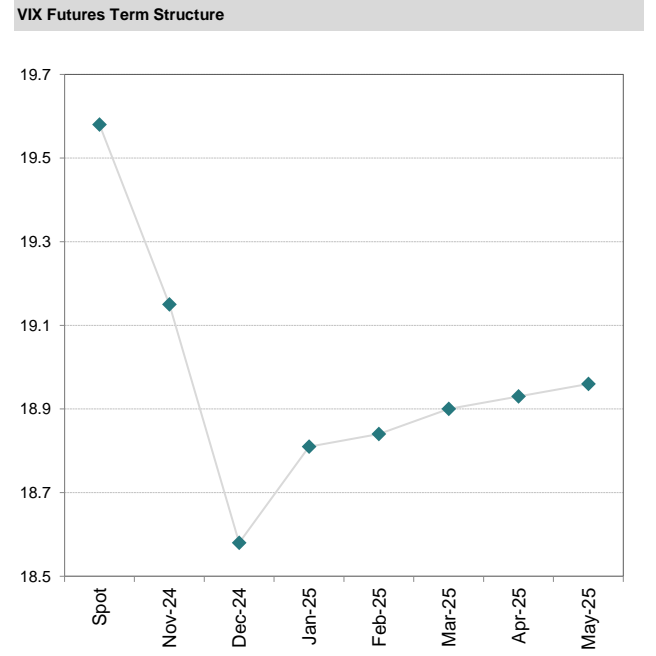
INDEX INVESTMENT STRATEGY

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Index Dashboard: Risk & Volatility October 16, 2024

VOLATILITY MEASURES				
US Equity	VIX	1m ±	200D Ave	Realized (1Yr)
Cboe Volatility Index® (VIX®)	19.58	1.35	15.31	12.67
Cboe 1-Day Volatility Index (VIX1D)	10.63	-7.81	12.79	12.67
Cboe Short-Term Volatility (VIX9D)	14.25	-3.70	14.53	12.67
Cboe 3-month Volatility (VIX3M)	20.32	-0.03	16.89	12.67
Cboe 1-Year Volatility (VIX1Y)	21.92	-0.33	20.11	12.67
Cboe DJIA Volatility (VXD)	17.41	1.91	13.70	10.88
Global Equity				
VSTOXX® (V2X)	19.21	2.15	15.71	13.09
S&P/ASX 200 VIX (A-VIX)	12.03	0.21	11.65	11.63
S&P/BMV IPC VIX (SPBMVIX)	16.63	7.01	13.06	16.48
HSI Volatility (VHSI)	31.47	12.82	23.07	26.00
Cboe EM ETF (VXEEM)	22.72	6.25	17.89	23.07
Interest Rate				
Cboe 20+ Yr US Treasury ETF (VXTLT)	18.30	3.54	15.58	16.09
S&P/JPX JGB VIX® (SPJGB)	3.17	-0.67	3.75	3.51
Credit				
CDX/Cboe NA IG 1M VIX (VIXIG)	29.16	0.74	26.54	19.06
CDX/Cboe NA HY 1M VIX (VIXHY)	142.75	9.96	134.26	96.25
iTraxx/Cboe Europe Main 1M VIX (VIXIE)	30.40	0.38	29.51	23.59
iTraxx/Cboe Europe X-over 1M VIX (VIXXO)	140.33	6.18	139.74	106.81
Currency				
Cboe Euro ETF (EVZ)	8.87	2.54	7.40	5.87
Commodity				
Cboe Gold ETF Volatility (GVZ)	17.31	0.18	15.80	14.59
Cboe Oil ETF Volatility (OVX)	47.84	11.65	32.10	29.07
Volatility of VIX				
Cboe VIX of VIX (VVIX)	111.62	6.19	90.84	113.18
INVESTABLE VOLATILITY INDICES				
Index	1m ±	YTD	12m ±	
S&P VIX Short-Term Futures Index	7.41%	-13.74%	-41.46%	
S&P 500 Dynamic VEQTOR Index	4.02%	15.76%	24.91%	
Cboe S&P 500 Buy-write Index	1.69%	14.55%	16.81%	
Cboe S&P 500 Put-write Index	1.67%	14.31%	17.04%	
S&P VIX Mid-Term Futures Index	0.26%	-9.20%	-23.47%	
S&P Dynamic VIX Index	-2.63%	-18.82%	-19.67%	
S&P 500 VIX Futures Term Structure	-3.42%	-8.78%	-6.58%	
S&P Daily Inverse Short-Term VIX	-8.83%	-27.63%	3.72%	
S&P 500®	4.08%	23.85%	35.53%	

TERM STRUCTURE & SKEW



VIX Futures Indices Roll Costs (Monthly)	
Short-term futures	-2.98%
Mid-term futures	0.21%

US Equity Implied Dispersion	Level	1M	12m ±
Cboe S&P 500® Dispersion Index (DSPX™)	31.73	3.42	2.39

Skew		
Cboe Skew Index (SKEW)	161.85	-3.33% 17.33%

REALIZED MEASURES			
S&P 500 Correlations (Month-end)	1 Year	3 Year	10 Year
S&P Europe 350®	0.81	0.85	0.84
S&P Emerging BMI	0.57	0.62	0.69
S&P 500 Bond	0.75	0.79	0.57
S&P GSCI Commodity	-0.12	0.17	0.39
U.S. Dollar Index	-0.55	-0.60	-0.39
S&P 500 Single Stocks			
	21-Day	12M Ave	3Y Ave
Dispersion (annualized)	23.29%	23.70%	25.22%
Volatility (annualized)	23.44%	25.53%	27.90%
Correlation (pairwise)	0.18	0.19	0.28

COMMENTARY

- The VIX crept 1 point higher in the past month to 20. Short-dated measures of U.S. equity implied volatility, on the other hand, plunged: the Cboe 1-Day Volatility Index plummeted 8 points to 11, while Cboe Short-Term Volatility dropped 4 points to 14.
- Similar to the U.S., equity implied volatility has also risen in other markets since our last report, with HSI Volatility registering the largest jump, up 13 points to 31. Our reported VIX-like indices across credit and commodities were mixed this month; while U.S. and Europe investment grade credit and gold volatility was little changed, Cboe Oil ETF VIX Index soared 12 points to 48, and U.S. and Europe high yield credit volatility also saw notable moves to the upside.
- With the onset of the Q3 earnings season S&P 500 implied dispersion rose 3 points to 32, reflecting market expectations that the relative importance of company specific news will be higher vis-à-vis top-down market events in driving stock prices in the month ahead.
- The increase in U.S. implied volatility made a severe dent on the strategy of holding and rolling short positions at the front of the curve: the S&P Daily Inverse Short-Term VIX Index plunged 9% in the past month.

Sources: S&P Dow Jones Indices LLC and/or its affiliates, Cboe, U.S. Federal Reserve (Dollar index and 10Yr Swap Rate), VIX Network members, Bloomberg LLC all as of October 16, 2024. **Volatility measures:** respective VIX and changes in those levels September 18, 2024 to October 16, 2024. 200D Average is the moving average based on trading days, colour coded by whether current respective VIX is above or below average. 1 year realized volatility calculated according to previous 1 years daily returns, annualised. Investable Index performance based on total return. Index Correlations of monthly returns between total return indices, in USD to month-end September 2024. **Stock Correlations, Dispersion and Volatility** based on index-weighted averages as of October 16, 2024. VIX futures monthly roll costs are expressed as the weighted sum of the percentage difference in price between each future and the future next closer to expiry, expressed as a fraction of that futures price and weighted according to that future's weight in the either the S&P VIX Short-Term Futures Index, or the S&P VIX Mid-Term Futures Index, as appropriate. Charts and graphs are provided for illustrative purposes. Past performance is no guarantee of future results. For more information, please visit our website at www.spdji.com

About the VIX® Network

The VIX Network is an association of exchanges and index providers dedicated to establishing standards that help investors understand, measure, and manage volatility. The Network's members have obtained, from Chicago Board Options Exchange ("Cboe") and its partner S&P Dow Jones Indices ("S&P DJI"), the rights to use the methodology of the CBOE Volatility Index ("VIX") to calculate their own volatility indices. In addition to Cboe and S&P DJI, members include: Australian Securities Exchange, CME Group, Deutsche Borse AG, Japan Exchange Group, Hang Seng Indexes in Hong Kong, National Stock Exchange of India, LIFFE, Taiwan Futures Exchange, and the TMX Group in Canada.

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The Cboe S&P 500 Dispersion Index was launched on September 27, 2023. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Complete index methodology details are available at www.spglobal.com/spdji. Past performance of the index is not an indication of future results. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect results and may be considered to reflect survivor/look ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results. Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations. Back-tested performance is for use with institutions only; not for use with retail investors.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the index is set to a fixed value for calculation purposes. The Launch Date designates the date when the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its data feed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate S&P DJI's ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using "Backward Data Assumption" (or pulling back) of ESG data for the calculation of back-tested historical performance. "Backward Data Assumption" is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as "product involvement") were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on "Backward Data Assumption" please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific data points and relevant time period for which backward projected data was used.

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