



PORTFOLIO ENHANCEMENT

With New Dynamic PutWrite Index PUTDSM



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Index and benchmark values for the period prior to an index's launch date are calculated by a theoretical approach involving back-testing historical data in accordance with the methodology in place on the launch date (unless otherwise stated). A limitation of back-testing is that it reflects the theoretical application of the index or benchmark methodology and selection of the index's constituents in hindsight. Back-testing may not result in performance commensurate with prospective application of a methodology, especially during periods of high economic stress in which adjustments might be made. No back-tested approach can completely account for the impact of decisions that might have been made if calculations were made at the same time as the underlying market conditions occurred. There are numerous factors related to markets that cannot be, and have not been, accounted for in the preparation of back-tested index and benchmark information.



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Introducing the Cboe[®] Validus[®] S&P 500[®] Dynamic PutWrite Index (PUTDSM)

- Rules-based Dynamic Strategies with Outperformance in Past Bearish to Slightly Bullish Markets
- Regular Income Generation with Option-Writing to Help Smooth Out Portfolio Returns



> Validus Dynamic Indices – the next generation of options strategy indices





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Our capital markets group focuses in particular on best execution and investment solutions & products:

- Systematic Overlays
- Investable indices
- Customized hedging solutions





Challenges in Traditional Asset Classes

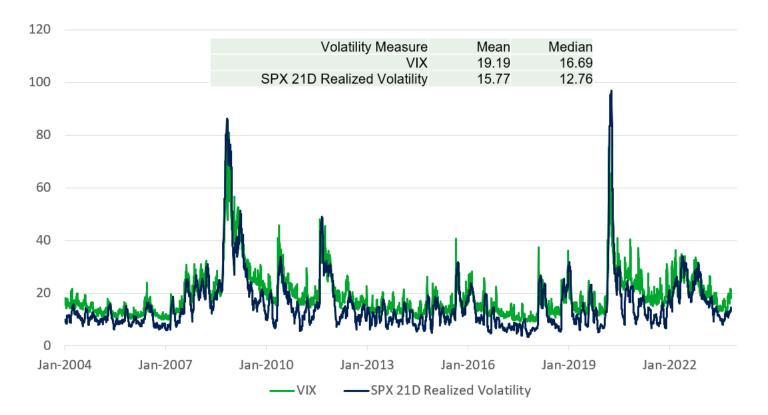
- > The Fed has rapidly raised the Fed funds rate to fight red-hot inflation rates at the expense of equity and bond asset class returns.
- > Despite a strong YTD return in equities, the S&P 500 has been down 12% since 2021.
- > The Bloomberg Aggregate Bond Index has dropped 19% in the same period.
- > The traditional 60/40 allocation has stalled after years of impressive performance.



Source: Cboe Global Markets, FactSet. Data from 12/31/2021 to 10/31/2023. Past performance is not indicative of future results.



Sellers of options often prefer market regimes in which implied volatility exceeds subsequent realized volatility.



Source: Cboe Global Markets, FactSet. Data from 01/04/2021 to 10/31/2023. Past performance is not indicative of future results.

Tailwind for Put Write Strategies

Cash Secured Put Write Strategy

Mechanics

- · Selling put options
- Holding an amount of cash sufficient to purchase the stock should the option be exercised

Potential Outcome

- If the stock's price remains above the strike, the investor keeps the premium as profit
- If the stock's price goes below the strike, the investor is obligated to buy the stock at strike price

General Usage

- Participation in equity market through options
- · Overlay cash portfolio with equity exposure
- · Generate steady income
- · Potential to purchase stocks at discount price

<u>Risks</u>

- Declining stock price
- Opportunity cost

Tailwind

- Cash is paying a healthy interest rate, reducing opportunity cost.
- Elevated implied volatility offers rich option premium.
- Declining equity market may create opportunities to purchase stocks at discounted prices.
- A put-write strategy tends to outperform in a rangebound, down or slightly up market.



Cboe's Approaches to Put Write Strategies

Cboe S&P 500 PutWrite Index (PUT)

Mechanics

- Selling at-the-money SPX put options
- Holding 1- and 3-month Treasury bills sufficient to purchase the index should the option be exercised
- Rolls monthly on expiration date

Objectives

- Offering exposure to SPX
- · Collecting premium

Cboe Validus S&P 500 Dynamic PutWrite Index (PUTD)

Mechanics

- Selling a basket of in-the-money SPX put options
- Holding 1-month Treasury bills sufficient to purchase the index should the option be exercised
- Dynamically determines put strikes using implied volatility surface
- Rolls on five days every month

Objectives

- Offering exposure to SPX
- Collecting premium
- Adapting to changing market volatility
- Reducing path dependency



Historical Performance



Source: Bloomberg and Validus Macro Strategies. Data from 01/03/2021 to 10/26/2023. Past performance is not indicative of future results.



New Robust Strategies: Cboe Validus S&P 500 Dynamic Strategies



DYNAMIC PUTWRITE CHARACTERISTICS

The Dynamic PutWrite Strategy adds dynamic rule-based features to a systematic overwrite Strategy which can significantly improve its riskadjusted return

The Dynamic PutWrite Strategy selects the strike of the put options which are sold in the context of the volatility regime and levels The Strategy mitigates the impact of path dependency by initiating the sell of put option on each of the days of the week prior to a S&P 500 option expiry and rolling them



Existing option overwrite strategies are generally "passive" in nature, for instance:

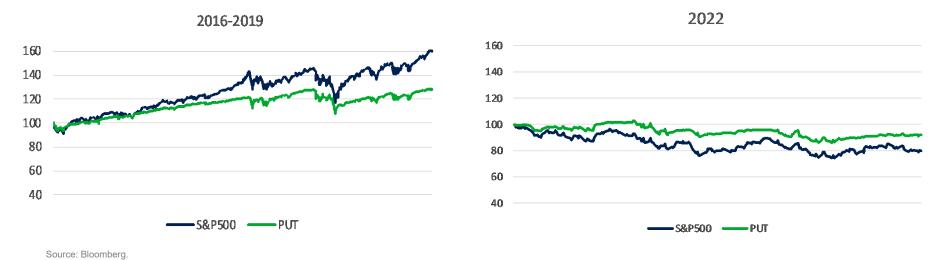
• Puts are sold at a fix frequency or given day of the week.

Trending market PUTSM index likely underperforms S&P 500

• The selected put strike is constant: at-the-money or 2% out-of-money.

However, the performance of a put write strategy depend inherently on:

- The volatility regime and the level of implied volatility: because the premium of the sold put depends on it.
- · The price behavior of the market: a range bound market versus a trending market.



Range-bound market PUTSM index likely outperforms S&P 500

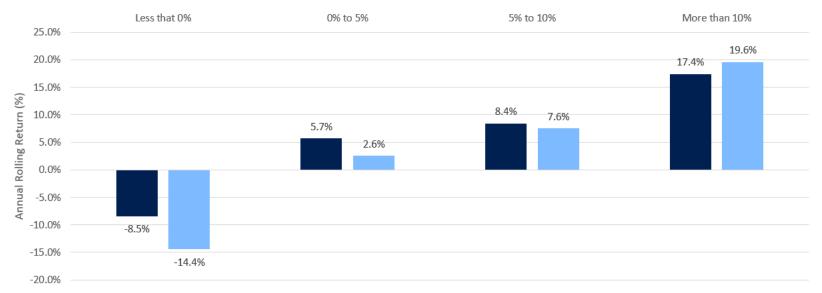
🔶 VALIDUS 🛛

Cboe Validus Dynamic Strategies: Enhanced Outcome Strategies

Cboe Validus Dynamic strategies are designed to be viewed as an "Enhanced Outcome" strategy. This means these strategies:

- A. Provide a continuous long position exposure to the S&P 500
- B. Use the premia collected via the dynamic approach to outperform the underlying over medium to long time horizon, in particular:
 - Outperform the underlying in episodes of market sell-off.

Dynamic PutWrite Annual Rolling Returns vs S&P500 Index Return Regime (2006-2023)



PUTD Mean SPX Mean



Cboe® Validus Dynamic PutWrite Index: Enhanced Outcome Strategies

The Dynamic PutWrite Index has historically outperformed the S&P500 in periods where the S&P500 had an annual return of 12% or less.

This potential outperformance can for instance allow investors to have more flexibility in managing their asset allocation during market sell-offs in particular.



1yr Rolling Excess PUTD Return by S&P500 Regime

Source: Bloomberg and Validus Macro Strategies.

The calculations of these returns are solely based a proprietary methodology developed by Validus and on information obtained from various data sources and may be inaccurate or incomplete. These returns and statistics are presented for informational purposes. No responsibility or will be accepted by Validus as to the accuracy or completeness of the return information and Validus expressly disclaims any liability is or will be accepted by Validus as to the accuracy or completeness of the return information and Validus expressly disclaims any liability therefore. The returns of any actual investment designed to follow the methodology of the Strategy will vary based on a number of factors, including, without limitation, leverage, base-currency of the account, timing of individual contributions and withdrawals Past performance is not indicative, or a guarantee, of future performance, and there can be no assurance comparable results will be achieved in the future



A review of the performance and characteristics of the Cboe Validus S&P 500 Dynamic PutWrite Index highlights that:

- Jan 2006 to Oct 2023: PUTD Outperforms both PUT and SPX from a risk-adjusted return perspective (**0.52** vs 0.47 and 0.36 resp.)
- Higher annualized return compared to either strategy as well (8.64% vs. 6.74% and 7.29% resp.)
- The Dynamic strategy's drawdown was noticeably less pronounced than the S&P 500. The time under water is also noticeably shorter than the S&P 500 price index.
- 95.2% daily return correlation with SPX.
- Upside/Downside Capture Ratio of 1.2x

Index	Annualized Return	Annualized Vol	Max DD	Information Ratio	Longest DD
S&P500	7.29 %	20.30%	-56.78%	0.36	1375
PUT	6.74%	14.31%	- 37.09 %	0.47	621
PUTD	8.64%	16.66%	-45.03%	0.52	776
PUTW*	6.10%	13.75%	-28.40%	0.44	N/A

* PUTW values are from March 2016 to October 2023

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The Cboe Validus S&P 500 Dynamic PutWrite Index has a long-term correlation of 95% with the S&P 500.



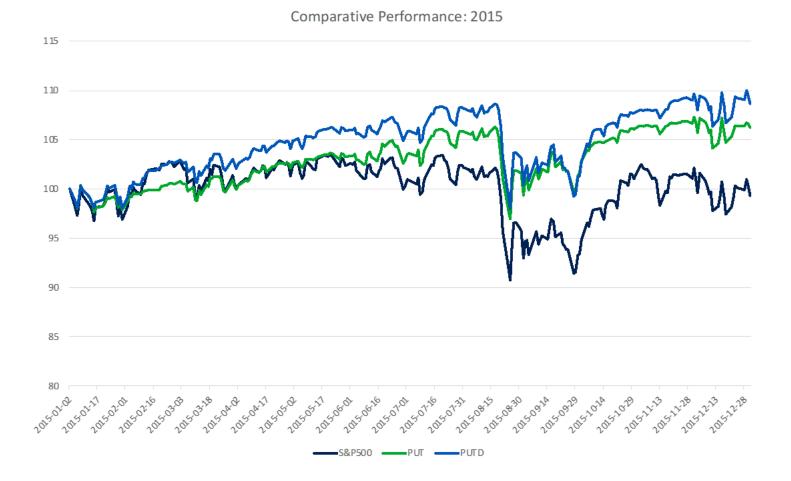
1Yr Rolling Daily Return Correlation





Comparative Performance: 2008-2009



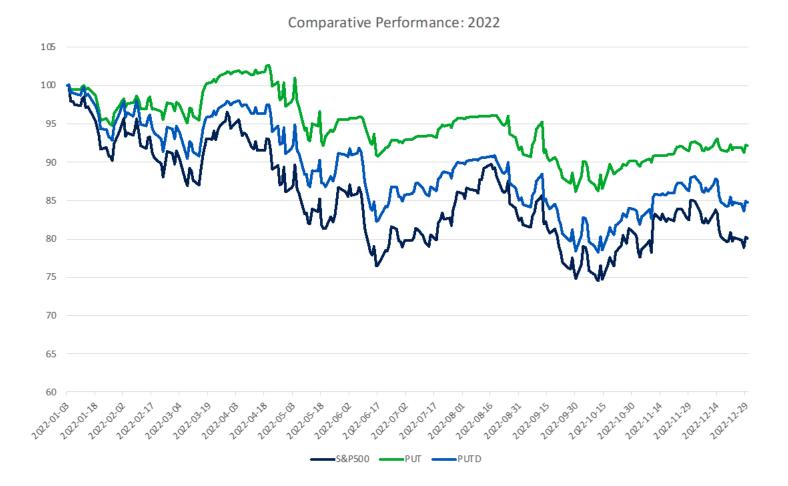






Comparative Performance: 2020





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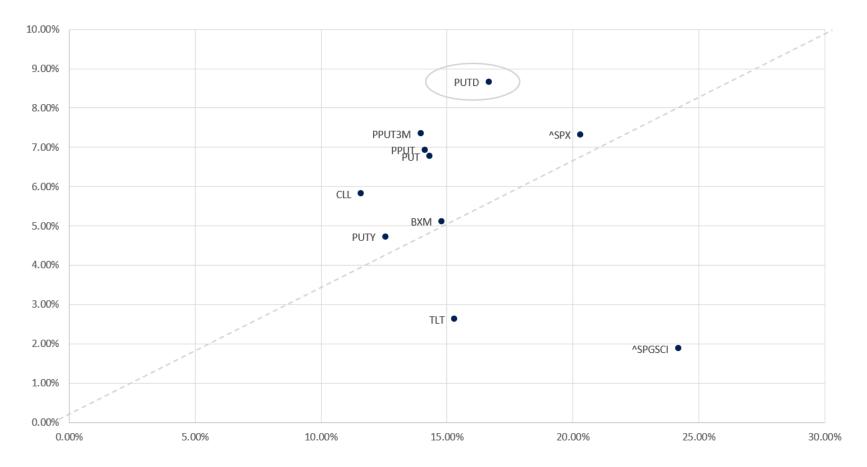




Comparative Performance: Since August 2023



Efficient Frontier, Indices (01-2006 to 10-2023)



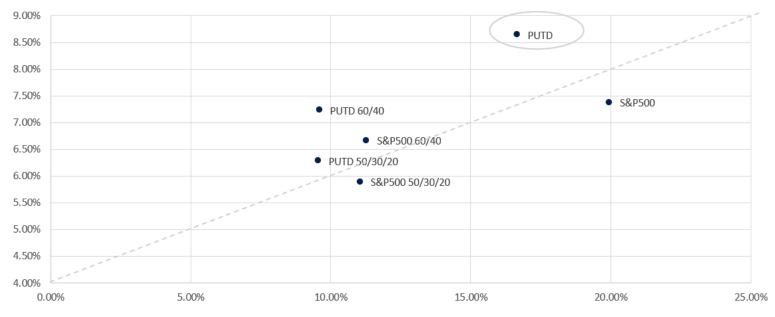
PPUT: Cboe S&P 500 5% Put Protection Index; PPUT3M: Cboe S&P 500 Tail Risk Index; PUT: Cboe S&P 500 PutWrite Index; CLL: Cboe S&P 500 95-110 Collar Index PUTY: Cboe S&P 500 2% OTM PutWrite Index; BXM: Cboe S&P 500 BuyWrite Index; TLT: iShares 20+ Year Treasury Bond ETF



Efficient Frontier

In the popular 60/40 (Equity/Bond) and 50/30/20 (Equity/Bond/Commodity) allocations, PUTD outperforms S&P 500 over the last 18 years.

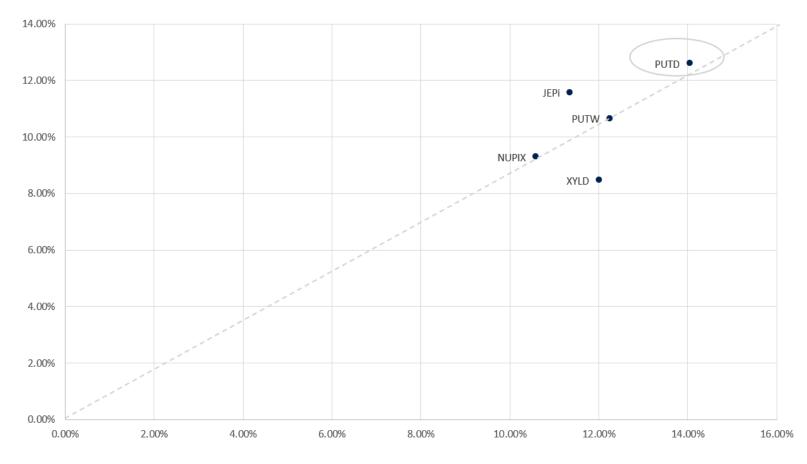
For this comparison we use TLT for Bonds and RICIGLTR for Commodities, rebalancing when allocations slide by ٠ more than 1%



PUTD vs SPX in Common Allocations (01-2006 to 10-2023)



Comparable Products (05-2020 to 10-2023)



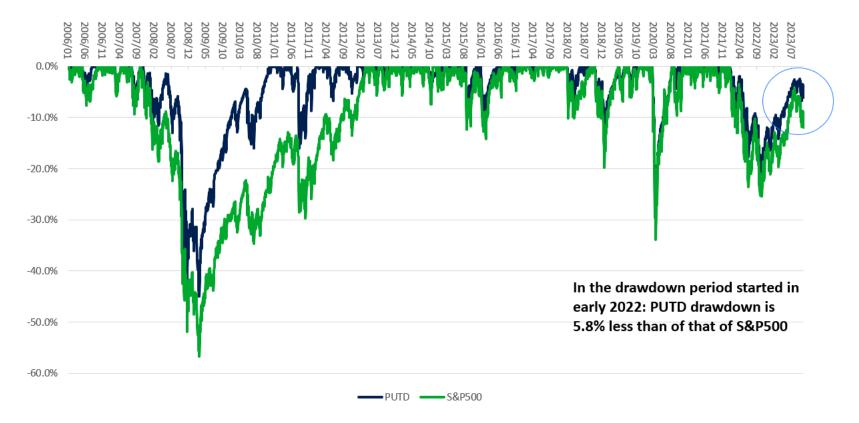
PUTW: WisdomTree PutWrite Strategy Fund; XYLD: Global X S&P 500 Covered Call ETF; JEPi: JPMorgan Equity Premium Income ETF; NUPIX: Neuberger Berman U.S. Equity Index PutWrite Strategy Fund



Drawdown Characteristics

PUTD outperforms S&P500 on key drawdown metrics as well.

- A smaller maximum drawdown of -45% compared to -57%.
- **43%** shorter time underwater of 776 days compared to 1375 days.





After a strong bullish market over the past several years, it may be more important now than ever to consider the impact that a range-bound or down market could have on one's overall portfolio. The Dynamic PutWrite Strategy allows investors to maintain a long market exposure, while potentially decreasing volatility and drawdown as compared to investing in the underlying index and may provide greater protection through downturns.

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	
SPX	11.80%	3.50%	-38.50%	23.50%	12.80%	0.00%	13.40%	29.60 %	11.40%	
PUTD	13.00%	5.70 %	-28.40%	30.10%	13.70%	6.40 %	13.50%	21.20%	8.60%	
PUT	13.80%	9.50%	-26.80%	31.50%	9.00%	6.20%	8.10%	12.30%	6.40 %	
Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	ALL
SPX	-0.70%	9.50%	19.40 %	- 6.20 %	28.90 %	16.30 %	26.90 %	-19.40%	10.00%	233.00%
PUTD	8.80 %	8.90 %	13.40%	- 5.80 %	20.90%	15.10%	23.50%	-15.00%	10.80%	312.00%
PUT	6.40 %	7.80 %	10.80%	-5.90%	13.50%	2.10%	21.80 %	-7.70 %	9.10%	205.00%

Source: Bloomberg and Validus Macro Strategies.

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TOPICS

- Introducing the Cboe Validus® S&P 500® Dynamic PutWrite Index (PUTD) and the Cboe Validus S&P 500 Dynamic Call BuyWrite Index (CALD)
- Rules-based Dynamic Strategies with Outperformance in Past Bearish to Slightly Bullish Markets
- Regular Income Generation with Option-Writing to Help Smooth Out Portfolio Returns

SPEAKERS

• Kambiz Kazemi and Berlinda Liu

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