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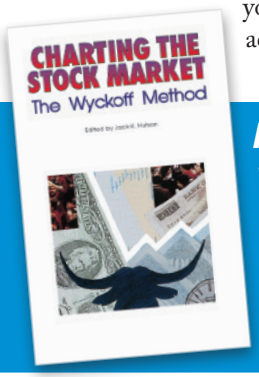

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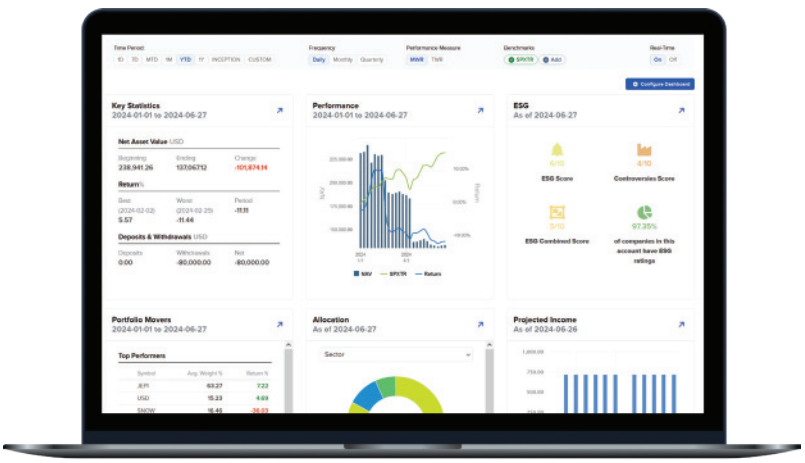

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Carley Garner

INSIDE THE FUTURES WORLD

Want to find out how the futures markets really work? Carley Garner is the senior strategist for DeCarley Trading, a division of Zaner, where she also works as a broker. She has written five books on futures and options trading, with the latest being Trading Commodity Options...With Creativity *(July 2020), as well as* A Trader's First Book On Commodities *(third edition, October 2017) and* Higher Probability Commodity Trading *(July 2016). Garner also authors widely distributed e-newsletters; for a free subscription, visit www.DeCarleyTrading.com. To submit a question, email her at info@carleygarnertrading.com or via www.DeCarleyTrading.com. Selected questions will appear in a future issue of S&C.*

SHOULD INVESTORS FOLLOW CENTRAL BANKS AND FOREIGN GOVERNMENTS INTO GOLD?

I'll start by stating the obvious: I was wrong about the magnitude and volatility of the gold rally. Anyone following me on social media or Substack has likely had a chuckle at my expense. 2025 has been a humbling year. Nevertheless, in the short run, the market is always right, but in the long run, the market and the participants driving price action are often wrong. In real time, it isn't easy to accept this reality, but we see it habitually in the markets.

For instance, in March of 2022, the world was convinced that the Russian invasion of Ukraine would lead to mass shortages of wheat. Wheat futures roughly doubled in price via several violent limit-up trading sessions as investors and traders attempted to get into the action. Just five months later, the market had given back the entire rally, and two years later, it was trading 30% lower than it had been before the war broke out. Although it wasn't obvious at the time, the market had it wrong. Similarly, crude oil peaked in 2022 in a period of bullish euphoria, only to decline by roughly 70% over the next three years. Yet, at the time, conventional wisdom suggested the oil rally was sustainable and even in its infancy.

Although it wasn't obvious at the time, the market had it wrong.

In 2020, the world was reeling with a global pandemic. Investors of all types, and even central bankers, foreign entities, and China, were gobbling up U.S. treasuries as quickly as they could. At their peak, the 30-year bond was paying less than 1% of interest per year in the form of coupon payments. Even worse, anyone buying these securities faced historically large interest rate risk. This is because when interest rates rise, bond prices fall. Anyone buying treasuries with almost no yield is betting that the world is so dire that they believe there

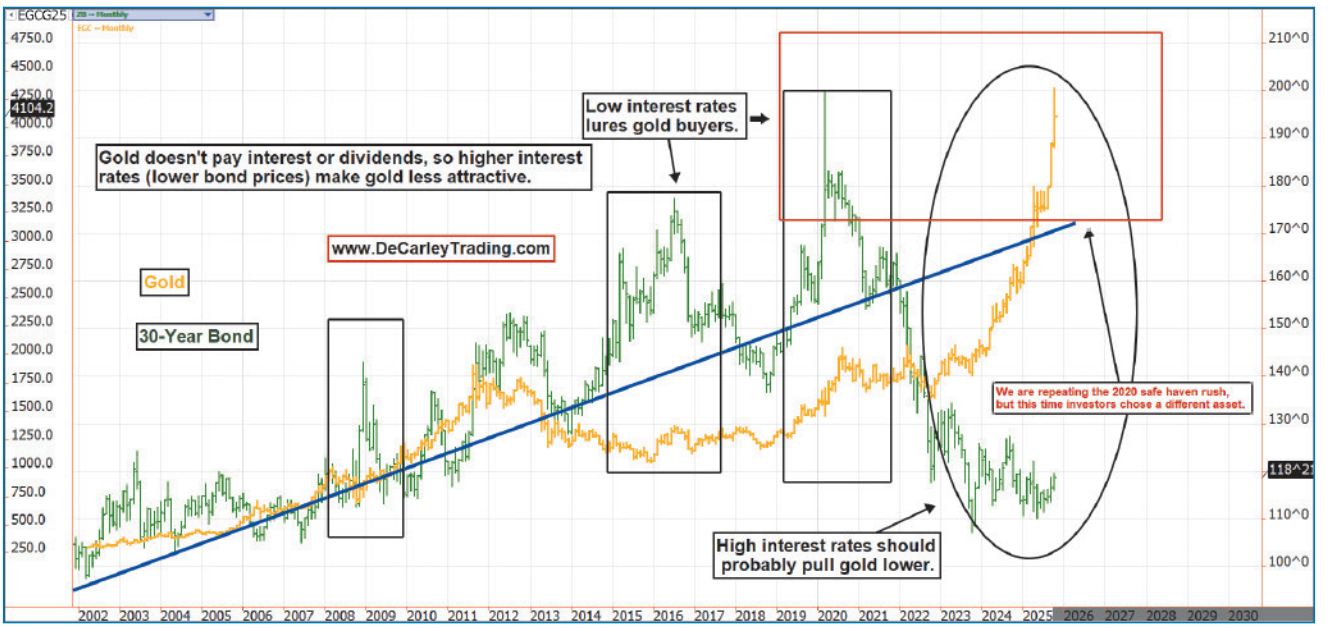

FIGURE 1: GOLD VS. US TREASURY BOND FUTURES, MONTHLY. The gold market has lately seen a parabolic move up. How long will this gold rush last?

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is more value in the return *of* money than in the return *on* money. While it is unlikely the U.S. government will default, holding onto a less than 1% yielding asset for 30 years just to get your money back, plus a small bump, isn't a fantastic mathematical life choice. Yet, everyone was doing it, and nobody questioned it.

If this sounds familiar, it should. In 2025, we are witnessing a similar rush to perceived safety assets as we did in 2020. However, instead of central banks and China buying treasuries, they have decided to buy gold. Coincidentally, gold, like treasuries, was in 2020 a non-yielding asset that delivers pure price risk. As the market is going parabolic due to panicked and speculative buying, those buyers are taking on excessive risk without considering the potential hangover that might come later.

During the treasury heyday of 2020, the gold market was relatively sluggish. It wasn't the haven of choice and wouldn't become so for years later. However, we must wonder if the market is getting it wrong this time, as it did in 2020. Unlike in 2020, the 30-year bond is paying investors a little over 4% annually, compared to a return of zero for gold. I realize 4% sounds like a waste of time in a world where assets are appreciating by 25% to 50% regularly, but eventually, those unknowingly holding excessive risk exposure will become aware of this. At that time, they might, once again, seek the return *of* capital rather than return *on* capital.

In conclusion, history suggests that the most popular investment today might not be the best-performing one in hindsight. Further, even our fearless leaders at the Federal Reserve, in the European Central Bank, or the People's Bank of China might not be any more intelligent than the rest of us. Sometimes jumping on the bandwagon and swinging for the fence pays off, but if you are still in the market when the music stops, it can be a whirlwind of pain. Going into late 2025, I think it is best to ask, "How much can I lose?" rather than "How much can I make?"

History suggests that the most popular investment today might not be the best-performing one in hindsight.

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Trading Momentum Breakouts

Capture Direction And Momentum

Create a momentum strategy using three core components. Here's how.

Trading success often hinges on early detection of price direction and timely confirmation of momentum breakouts. This article will explore an approach designed to identify directional bias and momentum buildup by integrating three core components: a fast-reacting moving average, a price channel, and a modified stochastic oscillator. Together, these tools offer a visual framework for interpreting price flow as well as momentum strength.

STRATEGY COMPONENTS

The basic setup involves three steps.

1. **Moving average channel**
   The first step is to create a simple moving average (SMA) channel of price highs and lows by using a 13-period SMA of the price high and a 13-period SMA of the price low. The SMA channel adds clarity to price structure by forming a boundary around the price range and assists traders in visualizing trending behavior and volatility.
2. **Price EMA**
   The next step is to overlay the SMA channel with a 5-period exponentially smoothed moving average (5 EMA) of the price close. The addition of the 5-period EMA offers a short-term view into directional acceleration and deceleration. A 5 EMA that travels outside the moving average channel indicates directional strength either to the upside or downside. And, because it reacts quickly to recent price moves, it can signal trend and momentum shifts before they are seen on the SMA channel.

   As seen in Figure 1, this method smooths directional price action while keeping traders attuned to shifts in momentum. The 5-period EMA responds swiftly to price changes, tracing the short-term trends. Meanwhile, the 13-period SMA channel—built from the average of high and low prices—acts as a directional guide and also forms a dynamic range that signals when price is accelerating or consolidating.
3. **Modified stochastic**
   The final step calls for modifying a slow stochastic oscillator in several ways: by changing the lookback parameters, the display, and the threshold levels.

Parameters. The slow stochastic lookback parameters are changed from 14,3 to 14,2, which makes it slightly more reactive to price. (Note: Some charting platforms show the stochastic settings as a 14,3,3. In that case, change the settings to 14,2,1).

Display. On the chart, the oscillator displays only the %K line and eliminates the %D line to avoid relying on crossovers and instead aligns momentum with structural setups such as the 5 EMA crossing the SMA channel. In this approach, showing only %K improves trade entries and points to inflection signals faster.

Threshold levels. Change the thresholds from 20/80 to the 40/60 levels. By shifting the levels, traders can respond earlier to the emergence or fading of momentum rather than to its high or low extremes. Think of it as catching the wave as it is moving rather than trying to time the exact top or bottom.

by Barbara Star, PhD

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The focus is less about reversals and more about continuations.

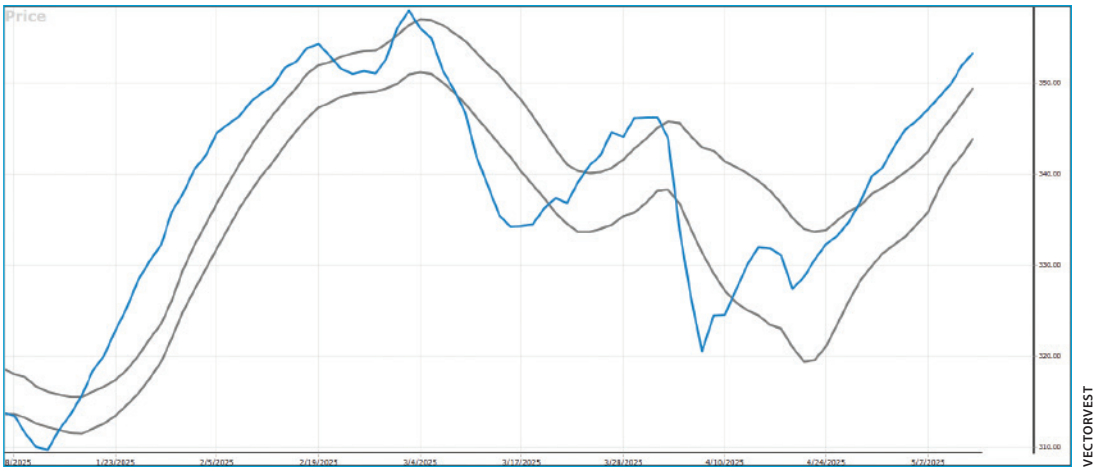

FIGURE 1: DIRECTIONAL COMPONENTS. Price bars are removed from the chart of Visa to illustrate the directional flow and interaction of a shorter moving average as it moves above and below a moving average channel.

The shift to a 40/60 zone enables the oscillator to filter for early trend strength and signal when trend momentum has strengthened. This approach treats a cross above 60 as a bullish signal of momentum buildup, while a move below 40 flags bearish momentum strength. Of even further value, the zone between 40 and 60 often identifies areas of price and momentum consolidations.

The modified stochastic oscillator along with the 5 EMA and SMA channel presented in the daily chart of pharmaceutical products distributor Cencora in Figure 2 illustrates the desired alignment between the indicators. The stochastic oscillator above its 60 level aligns closely with the 5 EMA move above the upper SMA channel line. Oscillator breaks below the stochastic 40 level approximately match the 5 EMA falling below the lower SMA channel line.

NO EASY JOURNEY

As mentioned, the 5 EMA responds swiftly to price changes and helps reveal short-term trends. Meanwhile, the 13 SMA channel acts as a directional guide.

However, crossing the channel is more difficult than it looks. The channel is dynamic, fluctuating in width as the distance between price highs and lows change. The 5 EMA needs to respond to those volatility changes.

In addition, the upper and lower lines of the SMA channel represent both support and resistance. Crossing the channel to the upside requires the 5-period EMA to break resistance twice: once to cross the lower SMA channel line, and then again to cross above the upper SMA line. Once the channel is crossed to the upside, it then becomes support for surging prices.

In a downturn, the 5 EMA needs to break support by crossing below the upper SMA channel line and again below the lower SMA channel line. The market's momentum builds when price falls beyond these boundaries. At that point, the upper and lower channel lines, which had provided support, have given way to increasing selling pressure and act as resistance to buyers.

PULLING IT ALL TOGETHER

To be clear, this is not a trading system. Its focus on indicators is a way to approach or view price action, which some might even call a form of momentum confirmation that could be used with other indicators or systems. With that in mind, this trading strategy does offer entry and exit opportunities.



FIGURE 2: INDICATOR ALIGNMENT. The daily chart of Cencora (COR) shows agreement among the three indicators: the 5 EMA, the SMA channel, and the modified stochastic oscillator.

Momentum alert. The 5 EMA serves as a smoothed surrogate for price. When the 5 EMA rises to meet the lower SMA channel line, the stochastic 40 level becomes the starting point for a potential upside shift and a sign that momentum has begun to firm. This is the alert for traders to take notice, but not a signal to enter a trade.



FIGURE 3: SPY ENTRIES AND EXITS. The colored areas identify periods when direction and strong momentum corresponded to varying market conditions in the February–June 2025 period of the ETF SPY.

Entries. In this approach, trades would not be entered until there is proof of momentum buildup. The 60 level on the oscillator marks the line where momentum strength has become decisive. Breaks above it should correspond to a 5 EMA move above the upper SMA channel line within a bar or two. In a decline, oscillator breaks below the stochastic 40 level along with a 5 EMA below the SMA channel provide evidence of strong momentum to the downside.

The no-trade zone. When the 5 EMA becomes stuck in the SMA channel, it produces those frustrating sideways moves where price bounces, without conviction, within a range, sometimes poking above and below the SMA channel. Very often, the stochastic oscillator also identifies those congestion zones by remaining within its 40 and 60 range, which indicates a momentum slowdown and indecision. During those times, it is best to avoid the impulse to enter trades, and instead, wait for directional clarity.

Exits. Exiting a trade is just as strategic as entering one. The modified stochastic and 5 EMA also simplify identifying trade exits. A stochastic close below its 60 level that corresponds to a 5 EMA close below the upper SMA channel line signals an exit from a bullish trade. When in a bearish trade, a stochastic cross from below to above its 40 level equates to an exit from a downtrending 5 EMA as it closes above the lower SMA channel line.

This exit works well with false breakouts or when a short-term move reverses and momentum quickly fizzles. But it is not ideal when strong momentum carries price away from the SMA channel. The space created between price and an SMA channel must be filled before the exit criteria are met. That means giving back a portion of a profitable trade. In that case, an early exit via the use of a trailing stop may protect profits. Other traders may look for warning signs such as a price break of the 5 EMA, a flattening or curling of the 5 EMA, or a shift of the stochastic in the opposite direction that provides an alert to tighten stops, take partial profits, or exit completely.

A TRADING EXAMPLE

The February to June 2025 daily chart of the ETF SPY in Figure 3 reflects the period when tariff talks led the major markets into the April 2025 lows where, after a few weeks of volatility, buyers jumped in and ran the market up to new highs a few months later.

The chart in Figure 3 has been colored to show those periods when all the indicators were aligned during the downtrending period (red), the congestion or transitional periods in the no trade zone (yellow), and the uptrending period (green).

An arrow points to a countertrend rally leading to a false breakout in March, which met a quick decline and departure using the suggested exit method of a 5 EMA closing below the upper SMA channel line and the stochastic below its 60 level.

An arrow in late May, however, identifies a retracement that caused the 5 EMA to fall below the lower SMA channel line while the modified stochastic oscillator remained above 60 which suggested the potential of a continuation price move to the upside.

This method smooths directional price action while keeping traders attuned to shifts in momentum.





FIGURE 4: TESLA IN SYNC AND OUT OF SYNC. Directional movement and momentum were out of sync during retracements. Strong momentum strength identified the probability of trend continuation in both up and down trends in the "no trade zone." (The channel is a "no trade zone.")

On the other hand, using an early exit technique would have helped traders holding short positions protect the erosion of some profits in early April when the shock of the tariff sizes led prices to plummet and the distance between the 5 EMA and the lower SMA channel to increase.

IN SYNC AND OUT OF SYNC

Alignment becomes a powerful validation signal when the stochastic oscillator, 5 EMA, and the 13 SMA channel move in sync, but there are times when the indicators become out of sync because of the mathematical differences in their makeup. Momentum indicators reflect the rate of price change and are often seen as leading indicators, while moving averages smooth price and are considered lagging indicators.

One common out-of-sync pattern is seen during price retracements. A sign of strong momentum and potential continuation of the trend often occurs when, in an uptrend, the 5 EMA falls to or below the upper SMA channel line during a pullback but the stochastic oscillator remains above its 60 level. Or, if in a downtrend, price pushes the 5 EMA up into the SMA channel as long as the stochastic remains below its 40 level.

Examples of this pattern are evident in Figure 4 on the chart of Tesla during its rise and fall from mid-October 2024 to late March 2025. Well-known for its volatility, TSLA often makes it difficult to stay with a trend because of its roller-coaster price movement. However, checking the position of the stochastic oscillator when the 5 EMA retraces to the SMA channel could prepare the trader for a continuation, a new entry, a reentry, or even as an alert to stand aside and wait for confirmation before entering a trade.

For instance, TSLA showed momentum strength when the stochastic remained above 60 in late November and early December 2024 while the 5 EMA pulled back into the SMA channel. Strength to the downside was seen during price retracements in 2025. Traders may not have avoided entering the countertrend rally that created a short-lived false breakout on the indicators in mid-January 2025 but they certainly could have avoided any temptation to enter 5 EMA retracements while the stochastic lingered below 40 throughout the remainder of January and February even if they were unaware of the reason for the decline.

With any mismatch between the indicators, it is best to wait for confirmation—such as a continuation of the prevailing trend or a 5 EMA break of the SMA channel boundaries—before entering.

SUMMARY

The three indicators used in this article work in concert to help traders discern the market's rhythm—identifying when price action, momentum, and structural boundaries are telling the same story. It offers an approach to trading that helps gauge direction and momentum reliability before committing capital.

Barbara Star, PhD, is a contributing writer to Technical Analysis of STOCKS & COMMODITIES. She trades part-time and provides individual instruction and consultation to those interested in the technical analysis of the financial markets. She can be reached at 818 224-4070 or star4070@aol.com.

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An Enhanced And Updated Hedging Approach

Trading The NDX Using A Hedged, Variable-Leverage Mean-Reversion Strategy

In an earlier article, a hedging strategy was introduced that was created to serve as an alternative to the classic 60/40 equity/bond allocation. Here, an enhanced version of that hedging strategy is presented that trades leveraged and unleveraged ETFs focused on the NASDAQ-100 index.

by Ken Huck & Nelson Huck

In our article in the December 2020 issue, we outlined a hedging strategy for the S&P 500 index using ETFs with low or negative correlation to the index—specifically, long/short bond and long/short euro funds. The goal was to offer an alternative to the traditional 60/40 equity/bond allocation, particularly in a rising interest rate environment. In this article, we provide recent performance of the original approach and introduce an enhanced version of the strategy. This improved strategy retains the core hedging component but replaces the S&P 500 index fund's buy-and-hold allocation with a variable-leverage mean-reversion strategy that trades leveraged and non-leveraged NASDAQ-100 ETFs, resulting in significantly better performance. Both the original and improved strategies use end-of-day data with trades taking place at the close of the following day.

Introduction

The 60/40 equity/bond portfolio strategy—60% equity and 40% bond positions—is a classic investing approach used to mitigate drawdowns and volatility. For decades, this portfolio strategy provided strong risk-adjusted returns; however, we were concerned that the resurgence of a high-inflation environment, as was experienced in the early 1980s, would pose challenges to both bonds and stocks. Indeed, in 2022, the classic 60/40 strategy

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suffered historic losses as rates rose. The strategy presented in the December 2020 issue employed a hedge by relative strength rotation among ETFs with low or negative correlation to the S&P 500 index. Specifically, the ETFs used were long/short treasuries (EDV/TBF) and 2× beta long/short euro currency ETFs (ULE/EUO). The overall strategy assumed 50% of the portfolio was placed in a buy-and-hold total return S&P 500 index fund, and the other 50% used the hedge rotation strategy. The parameters for the hedging portion of the strategy remain unchanged, and for convenience, the hedge strategy rules and parameters are provided at the end of this article.



FIGURE 1: ORIGINAL S&P 500 HEDGED STRATEGY OUT-OF-SAMPLE PERFORMANCE. Since 1/2/2018 until 8/13/2025, the original strategy (red) performed well compared to the S&P 500 index (green) and a 60/40 fund (yellow).

The SPX hedging strategy presented in the 2020 article has performed very well since development, and we were encouraged to improve it with the following modifications:

- Replace the S&P 500 index fund with NASDAQ-100 index (NDX) ETFs, as the NDX has historically outperformed the S&P 500.
- Instead of a simple buy-and-hold approach with NDX ETFs, we incorporated a long-only mean-reversion strategy utilizing variable leverage. The mean-reversion strategy trades leveraged and unleveraged NDX ETFs. Rather than going long/short as do most mean-reverting strategies, this method is a long-only strategy to avoid one of the common problems with many mean-reversion strategies: underperformance in strong markets that don't mean-revert.
- Use a long-term exponential moving average (EMA) to avoid the worst drawdowns in the NDX. We considered using the NDX in the original hedging strategy, but during the 2000 tech meltdown, the drawdowns were too severe to be offset by the hedge. Incorporating the EMA largely solves that problem.
- When not in the NDX portion of the strategy, the percentage formally allocated to the NDX ETFs is moved into money market, while the hedge continues to rotate among the bond and currency funds. We also evaluated allocating 100% to the hedge during equity declines—more about this later.
- The original strategy used a somewhat arbitrary 50/50 split between the buy-and-hold S&P 500 index fund and the hedge. The new strategy allows this split to be a variable that can be adjusted, based on investor risk tolerance.

	Annual, %	Daily MDD, %	UPI
Original strategy	13.6	–13.5	3.5
VFINX	12.7	–33.8	1.39
VBINX	7.8	–22.8	0.87

FIGURE 2: STATISTICS ON ORIGINAL STRATEGY. Returns for the original hedged strategy are similar to the returns of the S&P 500 index but with significantly lower risk.

Think of the overall strategy as being made up of two components:

- Part A trades the original hedge, which rotates among ULE, EUO, EDV, TBF, and a money market.
- Part B trades leveraged and unleveraged NDX ETFs (QLD/QQQ) and a money market.

The percentage allocation between part A and part B is fixed for a chosen tolerance for risk. This will become clear later in the article.

RECENT PERFORMANCE OF THE ORIGINAL S&P 500 HEDGED STRATEGY

Figures 1 and 2 show out-of-sample performance since 1/2/2018 comparing the original SPX hedging strategy (red) against the S&P 500 with dividends (VFINX) and

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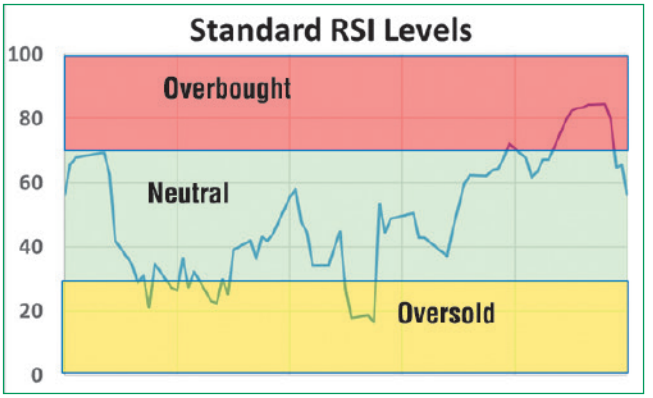

FIGURE 3: RSI LEVELS DETERMINE THE VALUATION OF THE MARKET. Standard RSI parameter values were allowed to vary in the mean-reversion strategy as a function of risk (MDD).

a popular 60/40 balanced fund (VBINX). The hedged strategy clearly outperformed by all measures, although it did experience challenges in early 2025 due to uncertainty surrounding tariffs and the inflation/interest rate outlook. The hedge's effectiveness motivated us to explore the use of the NDX and incorporate leverage.

Mean-Reversion Trading Using Variable Leverage

As noted, the buy-and-hold portion of the original strategy was replaced with a mean-reversion strategy that trades both the unleveraged NDX QQQ and the 2× beta QLD ETFs. We could use one of the 3× beta ETFs, but many will be uncomfortable with that level of leverage so we limited the analysis to a maximum of 2× beta of leverage. Investors FastTrack (www.investorsfasttrack.com) end-of-day data was used throughout the study. FastTrack data begins as early as 1988 and has been fully adjusted for dividends and splits.

In the original hedging article, we noted that the two euro ETFs are thinly traded. We actually prefer the Guggenheim/Rydex open-end long/short 2× beta dollar index (DXY) funds. Rydex also offers leveraged and unleveraged NDX open-end funds and long/short bond funds. For this analysis, however, we used only ETFs because many traders prefer their liquidity and transparency. Additionally, the NDX ETFs tend to outperform open-end NDX funds by 1–2%/year.



This improved strategy retains the core hedging component.

Long/short DXY ETFs with better liquidity than ULE and EUO do exist, but they are not leveraged (hint to fund companies: consider creating leveraged DXY ETFs). Note that the euro has approximately a 60% weighting in the DXY, so they are highly correlated.

The market is in an uptrend roughly 60–70% of the time. However, leveraged NDX ETFs can be highly volatile—even in strong trends. Within these trends, there are often periods when the market becomes overbought or oversold. Mean-reversion strategies attempt to capitalize on these situations, assuming that extreme price moves will revert to more typical levels.

Traditional mean-reversion strategies go long in oversold markets and go short in overbought, overvalued markets. However, there are two major shortcomings of mean-reversion strategies: One is that the market can often stay overvalued for extended periods, and going short at these times can be very untimely. And oversold markets can become even more oversold ("trying to catch a falling knife"). Our approach is different: Instead of simply going long when oversold, we adjust leverage at these opportune times. Going into the analysis, the working theory was that the strategy would increase leverage when the market became oversold and decrease the leverage as the market becomes fairly valued, and at extremely high valuations, decrease leverage further or go into the money market. The working theory proved to be only partially true. More about this later.

A common tool for evaluating overbought/oversold conditions is the relative strength index (RSI). RSI traditionally uses three regions: oversold, nominal, and overbought. The standard parameter is 14 days for the RSI period. A RSI of 30 or lower is considered oversold, while 70 and above is considered overbought. We allowed all these parameters to vary during optimization.

Figure 3 graphically shows the three standard RSI bands or regions.

When the RSI indicates the index is oversold, this is where the strategy was expected to apply leverage. As the RSI moves into the nominal region, leverage may be held steady, increased, or reduced. As RSI moves into the overbought region, then leverage is reduced or possibly the fund is sold and the strategy goes into the money market.

Using an EMA to Identify the Long-Term Trend

As previously noted, a major risk associated with a mean-reversion trading strategy is a failure for the market to revert during a major selloff. A long-term EMA helps avoid the worst market declines and avoids reentering

on bear market rallies. The number of days in the EMA was a variable in the optimization.

Obtaining Variable Leverage with Fixed-Leverage ETFs

The mean-reversion strategy uses variable leverage at values other than integers. Equation 1 is used to calculate daily changes in net asset value (NAV) using variable leverage while using funds with fixed integer values of leverage.

As an example, let's say we desire an overall beta of 1.5 using the 2× beta QLD ETF. Because we are using a 2× beta fund, but only desire an overall beta of 1.5, 75% of funds are put in QLD and the remaining 25% is put into the money market fund—see equation 2.

Equation 1:

$$NAV_{day} = NAV_{day-1} \times (1+des_\beta/ETF_\beta * (ETF_NAV_{day}/ETF_NAV_{day-1} - 1) - 1) + (ETF_\beta - des_\beta)/ETF_\beta * (MKT_{day}/MKT_{day-1}) - 1))$$

where:

NAV_{day} = Today's strategy net asset value (NAV)
des_ β = desired beta
ETF_ β = ETF beta
ETF_NAV_{day} = ETF NAV for current day
MKT_{day} = Money market NAV for current day

Equation 2: Example using equation 1 to calculate a new NAV for desired beta of 1.5 using the 2× beta QLD ETF

$$NAV_{day} = NAV_{day-1} \times (1+1.5/2 * (QLD_{day}/QLD_{day-1} - 1) - 1) + (2-1.5)/2 * (MKT_{day}/MKT_{day-1}) - 1))$$

where:

NAV_{day} = Today's strategy net asset value (NAV)
QLD_{day} = NAV for 2× beta QLD
MKT_{day} = Money market NAV

Each day, the mean-reversion strategy works through the following steps:

1. Determine if the NDX index is above or below the long-term EMA. If below, allocate the NDX portion to the money market and continue to trade the hedge. Note: An obvious question is why not allocate the NDX portion 100% into the hedge strategy. We evaluated this option; see results later in this article.
2. Calculate the RSI based on the unleveraged NDX index.
3. Based on the RSI, determine the band—low, middle, or high (see Figure 3) and the associated beta, which is a variable.
4. Determine which fund to use to meet the required beta, i.e., if leverage less than 1×, then use the QQQ ETF; if greater than 1×, use QLD.
5. Calculate the daily change in the strategy NAV based on equation 1.

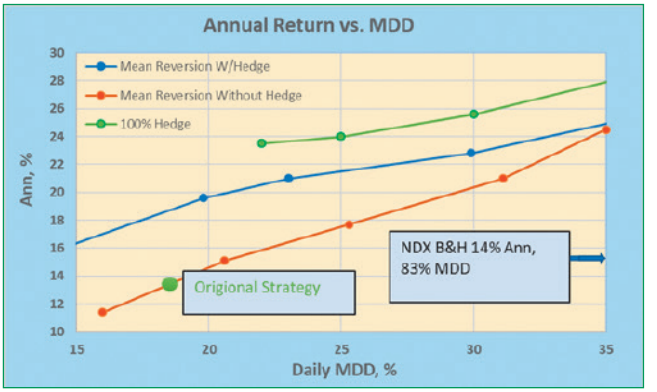

FIGURE 4: STRATEGY RETURNS VS. DAILY MAXIMUM DRAWDOWN (MDD). Buy-and-hold of the Nasdaq-100 index (NDX) returned 14% with an 83% MDD while the S&P 500 index returned 10.6% with a −55% MDD over the same period. Moving 100% into the hedge during market declines has the best returns, but it can't reduce the MDD below 22%.

Extending the Test Period with Synthetic Data

All the ETFs used do not have as much historical data as desired for optimization and testing, so synthetic data back to 1988 was created to allow the strategies to be optimized and tested on more than 35 years of market history. The process for creating synthetic data is explained in our article in the December 2020 issue.

Parameter Optimization

There are eight parameters to optimize: the period for the EMA to establish the long-term NDX trend; days to use in the RSI calculation; two RSI levels to establish valuation levels; the leverage to use for each of the three RSI bands; and the percentage split between the mean-reversion strategy and the hedging strategy.

As with the original hedging strategy, a genetic algorithm (GA) was used for optimization. The primary objective was to maximize annual return, with a specified daily maximum drawdown (MDD) as a secondary constraint. MDD goals of 15, 20, 25, 30 and 35% were used in a parametric analysis to help identify the risk

MDD, %	Ann, %	EMA, Days	RSI Period	Bottom RSI	Top RSI	Bottom Beta	Mid Beta	Top Beta	% Hedge
35.2	25.0	253	3	31	46	2.0	1.0	1.8	33.5
29.9	22.8	246	23	51	72	0.9	2.0	0.1	31.5
23.0	21.0	233	18	50	76	1.0	2.0	0.1	47.5
19.8	19.6	233	29	54	73	0.9	2.0	0.8	55.9
14.8	16.2	259	24	40	69	1.9	0.8	0.1	43.7

FIGURE 5: PARAMETERS FOUND DURING OPTIMIZATION. There were some surprises at some risk levels.

MDD, % Daily	MDD, % Monthly	Bot, %	Mid, %	Top, %	Trades Per Year
35.2	29.9	14.6	11.3	53.5	70
29.9	22.4	19.9	57.4	1.7	39
23.0	19.3	18.4	59.1	1.1	74
19.8	15.5	19.5	48.6	0.5	31
14.8	12.6	1.1	74.7	3.7	17

FIGURE 6: TIME, BY %, IN EACH RSI BAND AS A FUNCTION OF MDD RISK. Trades per year is the average number of adjustments per year to leverage.

vs. reward levels. Monthly MDD was also calculated for information purposes. Results are shown in Figure 4.

As noted above, we looked at allocating 100% of the portfolio into the hedge when the NDX traded below the long-term EMA. This is an obvious choice because very often, the hedge performs very well in a market decline; for example, there is often a flight to safety in treasuries during market declines. We found that although the returns were significantly improved for the high-risk (high MDD) cases, it became impossible to control the MDD to less than 22% because of the drawdown in the hedge during one of the periods when the NDX was in a major decline. A potential solution would be to limit the amount in the hedge to something less than 100%. Going forward, we will only consider the case where the NDX mean-reversion portion goes into the money market.

Anticipated question: What are the expected returns vs. MDD using the mean-reversion strategy for the NDX without the hedge? Results without the hedge along with performance of the original S&P hedging strategy are shown in Figure 4.



There are two major shortcomings of mean-reversion strategies.

We found a roughly linear relationship between return and drawdown: ~0.5% annual return gained for every 1% MDD increase. As expected, as the MDD is restricted, the annual return declines. Over the same time period of the optimization, the NDX returned approximately 14% with an 83% MDD and the S&P (total return) returned 10.6% with a –55.3% MDD. The original hedged S&P strategy returned a respectable 12.6% with an 17.9% MDD.

Figure 5 contains the optimized parameters found as a function of daily MDD goals, and this is where there are some surprises. The first column in Figure 5 is the actual MDD for the strategy when given goals of 35, 30, 25, 20 and 15%.

The parameters in Figure 5 should be evaluated in conjunction with additional information in Figure 6. Because many money managers report monthly MDD values, those are included in column 2 of Figure 6. Typically, monthly values are 2–7% less than the daily values.

Figure 6 shows the percentage of days in each of the three RSI bands. For example, for the 19.8% MDD case, 29.5% of the time is spent in the lowest RSI band, 48.6% in the mid RSI band, etc. The reason the percentage doesn't add up to 100% is because approximately 25% of the time the NDX is below the EMA. The EMA is similar for all cases so the percent of time below the EMA is very similar for all cases. We also include trades/year. "Trades," in this case, generally means readjusting the leverage.

Here are some additional observations of the results in Figures 5 and 6: The RSI period is generally a good bit longer than the standard 15 days, except for the 35% MDD case, where it is exceptionally short. For all practical purposes, the 35% case is generally 2× leveraged or nearly so much of the time.

The lower RSI band is generally higher than the standard value of 30, but the upper value for the RSI is close to the standard value of 70, again, except for the 35% MDD case.

As the desired MDD decreases to 30%, the percent in the hedge actually declines slightly from 33.5 to 31.5%, but the degree of leverage at the RSI extremes declines. In all lower-risk cases, very little time is spent in the upper RSI band; this isn't surprising because with such long RSI periods, the RSI doesn't spend much time in either high or low extreme values.

As the MDD goal declines to 25% and lower, the hedge percentage stabilizes around ~45–55% and the strategies spend the majority of the time in the middle band with full leverage, except for the 15% case where the leverage was drastically reduced.

The equity curves for the various MDD cases are shown in Figure 7 in a semi-log graph compared with the NDX. The higher MDD cases outperform the NDX in nearly all time periods. For the lower MDD goal cases, the NDX outperforms in recent years, but again, with significantly higher MDD.

DESCRIPTION OF THE HEDGE STRATEGY PORTION OF THE OVERALL STRATEGY

The hedge portion of the strategy from the December 2020 article has remained unchanged and is provided here for convenience. Refer to the original article for additional details.

Purchasing a fund:

- Purchase the top-ranked ETF (EDV, TBF, EUO, ULE or money market) based on the past 13 market days
- Money market is included when ranking the ETFs
- Any fund purchased must pass the 12/129 EMA crossover stop; otherwise, it would be immediately sold the next day
- The daily standard deviation can't be more than 1.6× the standard deviation of the S&P 500—measured over the previous 53 market days
- If no fund qualifies, then the money market is purchased.

Selling rules:

- Sell if it trips a 5% trailing stop
- Sell if it violates a 12/129 short/long EMA crossover
- Sell after 55 calendar days, if it is not in the top two funds ranked over 64 market days
- Sell after 55 calendar days, if it is not the top-ranked fund over 13 market days; this rule actually hurts annual performance but improves the MDD.

Additional rules:

- Money market minimum holding period is 5 calendar days
- If a fund trips the 5% trailing stop but is still the best-ranked fund and still meets the buy filters, the fund will continue to be held.

CONCLUDING COMMENTS AND AREAS FOR IMPROVEMENT

The methodology and strategy described in this article demonstrates a robust approach to hedging and leveraging the NDX, with clear avenues for further refinement. The above data is mostly optimized data and would not be expected to perform as well in real-time, however, the more than five years of real-time performance of the original hedging strategy is encouraging. There are several areas for improvement or modifications. An argument can be made that only more recent data should be used for optimization; limiting to the post-2000 tech bubble is an obvious option. For those willing to accept greater risk, moving the entire overall portfolio to the hedge during weak equity markets can increase returns 2–3% per year. Replacing the long-term EMA that determines the trend with a more robust market timing strategy would also be an improvement. We also looked at shorting the NDX during bear market bounces during major declines and found that returns increased by a few percent per year. Finally, there are periods of time when the S&P outperforms the NDX, and it would be useful to trade S&P-focused leveraged funds during these periods.

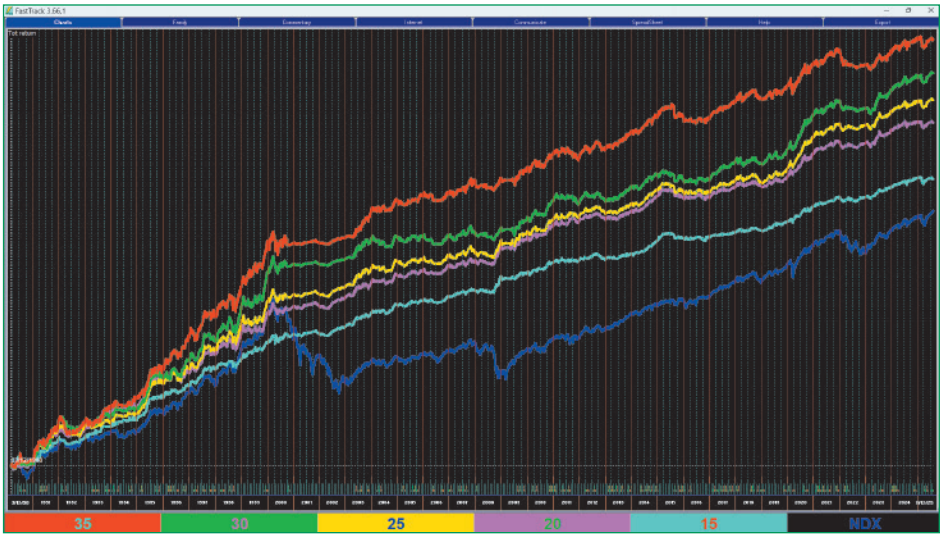

FIGURE 7: EQUITY CURVES FOR THE STRATEGY USING VARIOUS MDD GOALS, COMPARED WITH THE NDX INDEX. Although there are time periods when the NDX outperforms, it comes with occasional significant drawdowns.

Brothers Ken Huck and Nelson

Continued on page 22



Low-Latency Smoothing

The One Euro Filter

Could this smoothing filter be useful in your trading? Find out here.

by John F. Ehlers

The *one euro filter* was developed in 2012 by Georges Casiez, Nicolas Roussel, and Daniel Vogel. They gave it the name to suggest that it is cheap and efficient, like something you would buy for one euro. Contrary to its depreciating name, the one euro filter (also written as "1€ filter") displays outstanding low-latency performance while providing data smoothing.

The one euro filter is an exponential moving average (EMA) at its core, but it has a dynamically tuned EMA coefficient. As an EMA, the filter always has *unity gain*, which means it can closely follow a trend without overshoot when the market direction reverses.

Reducing Noise in Signals

A smoothing filter is a lowpass filter, passing the low-frequency components in the data spectrum below the critical frequency and rejecting high-frequency components above the critical frequency. The critical frequency is the frequency point where the amplitude response of the filter is half power (–3 dB) relative to its response at zero frequency.

Wavelength is the reciprocal of *frequency*, and it is easier for traders to think in terms of wavelengths rather than frequency. Therefore, I usually describe performance in terms of wavelength. In my July 2024 article in *Technical Analysis of* STOCKS & COMMODITIES magazine, "What Is The Real Meaning Of The EMA Alpha?" I showed that the EMA coefficient alpha is related to the critical period as:

$$\alpha = 2\pi / (4\pi + \text{Period})$$

How the One Euro Filter Works

With that background, here's how the one euro filter works: The current one-bar price difference is smoothed in the first EMA and a fraction of that value is added to the minimum critical period (an input parameter). The fraction is also an input parameter, *beta*. The summation is used as the critical period to calculate the EMA coefficient, which is then used to compute the filtered output

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for the current bar. The process is repeated for the next bar, but the EMA coefficient is likely to have a different value. Thus, the adaptive process is in kind of a loop, dynamically adapting the final EMA alpha with changes in the one-bar volatility of the data.

If you want to use the one euro filter as a sharpening filter, just assume the *PeriodMin* input is actually the maximum period length and input *beta* as a negative value.



FIGURE 1: ONE EURO FILTER. The one euro filter (1€ filter) features low-latency performance. The filter is able to immediately incorporate the current one-bar volatility in its adaptive behavior. Here, the filter is displayed on a daily chart of the emini S&P futures contract (ES).

TRADESTATION

The one euro filter is related to Tushar Chande's VIDYA (variable index dynamic average). With VIDYA, volatility is measured in one step and then that volatility is applied to modify the alpha of an EMA. The one euro filter is also related to Perry Kaufman's KAMA (Kaufman adaptive moving average). With KAMA, the EMA alpha is based on the *efficiency ratio*, that is, the ratio of trend to volatility. The two-step process of the adaptive moving averages introduces lag due to computing volatility. On the other hand, the one euro filter immediately incorporates the current one-bar volatility in its adaptive behavior.

Figure 1 shows a typical application of the one euro filter to about one year's worth of daily data for the emini S&P futures contract (ES).

EasyLanguage code to compute the one euro filter is given in the sidebar, "One Euro Filter, In EasyLangauge." I have taken liberty to simplify the filter, departing from the original coding. For example, there are only two input parameters here: the minimum length period to be used in the calculation of the EMA alpha, and the fraction (beta)

THE ONE EURO FILTER, IN EASYLANGUAGE

```
{
      One Euro Filter Indicator
      From "1€ Filter: A Simple Speed-Based Low-Pass Filter
For Noisy Input In Interactive Systems" (CHI 2012)
      By Georges Casiez, Nicolas Roussel, and Daniel Vogel
      (c) 2025  John F. Ehlers
}

Inputs:
   PeriodMin(10),    // Minimum cutoff frequency
   Beta(0.2);        // Responsiveness factor

Vars:
   Price(0),
   PeriodDX(10),
   AlphaDX(0),
   SmoothedDX(0),
   Cutoff(0),
      Alpha3(0),
   Smoothed(0);

Price = Close;

AlphaDX = 2*3.14159 / (4*3.14159 + PeriodDX);

// Initialize
If CurrentBar = 1 Then Begin
   SmoothedDX = 0;
   Smoothed = Price;
End;

//EMA the Delta Price
SmoothedDX = AlphaDX*(Price - Price[1]) + (1 -
AlphaDX)*SmoothedDX[1];

//Adjust cutoff period based on fraction of the rate of
//change
Cutoff = PeriodMin + Beta*AbsValue(SmoothedDX);

//Compute adaptive alpha
Alpha3 = 2*3.14159 / (4*3.14159 + Cutoff);

//Adaptive smoothing
Smoothed = Alpha3*Price + (1 - Alpha3)*Smoothed[1];

//Plot
Plot1(Smoothed);
```

of the smoothed one-bar volatility to also be used in that calculation. I also calculate both EMA alphas in terms of critical period rather than critical frequency.

Creating an oscillator

You can convert the one euro filter into an oscillator indicator by changing price to be the result of a highpass filter. For example, using the $Highpass function with a critical period of 54 bars, that line of code would be:

Price = $Highpass(Close, 54);

In a nutshell

The one euro filter is an adaptive moving average that adapts the filtering coefficient to the current volatility on a bar-by-bar basis. The average always has unity gain, so there is no overshoot at turning points in the market. The key feature of the one euro filter is its low latency.

John Ehlers is a retired electrical engineer and a retired technical analyst, specializing in the application of DSP (digital signal processing) to trading. His latest book is Cybernetic Trading Indicators *(2025), which presents and updates the market analysis techniques he developed over four decades of trading. For more information, see www.mesasoftware.com.*

Further reading

Casiez, Géry, Nicolas Roussel, and Daniel Vogel [2012]. "1€ Filter: A Simple Speed-Based Low-Pass Filter For Noisy Input In Interactive Systems," CHI 2012, May 5–10, 2012, Austin, TX, https://gery.casiez.net/publications/CHI2012-casiez.pdf.

Ehlers, John F. [2025]. *Cybernetic Trading Indicators*, Amazon.

_____ [2004]. *Cybernetic Analysis For Stocks And Futures*, John Wiley & Sons.

_____ [2013]. *Cycle Analytics For Traders*, John Wiley & Sons.

_____ [2021]. "A Technical Description of Market Data for Traders," *Technical Analysis of* STOCKS & COMMODITIES, Volume 39: May.

_____ [2024]. "What Is The Real Meaning Of The EMA Alpha?" *Technical Analysis of* STOCKS & COMMODITIES, Volume 42, July.

Kaufman, Perry J. [2022]. *Learn To Trade*, Amazon.

_____ [2020]. *Trading Systems and Methods*, 6th Edition, Wiley.

Chande, Tushar S. [1995]. "Identifying Powerful Breakouts Early [Using VIDYA]," *Technical Analysis of* STOCKS & COMMODITIES, Volume 13: October.

‡TradeStation

‡See Editorial Resource Index

The code given in this article is available in the ***Article Code*** *section of our website, Traders.com.*

See our ***Traders' Tips*** *section of the magazine beginning on page 48 for implementation of John Ehlers' technique to various technical analysis programs and trading platforms. Code found in the Traders' Tips section is also posted to Traders.com.*

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HUCK/NDX

Continued from page 19

Huck are the founders of Edge Ware, LLC. (www.edge-ware.com). Since 1995 they have developed a number of programs to help investors create their own trading systems. Their FastBreak Pro program, used to develop the hedge rotation strategy in this article, was one of the first commercially available programs to use a genetic algorithm for optimizing trading strategies. They can be contacted at email2ew@edge-ware.com.

Further reading

Huck, Ken [2020]. "Creating Synthetic Historical Data," *Technical Analysis of* STOCKS & COMMODITIES, Volume 38: March.

Huck, Ken, and Nelson Huck [2023]. "Trading High-Yield Bond Funds Using EMAs," *Technical Analysis of* STOCKS & COMMODITIES, Volume 41: February.

_____ [2020]. "Hedging The S&P 500 Index Using Low-Correlation ETFs," *Technical Analysis of* STOCKS & COMMODITIES, Volume 38: December.

Pardo, Robert [1992]. *Design, Testing, And Optimization Of Trading Systems*, John Wiley & Sons.

_____ [2008]. *The Evaluation And Optimization Of Trading Strategies*, 2nd ed., John Wiley & Sons.

‡Investors FastTrack (https://investorsfasttrack.com)

‡See Editorial Resource Index

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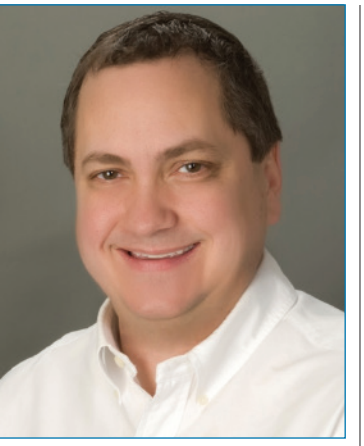
Algo Q&A



Kevin J. Davey

ALGORITHMIC TRADING

Have a question about system or algo trading? Kevin J. Davey has over 30 years of system trading experience. Davey is a full-time trader, and also teaches and consults via his Strategy Factory online workshop (https://kjtradingsystems.com), which was the winner of the 2024 Readers' Choice Award in this magazine for the category of "Trading Schools." Davey is also the author of five books on trading. Send your questions or topic suggestions to Kevin Davey at kdavey@kjtradingsystems.com. Selected questions will appear in a future issue of S&C.

BACKTESTING CORRECTLY

Last month, I showed how backtesting can greatly improve your odds of real-time success. I also said, "The trick is to perform this backtesting correctly." What did I mean by that?

Backtesting—when done correctly—can be very difficult, as it is full of traps and pitfalls. Unfortunately, some trading software is designed to make backtesting appear easy. Simply add a strategy to a chart, optimize inputs via the simple interface and bam—a great strategy appears! Or so you think…

A good backtesting process is the exact opposite of that. Sure, you can optimize, but you must be smart about it. So let's discuss some various ways to backtest.

Traditional backtest:

In this approach, you take all your historical data (for example, 2010–2025) and you optimize your desired parameters, rules, and filters over the whole period. The optimization engine in your trading software will absolutely give you the best-case set of parameters, whether it is based on highest net profit, most stable region of profit, or whatever criteria (fitness function) you have. It could be exhaustive optimization, where you test every combination of inputs, or it could be genetic optimization, which looks for best results without testing all combinations.

With this approach, the key characteristic is that you are testing over *all* the historical data. And that is the downfall of the traditional backtest. Just because a certain set of parameters has worked best historically does not mean it will be best (or even profitable) in the future.

Why not? Two primary reasons come to mind. First, the markets are continuously changing and evolving. The future might be similar to the past, but it will never exactly match the past. Second, market data is noisy, and when you optimize over noisy data, you are assuming the historical noise will be the same as the future noise. And that is not true at all, as much of the market noise is random.

Traditional backtesting rarely works well going forward.

Out-of-sample backtest:

A second approach is to run an optimized test with a portion of recent data left out. The strategy is optimized on most of the historical data and then verified by viewing the performance on the out-of-sample portion. If a strategy continues to do well on the out-of-sample data, then there is much more likelihood that it will work going forward.

Having this out-of-sample period is a great way to validate the optimization test. Unfortunately, many traders will see poor out-of-sample results, modify their strategy and then rerun the optimization and the out-of-sample. This retesting invalidates the out-of-sample performance, since the initial out-of-sample results were used to modify the strategy. That is a big pitfall traders fall into with out-of-sample testing.

When done correctly, though, this can be a useful approach. Even so, I believe there is a better way.

Walkforward backtest:

I won't get into the details of walkforward testing here, as I have written about it numerous times in previous columns. This approach takes out-of-sample testing one step further, providing much more out-of-sample data. In this way, it is a superior approach when compared to simple out-of-sample testing.

Of course, many of the same pitfalls that plague out-of-sample testing apply to walkforward testing, too. For example, running a walkforward test more than once, while making strategy logic changes in between tests, destroys the purity of the out-of-sample data.

When utilized properly, walkforward testing can provide a good indication as to future performance of the strategy.

That is a basic primer on backtesting. Avoid traditional backtesting and aim for out-of-sample or preferably walkforward testing. Then, you'll be in a much better position to create strategies that perform well in the future as well as in backtest.

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Harnessing Recurring Patterns

Energy Futures: Identifying & Capturing Intraday Price Biases

Can an intraday bias be exploited in energy futures for the development of trading strategies? Here is a demonstration of the trading logic. Find out the interesting insights that resulted.

by Andrea Unger

In a previous article (September 2024 S&C), we analyzed the concept of intraday bias in metal futures (@GC, @HG, @PI, @SI)—that is, recurring price behaviors over time, and more specifically, within the same trading session. In this article, we continue with a similar study focused on energy futures, led by the principal contract, crude oil (@CL), followed by natural gas (@NG), RBOB gasoline (@RB), and heating oil (@HO).

Intraday Bias Analysis for Energy Contracts

Specifically, we'll examine the daily price movements that characterize these four underlying assets and determine whether these patterns can be leveraged to build trading strategies. To load the historical data series that we want to study and identify recurring behaviors across various timeframes, we'll use Bias Finder, the software developed by Unger Academy. After importing data from January 1, 2010, to May 31, 2025, we'll begin our analysis by evaluating how these markets behave on a daily scale.

Let's start with the charts shown in Figure 1, which display the historical average price trends for each of the four energy futures throughout the trading session. As we observed in the metals sector, prices generally tend to decline during the overnight hours, while upward moves concentrate from midday onward. Although there are differences among the instruments, the common denominator appears to be a shift from a bearish to a bullish trend between approximately 11:00–11:30 am and 2:00–2:30 pm and this bullish trend tends to persist until the first hours after the exchange reopens (7:00–8:00 pm).

The table in Figure 2 provides a summary of the start

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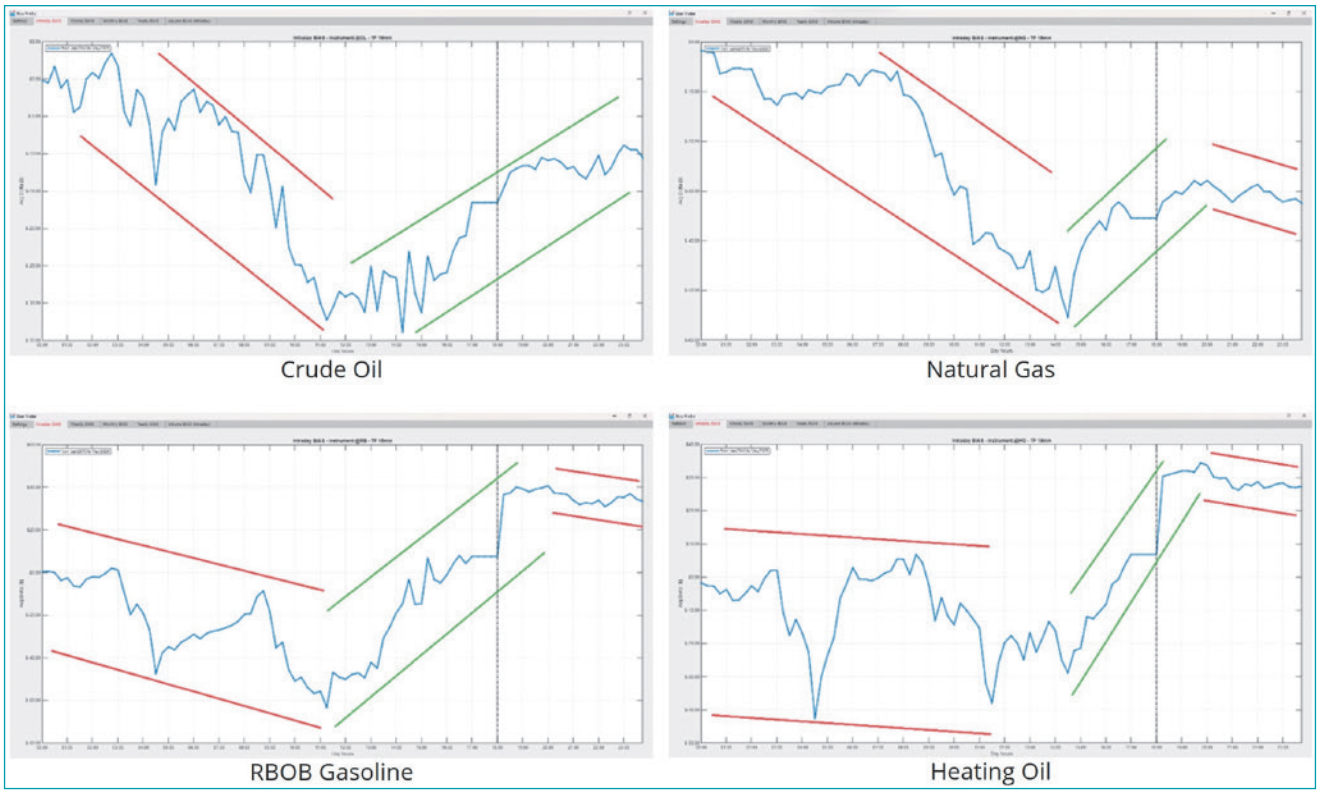


MULTICHARTS

FIGURE 1: INTRADAY BIAS ANALYSIS FOR ENERGY FUTURES. Here you see historical average price trends throughout the trading session for four energy futures markets. There tends to be a shift from a bearish to a bullish trend from the midday hours until the next market open.

and end times for each window by market, according to when the bias was observed.

Overall, these dynamics seem common across these markets, with the bearish window typically lasting longer than the bullish window—except in crude oil, where the durations are either reversed or more balanced.

Figure 3 shows the equity curves obtained by applying the indicated biases with no additional trade filters or stop-loss rules.

Figure 4 shows the performance metrics obtained for the base trading system with and without the application of a stop-loss.

KEY TAKEAWAYS FROM BASE-CASE RESULTS

Observing the example equity curves in Figure 3 and the table in Figure 4 showing the trading system with and without a stop-loss applied, we first note positive results across all time windows examined—albeit with low average trade values, a consequence of the exceptionally high number of trades, since these base strategies operate every day without any trade filters or restrictions.

Nevertheless, the equity curves are already quite compelling and visually appealing, with the possible exception of crude oil. Although its curve is upward-sloping, it appears much more erratic than the others, and its average

	INTRADAY SHORT BIAS		INTRADAY LONG BIAS	
	Start	End	Start	End
@CL	3:00 AM	11:00 AM	12:00 PM	12–12:30 AM
@NG	8:00 PM	2:30 PM	2:30 PM	8:00 PM
@RB	9:00 PM	11.00 AM	11–11:15 AM	8:00 PM
@HO	7:30 PM	11:30 AM	2:30 PM	7:30 PM

BIAS FINDER (UNGER ACADEMY)

FIGURE 2: SUMMARY OF TIME WINDOWS FOR OBSERVED INTRADAY BIAS. This table shows the start and end times for each market's apparent intraday bias.

trade is the smallest at only $23–$24. This likely reflects the inherent characteristics of the crude oil market, being the largest, most liquid, and most efficient of the four, which tend to suppress wide, sustained moves over such short timeframes, where randomness predominates.

Another interesting point is that, while the short side clearly outperforms for crude oil and natural gas, it's the long side that delivers the best results for RBOB gasoline and heating oil, in both net profit and average trade. In the case of natural gas, we know that the long-term bias is strongly bearish, driven by macro factors such as growing global supply that typically exceeds demand; so it makes sense that, even in the short term, the short side would be more effective. By contrast, the other markets lack such a pronounced underlying bias

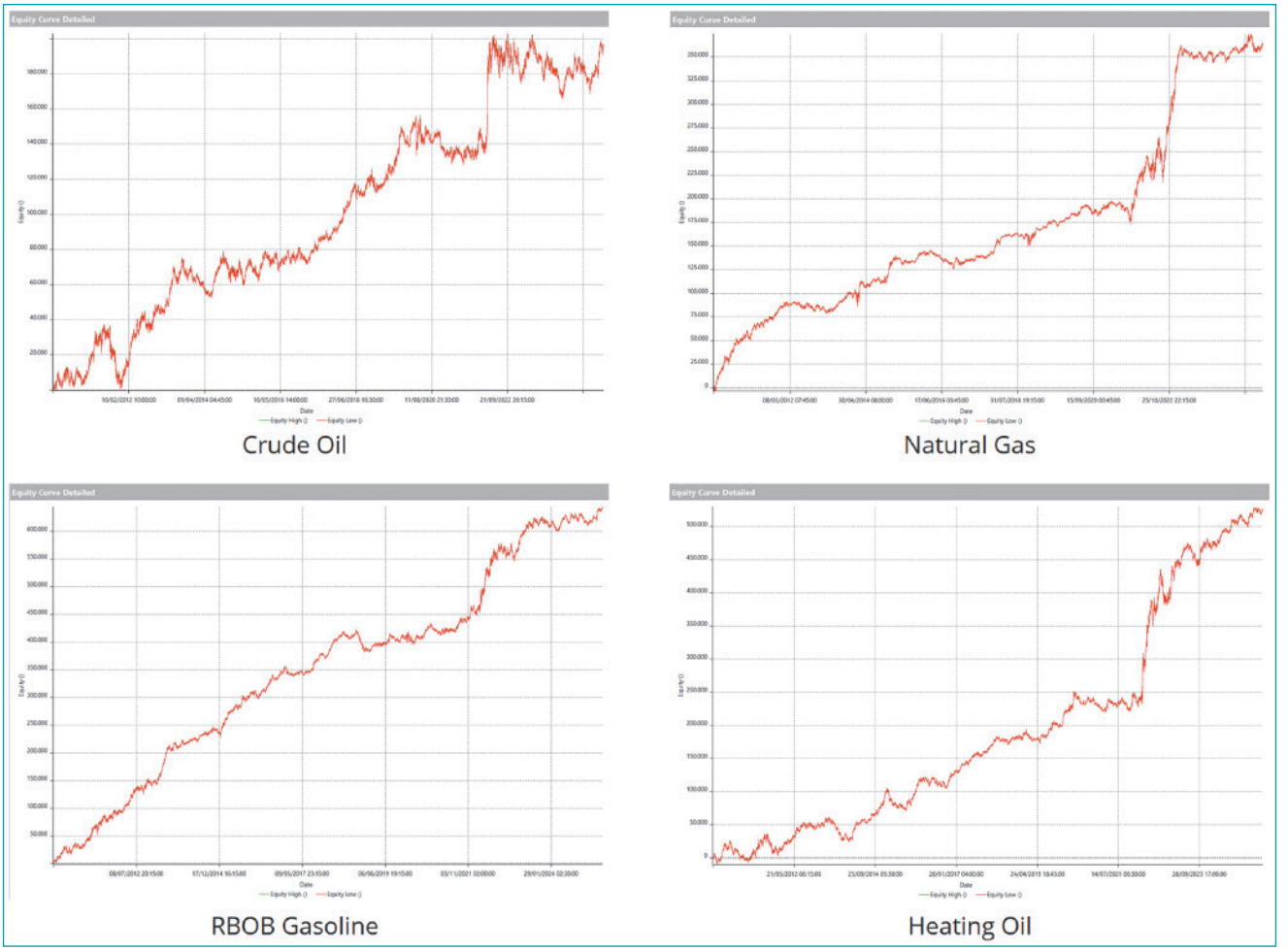


FIGURE 3: EQUITY CURVES, BASE TRADING SYSTEM. Here you see sample equity lines obtained after testing the base trading system, with entries and exits based on the observed intraday biases. Since this represents the base system, no additional trade filters or stop-loss rules are applied here.

	Net Profit	Avg. Trade	Number of Trades	Max Drawdown	Net Profit (Long)	Avg. Trade (Long)	Net Profit (Short)	Avg. Trade (Short)
Base Bias @CL	$196,150.00	$24.73	7,932	–$37,440.00	$73,790.00	$18.58	$122,360.00	$30.89
Bias with stop loss @CL	$185,680.00	$23.41	7,932	–$54,940.00	$63,380.00	$15.96	$122,300.00	$30.88
Base Bias @NG	$364,430.00	$47.84	7,618	–$48,000.00	$117,690.00	$30.90	$246,740.00	$64.78
Bias with stop loss @NG	$313,440.00	$41.12	7,618	–$57,640.00	$109,530.00	$28.73	$203,910.00	$53.51
Base Bias @RB	$643,574.40	$93.26	6,949	–$40,362.00	$401,604.00	$110.24	$241,970.40	$74.27
Bias with stop loss @RB	$543,135.60	$78.16	6,949	–$35,242.20	$346,516.80	$93.88	$196,618.80	$60.35
Base Bias @HO	$526,222.20	$85.31	6,168	–$55,036.80	$318,011.40	$103.99	$208,210.80	$66.95
Bias with stop loss @HO	$477,720.60	$75.73	6,168	–$38,539.20	$292,244.40	$91.38	$185,476.20	$59.64

FIGURE 4: PERFORMANCE METRICS FOR BASE TRADING SYSTEM, WITH AND WITHOUT A STOP-LOSS. This shows the performance metrics obtained for each of the four markets after testing the base trading system with and without a stop-loss.

to favor one direction over the other. Additionally, note that both gasoline and heating oil futures suffer from very low nighttime volume, which may partly explain their inability to produce significant downward moves during those hours.

ENHANCING PERFORMANCE WITH OPERATIONAL FILTERS

As with any intraday bias system—which by nature relies on the repeatability of certain price moves at specific times—you must start with a very high trade count. In reality, however, a live-ready, robust strategy requires operational filters to boost the average profit per trade.

We continued our study by selecting several types of filters to apply to the base system and evaluate each one's effectiveness. In this analysis, we also implemented a stop-loss of $1,500 for crude oil and natural gas, and $2,000 for RBOB gasoline and heating oil. The filters we tested are:

	Net Profit	Avg. Trade	Number of Trade	Max Drawdown	Net Profit (Long)	Avg. Trade (Long)	Net Profit (Short)	Avg. Trade (Short)
@CL – Moving Average -avg_len 65	$172,790.00	$44.09	3,919	–$41,810.00	$104,120.00	$52.51	$68,670.00	$35.47
@CL – Daily Factor – df_ level 0,5	$155,560.00	$36.55	4,256	–$30,380.00	$86,000.00	$40.39	$69,560.00	$32.70
@CL – Dayofweek - skipday_L 2 skipday_S 4	$194,080.00	$30.64	6,334	–$38,810.00	$85,280.00	$26.89	$108,800.00	$34.40
@NG – Moving Average- avg_len 25	$214,790.00	$58.72	3,658	–$25,880.00	$56,870.00	$31.16	$157,920.00	$86.15
@NG – Daily Factor – df_level 0,85	$319,610.00	$45.00	7,103	–$50,170.00	$109,260.00	$30.75	$210,350.00	$59.25
@NG – Dayofweek – skipday_L 4 skipday_S 2	$297,620.00	$48.83	6,095	–$34,120.00	$99,920.00	$32.71	$197,700.00	$65.03
@RB – Moving Average – avg_len 40	$474,574.80	$14.51	3,330	–$30,613.80	$272,819.40	$152.16	$201,755.40	$131.27
@RB – Daily Factor – df_ level 0,35	$296,826.60	$11.88	2,518	–$25,775.40	$217,173.60	$157.60	$79,653.00	$69.87
@RB – Dayofweek – skipday_L 2 skipday_S 4	$498,057.00	$90.28	5,517	–$34,419.00	$301,845.60	$104.16	$196,211.40	$74.92
@HO – Moving Average- avg_len 45	$319,036.20	$98.23	3,248	–$29,979.60	$176,559.60	$102.65	$142,476.60	$93.24
@HO – Daily Factor – df_level 0,5	$281,122.80	$81.09	3,467	–$28,337.40	$195,661.20	$106.40	$85,461.60	$52.49
@HO – Dayofweek skipday_L 4 skipday_S 2	$422,179.80	$82.06	5,145	–$34,435.80	$252,646.80	$95.45	$169,533.00	$67.87

FIGURE 5: PERFORMANCE METRICS FOR FILTERED TRADING SYSTEM. Each of the three filters tested eliminates some of the least-profitable trades. This suggests the trade filters offer a positive contribution to the trading system.

1. ***Trend filter***
   Simple moving average over *n* periods
2. ***Volatility compression filter***
   Daily factor: the ratio between yesterday's body size (distance from open to close) and yesterday's range (distance from high to low)
3. ***Day-of-week filter***
   Exclusion of the single worst trading day of the week for each side (long or short)

See the sidebar, "Applying Operational Filters To Base Trading System, in PowerLanguage," for the PowerLanguage code we developed to create the initial intraday bias trading system to test on the four energy futures markets, along with the code for the three trade filters to apply in the test.

The input optimization prioritized the values that would most improve the most critical aspect of these systems: the *average trade*, even at the expense of a significant drop in net profit, which was almost inevitable. Comparing these results to the corresponding results from the base trading system with the stop-losses applied as seen in Figure 4, it's clear that every filter contributes by eliminating some of the least-profitable trades, to varying degrees depending on the parameters chosen.

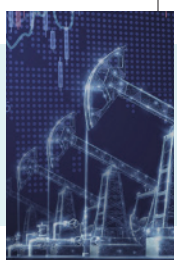
For example, applying a simple short-period moving average to avoid entries that are clearly against the trend already delivers a substantial overall improvement across all markets analyzed, reducing the number of trades by 40–50%.

Another noteworthy finding is the particular effectiveness of the *daily factor* filter in highly volatile markets like RBOB gasoline and heating oil. Pushing the compression threshold to fairly extreme values (for example, 0.35 on gasoline) yields undeniable benefits in boosting the average trade—over $140 for gasoline, nearly double the starting value.

In every case studied, the side that was already stronger to begin with benefits most from these operational filters—especially for natural gas, for the reasons discussed earlier. Crude oil remains the exception: the long side (which was the weakest under the base bias alone) shows the greatest improvement.

One final observation about the day-of-week filter is the apparent convergence on Tuesday (day 2) and Thursday (day 4) as the days to avoid opening positions, since they tend to exhibit the least-defined trend strength and consistency.

We'll examine the daily price movements that characterize these four assets.



Conclusions on applying the intraday bias approach to energy futures

We've reached the end of this article and can confirm that the energy futures sector presents compelling intraday biases that can be exploited to build trading strategies. We've also demonstrated several paths for enhancing these systems—by applying selective filters that, with some work, can transform them into live-ready strategies and provide useful portfolio diversification.

Until next time!

As with any intraday bias system, you must start with a very high trade count.



Andrea Unger is a full-time professional trader, president of The Unger Academy, and author of The Unger Method. He is a four-time World Trading Champion (2008, 2009, 2010, and 2012), an honorary member of SIAT (Italian Society of Technical Analysis, a branch of IFTA), and speaks throughout Europe, America, Australia, and Asia. He may be reached at Andrea@UngerAcademy.com. The Unger Academy provides services to traders, including individuals, to help them improve their approach to trading (more information can be found at https://autc.pro/tasc).

Further reading

Unger, Andrea [2021]. *The Successful Trader's Guide To Money Management: Proven Strategies, Applications, And Management Techniques*, Wiley Trading.

_____ [2021]. *The Unger Method: The Winning Strategy Of The 4-Time World Trading Champion*, The Boss Books.

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APPLYING OPERATIONAL FILTERS TO THE BASE TRADING SYSTEM, IN POWERLANGUAGE

A trading system based on an intraday market bias seeks to exploit recurring price patterns in a market. This code presents the base trading system used plus several trade filters that were tested to try to improve the quality of entries and exits in the trading system. The trade filters include a trend filter; a volatility compression filter (named the "daily factor," which is defined in the code); and a day-of-week filter. A stop-loss is also applied.

```
input: mystop(1500),myprofit(0),mybreakeven(0);
input: MyContracts(1),MyLETime(0), MyLXTime(0), MySE-
Time(0), MySXTime(0);
input:    MaxEntriesPerDay(2),filter_type_1_4(0),avg_
len(10);
input: df_level(1),skipday_L(-1),skipday_S(-1);

var: DF(0);

//DailyFactor

if (highs(1)-lows(1))<>0 then DF=absvalue(opens(1)-clos-
es(1))/(highs(1)-lows(1));

//Entries

if entriestoday(date)<MaxEntriesPerDay then begin
      switch(filter_type_1_4) begin

      //1. No filter
      case 1 : if Time=MyLETime then buy("LE") MyCon-
tracts contracts next bar at market;
            if Time=MySETime then sellshort("SE") MyCon-
tracts contracts next bar at market;

      //2. Moving Average
      case 2 : if Time=MyLETime and c>average(c,avg_len)
then buy("LE") MyContracts contracts next bar at market;
            if Time=MySETime and c<average(c,avg_len)
then sellshort("SE") MyContracts contracts next bar at
market;

      //3. Daily Factor
      case 3 : if Time=MyLETime and DF<df_level then
buy("LE") MyContracts contracts next bar at market;
            if Time=MySETime and DF<df_level then
sellshort("SE") MyContracts contracts next bar at market;

      //4. Dayofweek
      case 4 : if Time=MyLETime and
dayofweek(d)<>skipday_L then buy("LE") MyContracts
contracts next bar at market;
            if Time=MySETime and dayofweek(d)<>skipday_S
then sellshort("SE") MyContracts contracts next bar at
market;
      end;
end;

//Exits
if Time=MyLXTime then sell("LX_Time") next bar market;
if Time=MySXTime then buytocover("SX_Time") next bar
market;

if mystop>0 then setstoploss(mystop);
if myprofit>0 then setprofittarget(myprofit);
if mybreakeven>0 then setbreakeven(mybreakeven);

setstopcontract;
```

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Key Elements For Consistent Success

Anatomy Of A Profitable Forex Trading Strategy

What are the key components for consistent success in a forex trading strategy? We break it down, and provide an example forex strategy to consider.

by Azeez Mustapha

The foreign exchange (forex) market is a vast and dynamic market that offers lucrative opportunities for traders. However, success in forex is not just about luck; it requires a well-structured strategy. Many traders fail due to a lack of a clear plan, often making emotional rather than data-driven decisions.

Beginners often struggle due to a lack of essential skills, while even disciplined traders fail when using flawed systems with poor risk–reward ratios. Overcomplicating analysis often backfires—simplicity is key. A strong strategy should limit losses in tough markets while ensuring steady profits in favorable conditions.

A consistently profitable forex strategy must adapt to both trending and ranging markets. The *trend & range adaptive forex strategy* that I'll describe here is designed to do just that, integrating multiple technical indicators to confirm market direction, momentum, and volatility. This strategy utilizes the 50-period exponential moving average (EMA) to identify trends; it uses the average true range (ATR) to measure volatility; and it uses a combination of RSI, Bollinger Bands, and MACD to refine entry and exit points.

See Figure 1 for a summary of what the strategy entails.

For trending markets, the strategy focuses on capturing 50 pips by following momentum-confirmed entries; meanwhile, in choppy or ranging conditions, it limits losses to 30 pips by leveraging Bollinger Bands to avoid false breakouts. With a structured risk management approach and a dynamic stop-loss mechanism, this strategy aims to maximize gains while minimizing risks, making it a practical tool for traders seeking consistency.

PHONGPHAN/SHUTTERSTOCK

BREAKDOWN OF THE TREND & RANGE ADAPTIVE FOREX STRATEGY	
Timeframe:	H4 (4-hour chart)
Indicators	50 EMA, ATR (set to 14), RSI, Bollinger Bands, MACD (12, 26, 9)
Buy rule	1. Price moving within Bollinger Bands without trending outside 2. RSI between 30–45 (indicating oversold conditions) 3. MACD made a bullish crossover, and the direction of the MACD lines have turned in the upside direction 4. Entry Trigger: Buy when price touches the lower Bollinger Band and a bullish reversal candle forms
Sell rule	1. Price oscillating within Bollinger Bands (not trending) 2. RSI between 55–70 (near overbought conditions) 3. MACD near zero line, showing weak momentum .
Position sizing	0.01 lots for each $500 (thus making it 0.1 lots for $5000)
Stop-loss	30 pips
Take-profit	50 pips
Trailing stop	Optional
Risk management & trade optimization	0.6%
Potential reward per trade	1%
Max. weekly drawdown	3%
Risk management and trading optimization	• Use a 1:1.7 risk-reward ratio in trends and 1:1 in choppy markets • Avoid trading before major news releases • Trail stop-loss once you reach +25 pips in profit
Instrument names	AUDUSD, EURUSD, USDCHF

FIGURE 1: TREND & RANGE ADAPTIVE FOREX STRATEGY. Here's a summary of the trend & range adaptive forex strategy. This strategy uses a 50EMA to identify trends; the ATR to measure volatility; and RSI, Bollinger Bands, and MACD to refine entry and exit points.

LIMITATIONS OF THE TREND & RANGE ADAPTIVE FOREX STRATEGY

While the *trend & range adaptive forex strategy* is designed to work in both trending and ranging market conditions, it has some inherent limitations that traders should be aware of:

1. **Lagging indicators in strong trends**
   The strategy relies on indicators such as the 50 EMA, RSI, MACD, and Bollinger Bands, which are lagging indicators. This means that by the time a trade signal is generated, a significant portion of the price movement may have already occurred, leading to late entries and missed profit opportunities in fast-moving markets.
2. **False signals in low-volatility conditions**
   In choppy or sideways markets, Bollinger Bands and RSI are used to detect overbought and oversold levels. However, during extremely low-volatility periods, price movements may lack momentum, causing false breakouts and resulting in premature stop-loss hits.
3. **Requires strict trade discipline**
   The success of this strategy depends on strict adherence to trading rules, including proper stop-loss placement, waiting for confirmation signals, and not overtrading. Traders who lack patience or fail to follow the risk–reward ratio may experience inconsistent results.
4. **Limited performance in ranging markets**
   Although the strategy includes specific rules for trading in choppy markets, ranging conditions can be unpredictable, with price repeatedly touching both support and resistance levels. This can lead to whipsaw movements, where traders enter and exit positions frequently without gaining significant profit.
5. **Dependence on optimal market conditions**
   This strategy works best in liquid markets, particularly during the London and New York sessions. Low-activity periods, like the Asian session, may weaken trend confirmation. While flexible, the *trend & range adaptive forex strategy* isn't foolproof. Traders should avoid over-relying on indicators, should apply proper risk management, and should complement it with fundamental analysis and market sentiment for better results.

With those caveats explained, we'll move on to its advantages and some example trades.

WHY THIS STRATEGY WORKS

- Adapts to both trending and ranging markets
- Bollinger Bands prevent bad entries in choppy conditions
- MACD and RSI confirm momentum shifts for better accuracy
- This approach will help you to consistently capture

A consistently profitable forex strategy must adapt to both trending and ranging markets.





FIGURE 2A: EURUSD BUY TRADE SETUP. A buying opportunity is spotted in EURUSD as the RSI bounced from below 30, intercepting at 34, while the MACD confirmed bullish momentum with a crossover. The MACD lines began rising toward the zero level, signaling a potential trend reversal.



FIGURE 2B: EURUSD BUY TRADE SETUP. A buy stop is placed at 1.0244 on January 13, 2025, with a stop-loss at 1.0214. The price hit the take-profit at 1.0294 on January 14, 2025, securing a 50-pip gain.

50 pips in strong trends while minimizing losses to 30 pips in tough conditions.

Analysis of the Strategy: What the Strategy Is Expected to Do

This strategy is designed to capitalize on range-bound price movements within Bollinger Bands while ensuring controlled risk exposure through strict position sizing and stop-loss rules. It focuses on short- to medium-term timeframes (M15, H1, H4) and utilizes multiple indicators to confirm low volatility before entering trades.

1. ***Buy trades:*** The strategy seeks to buy at oversold conditions when price touches the lower Bollinger Band, RSI is between 30–45, and MACD signals weak momentum near the zero line. This increases the probability of a mean-reversion bounce rather than a continued decline.
2. ***Sell trades:*** The strategy aims to sell at overbought conditions, with price oscillating near the upper Bollinger Band, RSI between 55–70, and MACD showing weak momentum. This helps traders take advantage of potential price reversals.

TRADINGVIEW



FIGURE 3A: AUDUSD, BOLLINGER BANDS AND MACD. A bullish MACD crossover signals a buy opportunity. The trade is entered only after both MACD lines approach the zero level, confirming the setup at 0.62500.



FIGURE 3B: AUDUSD, BOLLINGER BANDS AND RSI. Although the RSI presents a clear buying opportunity with a bullish crossover at the 40 level, the buy order is not entered until the MACD lines approach the zero level.

TRADE SETUP EXAMPLES

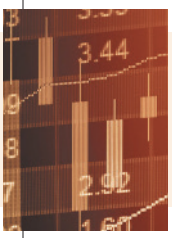
To illustrate how this strategy works, I'll show three trading examples based on AUDUSD, EURUSD, and USDCHF. Two examples demonstrate successful trades, while the third highlights a losing trade. The second example explains how profit can be made when prices decline, and the third demonstrates how a winning trade can be prevented from turning into a losing one by using a trailing stop. Each example is accompanied by a chart where:

- The red line represents the 50 EMA
- Bollinger Bands help identify entry and exit points
- The RSI, and MACD indicators confirm trade conditions

Example 1: EURUSD buy trade setup

In Figures 2A and 2B, we spotted a buying opportunity as the RSI bounced from below 30, intercepting at 34, while the MACD confirmed bullish momentum with a crossover. The MACD lines began rising toward the zero level, signaling a potential trend reversal.

We placed a buy stop at 1.0244 on January 13, 2025,



Even disciplined traders fail when using flawed systems with poor risk–reward ratios.

with a stop-loss at 1.0214. The price hit our take-profit at 1.0294 on January 14, 2025, securing a 50-pip gain.

Trade summary

- Instrument: EURUSD
- Order type: Buy stop
- Entry date: January 13, 2025
- Entry price: 1.0244
- Initial Stop-Loss: 1.0214
- Exit date: January 14, 2025
- Exit price: 1.0294
- Profit/loss: +50 pips

Example 2: AUDUSD buy trade setup

Figure 3A illustrates the use of the Bollinger Bands indicator alongside the moving average convergence/divergence (MACD), while Figure 3B showcases the combination of Bollinger Bands and the relative strength index (RSI).

In Figure 2A, a bullish MACD crossover signals a buy opportunity. The trade is entered only after both MACD lines approach the zero level, confirming the setup at 0.62500.

In Figure 2B, although the RSI presents a clear buying opportunity with a bullish crossover at the 40 level, we hold off on executing the buy order until the MACD lines approach the zero level.

Trade summary

- Instrument: AUDUSD
- Order type: Buy stop
- Entry date: February 4, 2025
- Entry price: 0.62000
- Initial stop-loss: 0.61970
- Exit date: February 4, 2025
- Exit price: 0.62050
- Profit/loss: 50 pips

Example 3: USDCHF sell trade setup

In Figure 4, the RSI formed a bearish crossover near the 70 level, indicating overbought conditions and a potential reversal. However, price action did not confirm the signal. A sell order was triggered at 0.87260 based on the RSI crossover, but the market immediately moved against the trade, hitting the 30-pip stop-loss.

The MACD crossover was stronger than the RSI's, with widening MACD bands while the RSI lagged. For stronger confirmation, the MACD lines should have moved closer to the zero level before executing the sell order to validate the emerging downtrend. However, the trade was entered too early, leading to a loss.

Trade summary

- Instrument: USDCHF
- Order type: Sell stop



FIGURE 4: USDCHF SELL TRADE SETUP. The RSI formed a bearish crossover near the 70 level, indicating overbought conditions and a potential reversal. However, price action did not confirm the signal. A sell order was triggered at 0.87260 based on the RSI crossover, but the market immediately moved against the trade, hitting the 30-pip stop-loss.

- Entry date: November 7, 2024
- Entry price: 0.87260
- Initial stop-loss: 0.87290
- Exit date: November 7, 2024
- Exit price: 0.87290
- Profit/loss: –30 pips

Conclusion

A profitable forex strategy requires technical precision, market awareness, and disciplined risk management. The *trend & range adaptive forex strategy* helps traders identify high-probability setups using Bollinger Bands, MACD, and RSI for precise entries and exits.

No strategy is foolproof—success depends on continuous learning, adaptability, and trade management. Trailing stop losses help secure profits, while fundamental analysis and market sentiment improve decision-making.

Mastery comes with patience, backtesting, and experience. Disciplined traders who refine their approach based on market dynamics have a higher chance of consistent success.

Azeez Mustapha is an analyst at Instaforex Companies Group and a blogger at Advfn.com, and as well as a freelance author for various trading publications. He is a trading signals provider at some websites. He can be reached via email at azeez.mustapha@analytics.instaforex.com.

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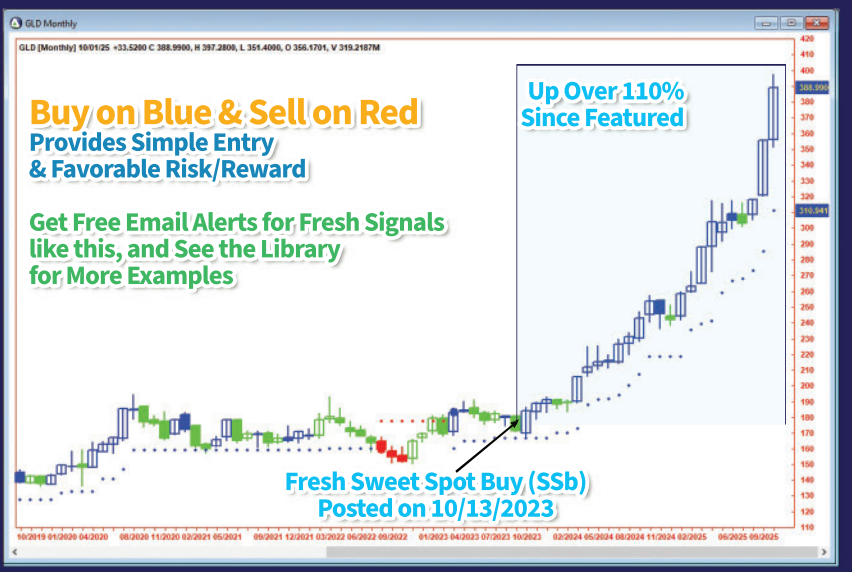

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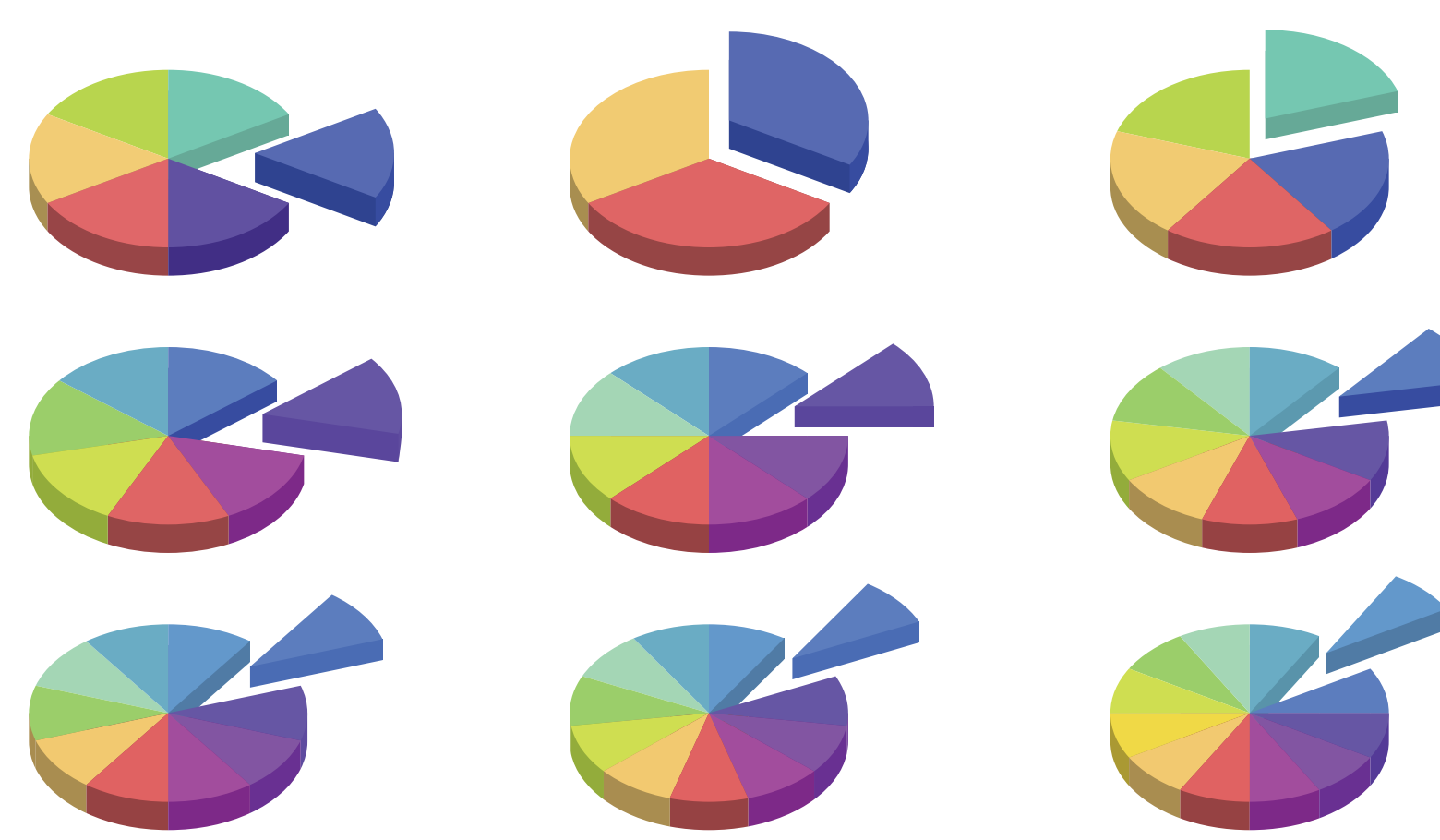

Broader Market Participation

Unlocking True Diversification: The Power Of Equally Weighted ETFs

What every investor needs to know about ETF weighting.

by Andrea Ciarrocchi

Understanding the difference between market-capitalization-weighted ETFs and equally weighted ETFs is important for your portfolio. Here's a look into how each type works, their distinct advantages and disadvantages, and which might be a better fit for your portfolio based on your diversification goals and risk tolerance.

INTRODUCTION

Exchange traded funds (ETFs) have revolutionized the investment landscape, offering accessible and cost-effective ways to gain exposure to diverse markets. Their popularity stems from their simplicity and ability to track various indexes. However, beneath this apparent simplicity lies a crucial distinction that can significantly impact a portfolio's performance and risk profile: the method by which an index, and consequently the ETF, weights its underlying components.

While many investors are familiar with the widely adopted market-capitalization-weighted approach, a lesser-known but equally compelling alternative exists: the equally weighted methodology.

This article will present a comparison of these two fundamental ETF structures. I'll explore how each approach functions, examine their unique advantages and disadvantages, and ultimately provide insights to help investors determine which weighting strategy aligns best with their investment objectives and diversification preferences.

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How classic cap-weighted ETFs work

A classic ETF typically operates on a market-capitalization-weighted methodology, meaning the weight of each stock in the fund is proportional to its total market value. For instance, in an ETF tracking the S&P 500 index, which comprises 500 of the largest publicly traded companies in the United States, companies with higher market capitalizations (share price multiplied by the number of outstanding shares) will have a greater influence on the index's, and thus the ETF's, overall performance. This means that if a mega-cap company like Apple or Microsoft sees a significant price movement, it will have a much more substantial impact on the S&P 500 ETF's value than would a smaller company within the same index, even if the smaller company experiences a larger percentage change. ETFs tracking such indexes aim to replicate this weighting precisely, often through physical replication where they hold the actual underlying stocks in the same proportions as the index, or, for very large indexes, through optimized sampling. This design inherently reflects the broader market's consensus on company valuations, leading to a natural concentration in the largest and often most established firms.

The pie chart in Figure 1 visually demonstrates the significant concentration of a market-capitalization-weighted ETF such as SPY in its top few holdings. This highlights how a small number of mega-cap companies can heavily influence the overall performance of the fund, with other companies representing the vast majority of the index's constituents but a much smaller portion of its total weight.

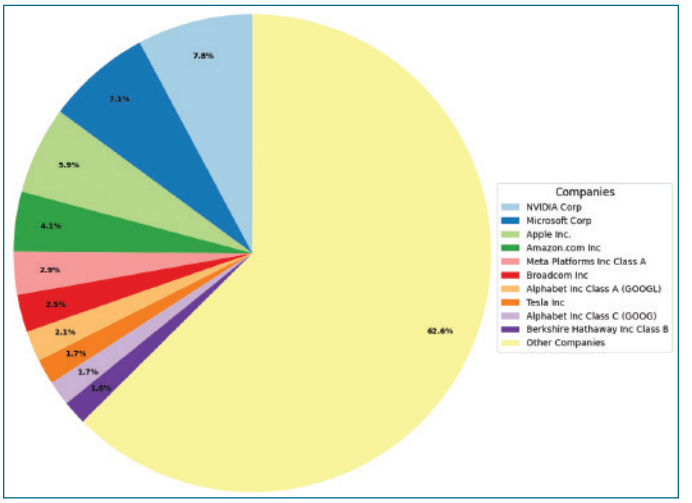

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FIGURE 1: DISTRIBUTION OF SPDR S&P 500 ETF (SPY) BY COMPANY WEIGHT. Market-capitalization-weighted ETFs—that is, ETFs that use the market cap of constituent companies to determine their weighting in the ETF—typically have a large concentration of their weight in mega-cap companies.

The mechanics of equally weighted ETFs

In stark contrast to the market-capitalization-weighted approach, an equally weighted ETF assigns the same weight to every constituent company within its underlying index, regardless of their size. Taking the S&P 500 as an example once more, while a classic S&P 500 ETF (like SPY) would have Apple or Microsoft commanding more than 5–7% of the fund individually due to their massive market caps, an ETF tracking the S&P 500 Equal Weight Index (EWI) would allocate approximately 0.2% (1/500th) of the fund's assets to each of the 500 companies.

This fundamental difference necessitates regular rebalancing, typically quarterly, where the fund manager must sell portions of companies that have grown in value (and thus increased their weight beyond 0.2%) and buy more of those that have underperformed (and whose weight has fallen below 0.2%).

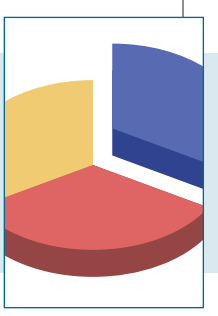
This systematic "buy low, sell high" mechanism, known as the *rebalancing bonus*, is a key characteristic and potential source of outperformance for equally weighted strategies. The primary benefit of this methodology is significantly enhanced diversification, as the fund is no longer dominated by a handful of mega-cap companies. It provides greater exposure to the performance of smaller and mid-sized companies within the S&P 500, which might otherwise be overshadowed in a cap-weighted index.

However, this active rebalancing can lead to higher trading costs and potentially greater tax implications compared to their cap-weighted counterparts, which generally have lower turnover.

Choosing the right ETF for your portfolio

Deciding between a classic market-capitalization-weighted ETF and an equally weighted ETF ultimately depends on an investor's individual objectives, risk tolerance, and investment philosophy. For those who prioritize mirroring the broad market's performance with minimal intervention and costs, the market-cap-weighted

A lesser-known but equally compelling alternative exists: the equally weighted methodology.



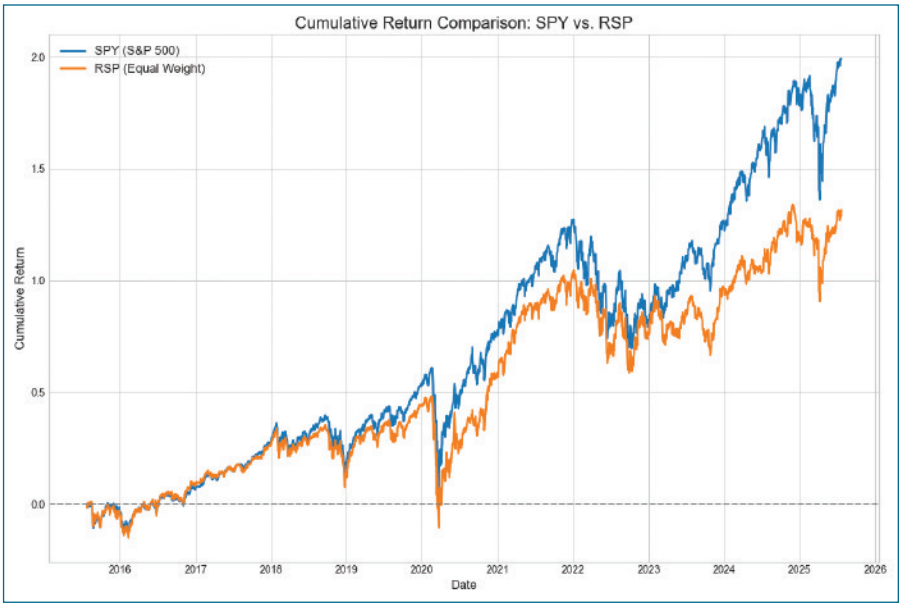


FIGURE 2: CUMULATIVE RETURN COMPARISON: SPY VS. RSP. Comparing the historical performance of a market-cap-weighted ETF to the performance of an equally weighted ETF shows that equally weighted ETFs have often demonstrated stronger performance during periods of broader market participation.

approach remains the standard choice, offering exposure that naturally aligns with the largest and most established companies. This strategy is often favored by investors who believe in the efficiency of the market and prefer a passive approach that allows the largest companies to dictate performance, accepting the inherent concentration risk for the benefit of lower turnover and typically tighter tracking to the overall market.

Conversely, investors seeking enhanced diversification and a potential rebalancing bonus might find equally weighted ETFs more appealing. This approach appeals to those who wish to mitigate the concentration risk present in cap-weighted indexes and gain more balanced exposure across all companies, including smaller and mid-sized firms that might be overlooked. While equally weighted funds involve higher turnover and potentially greater trading costs and tax implications due to their frequent rebalancing, this systematic "buy low, sell high" mechanism can offer a compelling long-term advantage, particularly in environments where market leadership rotates frequently or where smaller companies exhibit stronger growth.

Ultimately, a thoughtful investor might even consider incorporating both types into a diversified portfolio, using a market-cap-weighted ETF for core exposure and an equally weighted ETF as a satellite holding to achieve a more nuanced and balanced diversification strategy. The key lies in understanding how each methodology functions and aligning it with one's personal investment goals and outlook.

COMPARATIVE HISTORICAL PERFORMANCE

When evaluating market-capitalization-weighted versus equally weighted ETFs, historical performance offers valuable insights, though it's crucial to remember that past results do not guarantee future returns. Historically, the performance of these two methodologies has often diverged based on prevailing market conditions and leadership.

During periods dominated by a few mega-cap companies, such as the tech boom of the late 1990s or certain phases of the 2010s where large technology firms experienced exponential growth, market-capitalization-weighted ETFs, like those tracking the standard S&P 500, have tended to outperform their equally weighted counterparts. This is because their inherent concentration allows them to fully capture the upward momentum of these market leaders.

Conversely, equally weighted ETFs have often demonstrated stronger performance during periods of broader market participation, particularly when smaller and mid-sized companies within the index are outperforming the largest constituents. This can be observed during market recoveries, periods of economic expansion where growth is more evenly distributed across sectors and company sizes, or in environments where the "rebalancing bonus" (the systematic selling of winners and buying of laggards) proves particularly effective.

The rebalancing mechanism of equally weighted funds can be especially beneficial in sideways or volatile markets, as it inherently forces a contrarian approach. Therefore, while market-cap-weighted funds typically offer a smoother ride when large companies are leading, equally weighted funds can provide diversification benefits and potentially superior returns in a wider range



The primary benefit of this methodology is significantly enhanced diversification.

of market scenarios, particularly those favoring broader market breadth.

Figure 2 illustrates the comparative historical performance between a market-capitalization-weighted ETF (SPY) and an equally weighted ETF (RSP) tracking the S&P 500. While the exact outcome can vary depending on the specific timeframe chosen, a general explanation of what such results often indicate and why you might see one outperform the other is rooted in market dynamics.

In many recent periods, particularly the one shown in Figure 2 (roughly 2015–2025), the U.S. stock market, and specifically the S&P 500, has been heavily driven by the exceptional growth of a few very large technology and growth companies, such as Apple, Microsoft, Amazon, NVIDIA, and Meta. Since SPY allocates a much larger percentage of its assets to these mega-cap companies, proportional to their market value, it benefits disproportionately when these giants perform exceptionally well; their strong performance can pull the entire index higher, even if many smaller companies are lagging. Furthermore, SPY's lower turnover means fewer trading costs and potentially better tax efficiency, which can slightly enhance its returns over the long run compared to funds with higher turnover.

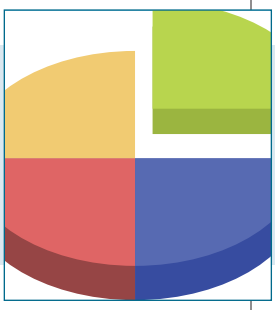
Conversely, RSP, the equally weighted ETF has less exposure to the top-heavy performance of the mega-caps that have led the market in recent years. While the S&P 500 is considered large-cap, RSP's equal weighting effectively gives more influence to the smaller companies within the S&P 500, and if these companies are not performing as strongly as the mega-caps, RSP's overall return will reflect that. Although equally weighted funds benefit from the "buy low, sell high" rebalancing mechanism, this advantage might be overshadowed during prolonged periods where market leadership is highly concentrated in a few consistently outperforming mega-caps; the rebalancing bonus is often more pronounced in sideways or volatile markets, or when market leadership rotates more frequently.

It is important to note that market cycles change, and there have been periods in history where equally weighted strategies have outperformed cap-weighted ones, particularly after periods of high concentration or during broader economic recoveries.

Conclusion

When deciding between a market-capitalization-weighted ETF and an equally weighted ETF, investors should consider their personal investment goals, risk tolerance, and philosophy. For those who want to mirror the broad market's performance with minimal costs and intervention, the market-capitalization-weighted approach is the standard choice. This strategy is well-suited for investors who believe in market efficiency and prefer a passive approach, even with the inherent risk of concentration in a few large companies. Market-cap-weighted ETFs also have lower turnover, which results in fewer trading costs and potential tax benefits.

This fundamental difference necessitates regular rebalancing, typically quarterly.



Alternatively, equally weighted ETFs are a compelling option for investors seeking greater diversification and the potential for a "rebalancing bonus." By assigning the same weight to every company in an index, these ETFs reduce the concentration risk found in cap-weighted funds and provide more balanced exposure to smaller and mid-sized companies. The systematic rebalancing, which involves selling companies that have performed well and buying those that have underperformed, can be a source of outperformance, particularly in volatile markets or when leadership rotates frequently. However, this frequent rebalancing leads to higher trading costs and potential tax implications.

Historically, the performance of these two methodologies has diverged based on market conditions. Market-cap-weighted ETFs have tended to outperform during periods dominated by a few mega-cap companies, while equally weighted ETFs have shown stronger performance during times of broader market participation. Ultimately, a thoughtful investor might consider using both types of ETFs in a diversified portfolio: a market-cap-weighted ETF for core exposure and an equally weighted ETF as a satellite holding to achieve a more nuanced strategy. The key is to understand each methodology and align it with your own investment outlook.

Andrea Ciarrocchi has a deep passion for healthcare, geopolitics, photography, and information technology. His work is available at https://andreaciarrocchi.altervista.org.

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Will This Shiny Metal Continue Its Multiyear Advance?

Silver ETFs: Is It Too Late To Get In After A Long Bullish Rise?

To help you explore whether adding a silver ETF to your portfolio could provide capital gains potential and enhance diversification, here is some background on this commodity and an examination of some ETFs related to the silver market.

by Leslie N. Masonson, MBA

Precious metal stocks, particularly miners, have experienced a significant bull run since early 2024. The ETF iShares Silver Trust (SLV) has gained 56% so far in 2025 (as I write this in early October 2025) and 76% since January 2024, outperforming the iShares Gold Trust ETF (GLD) by seven percentage points. Meanwhile, four silver miner ETFs have surged over 100% in 2025 so far.

Seeing these strong numbers, some investors may be considering whether to try to get in on this trend by adding positions in one or more silver-related ETFs to their portfolio (in an appropriate allocation for their account). In addition to using their favorite tools to help them evaluate the state of the trend and the condition of the market, investors can also take into consideration specific information about the various ETFs in this category and their historical performance. Here, I'll provide some data, statistics, and background for investors to consider.

Figure 1 lists the names and tickers of eleven silver-related ETFs that are reviewed in this article. The variety within this category is noteworthy: two of the ETFs are two outright holders of silver (the ETFs SLV and SIVR); four of the ETFs (SIL, SILJ, SLVP, and AGMI) focus on silver mining companies; one of the ETFs (SLVO) uses a covered call alternative approach; two of the ETFs, one bull and one bear (AGQ and ZSL), are double-leveraged; one of the ETFs (SLVR) holds both metals and miners; and

RASHEVSKYI VIACHESLAV/SHUTTERSTOCK

one ETF (GBUG) includes both gold and silver miners. This offers quite a range of options for investors.

Some background: Gold vs. silver

Before we proceed, let's compare the characteristics of gold and silver. Gold is a yellow metal that is malleable and an excellent electrical conductor, known for its resistance to corrosion. It is commonly used for investment purposes (such as in the form of bullion, bars, or coins), in jewelry, and in electronic components.

In contrast, silver is a bright, reflective metal. It is also malleable and mostly corrosion-resistant, but it is ductile as well, possessing the highest thermal and electrical conductivity of any metal. Because of these properties, silver is used in solar panels, electronic components, jewelry, and eating utensils. Due to its versatility, silver has a higher demand. It is often available as silver bullion stored in vaults. Additionally, silver is much less expensive per ounce than gold, making it more accessible to retail and professional buyers. Silver is often referred to as the high-beta version of gold.

Silver price influences

There are many factors that impact the price of silver, such as:

- **Rate of inflation:** As a store of value, silver typically rises when the rate of inflation increases. Basically, it is considered an inflation hedge, especially when rates accelerate as they did in the 1980s when silver hit a peak price of $50 per ounce.
- **Federal monetary policy:** Silver offers no dividends or interest. Rising interest rates provide a competitive force to holding silver. This can result in lower silver prices. The opposite is also true.
- **Strength of U.S. dollar:** Silver is typically pegged to the U.S. dollar. The stronger the dollar, the more expensive it is to foreign buyers. This situation could limit silver's demand and price.
- **Industrial demand:** Silver's properties make it critical for electronics, solar panels, and electric vehicles. Strong economic growth increases industrial activity, boosting demand and price. Conversely, economic downturns can reduce demand. Industrial demand now accounts for a significant portion of overall silver consumption.
- **Supply and demand:** Silver mines may not produce as much silver as expected for any number of reasons such as stricter environmental regulations. On the other hand, industrial demand can result in higher silver prices and increased manufacturing. Because over 50% of its demand comes from industrial applications and for some medical uses, silver prices are highly sensitive to the health of the global economy.
- **Storage and insurance costs:** Bullion and coins need safe storage at a bank vault, home safe, or private vendor. If the silver is kept at home, insurance may be a cost factor for some holders to protect against theft or loss (for example, due to a flood or hurricane).
- **Geopolitical risks:** Instability, conflicts, or tariffs can result in a buying surge in silver. For instance, tensions between major powers can lead investors to seek refuge in precious metals like silver.
- **Competitive gold prices:** Gold and silver prices usually are highly correlated, but the price of silver tends to be more volatile over time. Also, sometimes gold stocks and ETFs perform better than their silver counterparts, and vice versa.
- **Investor speculation:** Political and economic events worldwide can lead to wild speculation in the precious metals by investors and traders, especially in the silver futures market.

Ticker	Fund Name
SLV	iShares Silver Trust
SIL	Global X Silver Miners ETF
SIVR	abrdn Physical Silver Shares ETF
SILJ	Amplify Junior Silver Miners ETF
AGQ	ProShares Ultra Silver ETF (2x)
SLVP	iShares MSCI Global Silver Miners ETF
SLVR	Sprott Silver Miners & Physical Silver ETF
SLVO	UBS AG ETRACS Silver Shares Covered Call ETN
GBUG	Sprott Active Gold & Silver Miners ETF
ZSL	ProShares UltraShort Silver ETF (–2x)
AGMI	Themes Silver Miners ETF

FIGURE 1: SILVER-RELATED ETFS REVIEWED. The names and tickers of the 11 ETFs discussed in this article are shown here.

Historical account of a market fiasco: the Hunt brothers story

In the 1970s and 1980, brothers Nelson Bunker Hunt and William Herbert Hunt famously attempted to corner the silver market as a safeguard against high inflation and a weakening dollar. The Hunt brothers not only bought large quantities of physical silver but they also acquired massive amounts of silver futures contracts. Their activities caused the price of silver to skyrocket from around $2 an ounce to $50 an ounce at its peak in January 1980. However, on March 27, 1980, an event that became known as "Silver Thursday" occurred when the



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FIGURE 2: SILVER PRICE SINCE 2013. You can see in this historical chart of silver futures how the price of silver recovered from its 2015 lows and at the far right of the chart is approaching its all-time high of $50 an ounce, which it last saw in 1980.

COMEX and CBOT exchanges increased silver margin requirements, leading to a collapse in silver prices. The Hunt brothers were forced to liquidate their positions, incurring estimated losses exceeding $1 billion. Their downfall resulted from trying to manipulate the market and using excessive leverage. Today, a similar situation would be unlikely to occur due to the larger market size, the presence of more participants, and increased scrutiny from regulators who monitor the markets in real time.

A BIT OF PRICE HISTORY

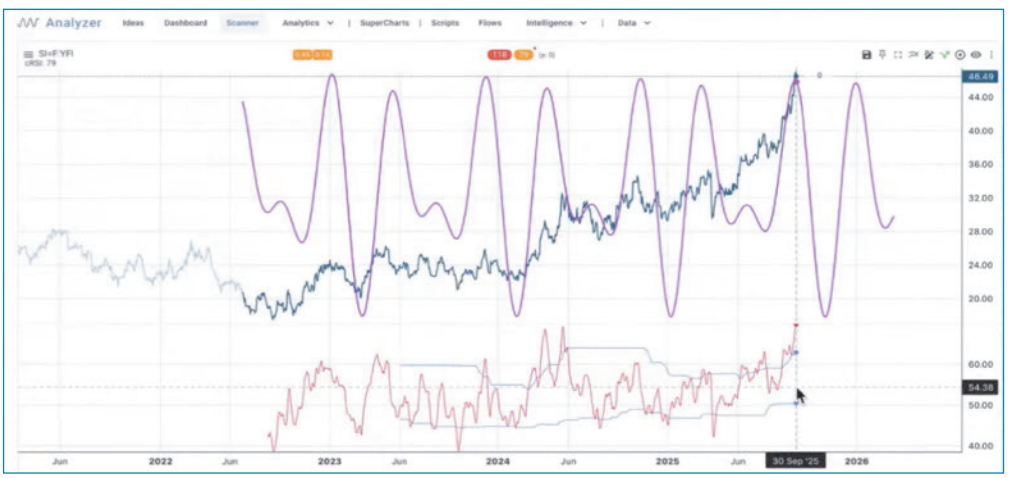
During the 1990s, the price of silver remained fairly stable, fluctuating between $4 and $6 an ounce. However, from 2008 to 2011, the price of silver surged, hitting $49.83 in April 2011. Following this peak, the price declined and ranged from $15 to $24 between mid-2013 and mid-2020. Recently, it began to rise again, closing at $46.66 on September 26, 2025. This volatility shows that silver can experience periods of both sharp increases and declines, and recently, it has been in a significant upward trend. Figure 2 provides a silver price chart from 2013 to September 26, 2025, illustrating how prices have recently surpassed the highs of April 2011 (not shown).

From a technical analysis perspective, a price breakout above $50 for silver could signal potential higher prices ahead. This breakout would indicate a challenge of the triple top formed by the highs of 1980, April 2011, and the current $50 price resistance. Yet research given by Richard Smith with the Foundation for the Study of Cycles (FSC) suggests that silver prices may be at a cycle peak. That opinion is based on the predominant 79-day and 118-day cycles.

In Figure 3, the blue line represents the price of silver while the purple line shows a combination of the two cycles, the 79-day and 118-day. The momentum indicator in the bottom pane indicates that momentum is currently at an all-time high, suggesting that the upward trend might not be finished yet. At this point, silver is on track to surpass the April 2011 price high of $47.

During the week ending September 26, precious metal ETFs experienced the largest inflows of any asset class, totaling $4.71 billion. In comparison, aggregate bonds were in second place with $2.75 billion, while large- and mid-cap stocks saw outflows of $12.3 billion combined. In a recent week, leveraged ETFs for gold and gold miners recorded the largest inflows while the silver leveraged ETF (AGQ) showed weaker inflows. It's possible that a stock market rally may pause while precious metals continue to rise.

Furthermore, FSC's cycle analysis recently indicated a major cycle peak for the S&P 500 index around August 2025.



FOUNDATION FOR THE STUDY OF CYCLES

FIGURE 3: SILVER 79- AND 118-DAY CYCLE. In a recent video published by the Foundation For The Study Of Cycles, cycles expert Richard M. Smith displays this chart of silver prices with the 79-day and 118-day cycle superimposed. The chart shows the recent high, which could be a cycle peak and lead to a topping pattern, although Smith points out that momentum (bottom pane) is still rising at this point.

Yet the index has already surpassed the cycle projection and may be in a consolidation phase as of September.

Whether silver futures will continue on their upward path remains uncertain.

Many investors think of gold and silver as safe havens during turbulent times. However, they may not be aware that from January 1, 2020 to September 26, 2025, both gold and silver ETFs have outperformed the S&P 500 index, as represented by the SPDR S&P 500 ETF Trust (SPY). For instance, iShares Silver Trust (SLV) has risen by 148.6% in price, compared to 137.7% for iShares Gold Trust ETF (GLD) and only 105.3% for SPY. This outperformance is impressive and somewhat surprising, especially given the strong performance of the so-called "Magnificent Seven" stocks since early 2024 and their 33% weighting in the S&P 500 index.

Silver-Related ETFs Metrics Comparison

The 11 ETFs examined in this article had the following overall characteristics:

- All passively managed, except GBUG, which is actively managed
- Portfolio companies provide global coverage
- Legal structure: open-ended except for SLV and SIVR, which are grantor trusts, and SLVO, which is an exchange traded note; ZSL and AGQ are ETFs operated as commodities pools
- SLV and SIVR hold silver bullion in vaults and provide no dividends
- Nine of the ETFs issue a 1099 for tax reporting; two of them, ZSL and AGQ, provide a K1
- SLVO (the only exchange traded note covered here) has a distribution yield of 18.72%, SILJ 3.29%, and SIL 1.22%
- SLVO uses derivatives as a sub-asset class for synthetic income; it is a structured note
- ZSL and AGQ use derivatives as a sub-asset class for leverage; ZSL is a –2× (bearish) leveraged fund while AGQ is a +2× (bullish) leveraged fund
- SLVP is listed on Cboe BZX US Equities Exchange
- SLV, SIIVR, ZSL, AGQ, SIL, and SILJ are listed on NYSE Arca
- SLVO, SLVR, and GBUG are listed on Nasdaq

Let's explore the specifics of these ETFs. Figure 4 provides a comparison of key metrics.

Physical Metal ETFs

• iShares Silver Trust (SLV)

As you can see in Figure 4, SLV—a pure metal ETF—leads the category with the earliest inception date of April 21, 2006, a substantial AUM of $22.2 billion, the highest average daily trading volume at 23.3 million shares, a three-year average total return of 35.2%, and year-to-date inflows of $1.28 billion in 2025. As is the case in many ETF categories, the first ETF in its space usually dominates with the most AUM, trading volume, and inflows. It is challenging for competitors to gain significant ground unless they have comparable performance, decent trading volume, and a reasonable expense ratio.

• abrdn Physical Silver Shares ETF (SIVR)

SIVR, a close competitor and the only other pure commodity play, has amassed an AUM of $2.9 billion, a lower expense ratio by 20 basis points, and an average daily volume just over 1 million shares. It boasts a slightly higher three-year return of 35.46% and about half the

Ticker	Inception Date	AUM ($MM)	Net Expense Ratio	Avg Daily Volume	Avg Spread %	YTD Total Return	1-Year TR	3-year TR	5-year TR	10-Year TR	Max Long-term Cap Gains	YTD Flow	5Y Flow
SLV	2006–04–21	22187.721	0.5	23350596	0.029	58.98	43.06	35.21	14.47	11.26	28%	1282989500	253977000
SLVP	2012–01–31	535.868	0.39	330519	0.279	132.99	90.56	50.7	13.53	17.64	20%	68914530	139617440
SIVR	2009–07–20	2910.944	0.3	1108230	0.029	59.38	43.31	35.46	14.68	11.48	28%	596079750	1081787900
SLVO	2013–04–16	232.588	0.65	33011	0.333	46.59	40.93	28.57	14.71	7.48	20%	22943222	291677484
AGMI	2024–05–03	2.032	0.35	2684	0.865	114.41	73.02				20%	753206	1241027
SLVR	2025–01–14	307.806	0.65	216922	0.316						20%	222990909	222990909
GBUG	2025–02–19	100.054	0.89	81791	0.370						20%	67847700	67847700
ZSL	2008–12–01	34.230	0.95	521392	0.079	–62.79	–56.54	–52.57	–37.47	–33.39	27.84%	33566367	1498408
AGQ	2008–12–01	1027.141	0.95	2054362	0.028	122.42	74.28	56.75	13.01	8.56	27.84%	–96381066	–37742858
SIL	2010–04–19	3528.012	0.65	2212534	0.049	120.71	91.72	49.76	12.07	14.97	20%	928889588	1366223732
SILJ	2012–11–28	2475.83	0.69	6686811	0.059	126.38	76.14	43.93	12.84	16.58	20%	453318500	1274203000

FIGURE 4: SILVER-RELATED ETF COMPARISON. Top performers were all miners: SIL, SILJ, and SLVP, which tends to be the case in bull market runs. AGQ, the 2× leveraged ETF, had excellent performance in the past three years but weaker performance in earlier periods.



Precious metal stocks, particularly miners, have experienced a significant bull run since early 2024.

year-to-date cash inflows at $596 million. Additionally, its performance has been slightly better than SLV's over the periods shown, except for 2025 year-to-date, where it lags behind by 60 basis points (0.60 percentage points).

Silver miner ETFs

Silver miner ETFs invest in the stocks of silver mining companies. Their price performance is impacted by the fluctuating price of spot silver, among other variables. Moreover, each ETF's portfolio must contend with each company's production costs, operating efficiency, management capabilities, and competitive pressures. Mining stocks typically exhibit higher volatility and higher returns than physical metal ETFs during significant bullish trends, as is the current situation.

Now, let's compare the performance of the four silver miners: SIL, SILJ, SLVP, and AGMI.

- ***Global X Silver Miners ETF (SIL)***
- ***Amplify Junior Silver Miners ETF (SILJ)***

The first two are quite similar in their metrics. SIL has $3.53 billion in AUM compared to $2.48 billion for SILJ. SIL has a four-basis-point lower net expense ratio but trades only 2.2 million shares a day compared to SILJ's 6.7 million. SIL had a higher one-year return of 91.7%, which was 15 percentage points better than SILJ, and a 5.8 percentage point advantage over three years. However, SILJ recorded a year-to-date return of 126.4% compared to SIL's 120.7%. Furthermore, SILJ had higher returns over both the five- and ten-year periods by 77 and 161 basis points, respectively. SIL attracted more than twice the cash inflows year-to-date and $92 million more over five years.

- ***iShares MSCI Global Silver Miners ETF (SLVP)***
- ***Themes Silver Miners ETF (AGMI)***

SLVP, launched in January 2012, has captured only $535.9 million in AUM, but has one of the lowest expense ratios in the group at 0.39%. Its average daily trading volume of 330,000 shares is significantly lower than that of SIL and SILJ. However, as indicated in Figure 4, it performed best across most time periods, despite having very low year-to-date inflows of only $68.9 million.

AGMI is the newest miner on the block, having launched on May 3, 2024. So far, it has attracted a mere $2 million in AUM and has a minuscule average daily trading volume of 2,684 shares. Although it has appreciated 114.4% year-to-date and 73.0% over one year, its performance lags behind the other three miners. With net inflows of $0.75 million year-to-date, this ETF may not remain viable, as it typically needs to reach a $50 million minimum level to sustain itself.

The remaining ETFs

The remaining ETFs in the list of 11 covered in this article include GBUG, SLVR, AGQ and ZSL. Here's a look at how they are performing and how that compares to the ones already discussed (again, see Figure 4).

- ***Sprott Active Gold & Silver Miners ETF (GBUG)***

GBUG is unique in that it holds both gold and silver miners. However, it is too new to evaluate here, with only six months of history.

- ***Sprott Silver Miners & Physical Silver ETF (SLVR)***

SLVR is also a newcomer, with only eight months of history. Consequently, it is too early to assess its performance or compare it to other ETFs in this space. Interested investors may want to keep it on their watchlist for a few years to evaluate its suitability for portfolio inclusion.

- ***ProShares Ultra Silver (AGQ)***
- ***ProShares UltraShort Silver (ZSL)***

Both AGQ and ZSL were launched in December 2008 and are sponsored by ProShares. They are double-leveraged mirror-image ETFs, with AGQ being +2× bullish and ZSL being –2× bearish.

As expected, ZSL has performed poorly during rising periods, making it suitable primarily for nimble traders looking to profit quickly during market corrections. Average investors and traders should generally avoid this ETF.

AGQ, despite being double leveraged, has shown significant performance only over the past three years; it has not fared well in longer-term evaluations. Over ten years, its average total return of 8.56% ranks as the second worst in the group. It has not delivered the expected enhanced results for the heightened risk involved. Therefore, most traders and investors would be advised to avoid this ETF, though experienced and agile traders could potentially capitalize on a bull run with proper risk management, position sizing, and adherence to their trading strategies and rules.

THE ETN

The only ETN in the list of 11 symbols considered in this article is SLVO. Here's a quick look at its structure, its performance, and how it compares to the others in Figure 4.

• UBS AG ETRACS Silver Shares Covered Call ETN (SLVO)

SLVO employs covered call writing to enhance its performance. It is an exchange-traded note (ETN), not an ETF. It is an unsecured debt instrument issued by a financial institution that tracks an index. Interested investors should be sure to read the SLVO prospectus and fact sheet to fully understand its structure and associated risks. In the past dozen years, it has only captured $233 million in AUM. Its 0.65 expense ratio puts it in the middle of the pack. Average daily trading volume is quite low at 33,000. Its 2025 YTD return of 46.6% puts it in last place of the group, while its five-year return was tied for first place at 14.7%, but that's only a few basis points higher than SLV or SIVR. The year-to-date inflows of only $33.9 million is low. Based on its metrics, there doesn't seem to be any reason to consider this one at this time over its higher-performing competitors.

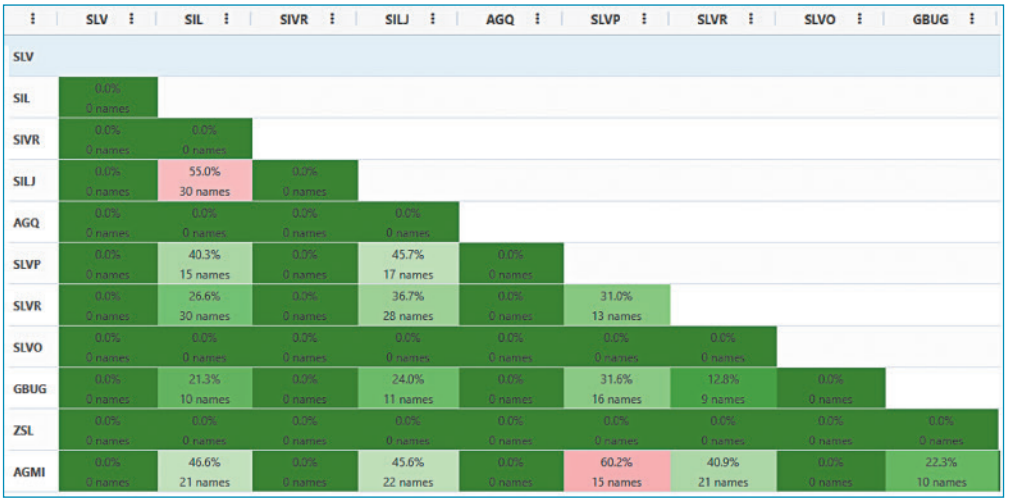


FIGURE 5: ETF HOLDINGS OVERLAP. SIL, SILJ, and SLVO have the highest number of stocks in common. This contrasts with SLV, SIVR, AGQ, and SLV, which do not have any overlapping stocks with other ETFs.

SILVER ETF STOCK PORTFOLIO OVERLAP

Figure 5 provides a birds-eye view of the stocks held most in common by the eleven ETFs. AGMI has the largest number of stocks that are held by the other ETFs. The largest overlap is 60.2% or 15 names held in common with SLVP. SIL and SILJ have a 55% duplication between them, which translates to 30 stocks in common. Note that the pure metal ETFs have 0% readings,

Name	Ticker	# Funds 1
Wheaton Precious Metals Corp	WPM-CA	6
Coeur Mining, Inc.	CDE-US	6
Endeavour Silver Corp.	EDR-CA	6
Pan American Silver Corp.	PAAS-CA	6
Discovery Silver Corp	DSV-CA	6
SSR Mining Inc	SSRM-CA	6
Aya Gold & Silver Inc.	AYA-CA	6
First Majestic Silver Corp.	AG-CA	5
Hecla Mining Company	HL-US	5
Industrias Penoles SAB de CV	PE&OLES-MX	5
Fresnillo PLC	FRES-GB	5
OR Royalties Inc.	OR-CA	5
Silvercorp Metals Inc.	SVM-CA	5
Vizsla Silver Corp.	VZLA-CA	5

FIGURE 6: STOCKS HELD MOST IN COMMON IN THE ETFS. The first seven stocks listed are held by six of the ETFs, while the next seven stocks are held by five of the ETFs.

Year	GLD	SLV	S&P 500
2025	42.38%*	55.83%*	13.91%*
2024	26.66%	20.28%	24.89%
2023	12.69%	-2.98%	26.18%
2022	-0.77%	4.66%	-18.18%
2021	-4.15%	-15.78%	28.73%
2020	24.81%	45.90%	18.33%
2019	17.86%	15.35%	31.22%
2018	-1.94%	-9.98%	-4.57%
2017	12.81%	4.85%	21.71%
2016	8.03%	12.18%	12.00%
2015	-10.67%	-11.83%	1.23%
2014	-2.19%	-22.17%	13.46%
2013	-28.33%	-38.41%	32.31%
2012	6.60%	5.01%	15.99%
2011	9.57%	-11.06%	1.89%
2010	29.27%	77.01%	15.06%
2009	24.03%	49.40%	26.35%
2008	4.92%	-24.61%	-36.79%
2007	30.45%	13.09%	5.15%
2006	22.55%	-0.28%	15.85%
2005	17.76%	N/A*	4.83%

FIGURE 7: ANNUAL RETURNS OF GLD, SLV, AND SPY. GLD has been the best performer over the past nineteen years, while SLV beat GLD in 2007, 2009, 2010, 2016, 2020, 2022, and 2025 so far. SPY beat both GLD and SLV in 2012 through 2015, 2017, 2019, and 2021 through 2023. ***NOTE:** Data for SLV starts in April 2006, so there is no full-year return for 2005. The 2005 data represents the year-to-date (YTD) return as of late September 2025, not the full annual return.

as they only hold the metal and not mining companies.

Figure 6 shows the mining stocks held most in common by the ETFs. Only Hecla Mining (HL) and Coeur Mining, Inc. (CDE) are American companies, while ten are from Canada. Interestingly, during a former metals bull run, these two companies experienced spectacular stock price appreciation in late 2016 through early 2017, with HL zooming 177.2% and CDE catapulting 266.5%.



STOCKCHARTS.COM

FIGURE 8: SILVER MINER ETFS VS. SILVER METAL ETFS. The miner ETFs and metal ETFs tracked each other very closely. However, the miner ETF SLVP (in green) led the pack with a return of nearly 49%.

Figure 7 provides a 20-year price performance comparison of gold and silver ETFs compared to the S&P 500 (SPY) through September 26, 2025. The SPY produced better returns in 2012 through 2015, 2017 through 2019, 2021, and 2023. Gold was the leader in 2005 through 2008, 2011, 2013, 2018, and 2024. Silver was only able to be the leader in 2010 (margin of at least 47 percentage points over GLD), marginally in 2016, solidly in 2020 (margin of 21 percentage points over GLD), 2022, and so far into late September 2025 (margin of 13.5 percentage points over GLD).

Cumulatively since January 1, 2006, GLD has produced a total return of 545.6%. SLV returned 203.11% (no dividends declared), and SPY returned 415.28%. So, over almost the last 19 years, gold has been the "golden" investment with much less volatility than the S&P 500. I'm sure not many of you were aware of that fact.

However, measuring the price performance since January 1, 2020, SLV has led the pack with a return of 148.57%, compared to 137.72% for GLD and 105.27% for SPY. Even with the Magnificent Seven stocks and tech stock boom, these two metals have outpaced SPY, but QQQ beat them all with a return of 178.26% with higher volatility.

Ticker	Overall Signal	Short Term Signal	Inter. Term Signal	Long Term Signal
SLV	Buy	Buy	**Buy—Strong**	Buy
SIL	Buy	**Buy—Strong**	Buy	Buy
SIVR	Buy	Buy	**Buy—Strong**	Buy
SILJ	**Buy—Strong**	**Buy—Strong**	**Buy—Strong**	Buy
AGQ	Buy	Buy	Buy—Strong	Buy
SLVP	Buy	Buy	Buy—Strong	Buy
SLVR	**Buy—Strong**	**Buy—Strong**	**Buy—Strong**	Buy
SLVO	**Buy—Strong**	**Buy—Strong**	**Buy—Strong**	Buy
GBUG	Buy	Buy	**Buy - Strong**	Neutral
ZSL	**Sell**	**Sell**	**Sell—Strong**	**Sell**
AGMI	Buy	**Buy—Strong**	**Buy—Strong**	Neutral

ETFACTION.COM

FIGURE 9: RECENT BUY RATINGS. Here you see some buy and sell indications from ETFaction.com based on their proprietary indicators for silver-related ETFs as of September 26, 2025. Overall, the service is bullish on most of these ETFs. The signals are further broken down by timeframe to differentiate between signals based on a short-term outlook or a longer-term outlook for the given ETF.



[Silver] is ductile as well, possessing the highest thermal and electrical conductivity of any metal.

PRICE PERFORMANCE: SILVER MINER VS. SILVER METAL ETFS

Figure 8 compares three silver mining ETFs from November 29, 2012 through September 26, 2025. During this period, SIL increased by 18.4%, SILJ gained 26.9%, and SLVP was up 47.9%, while SLV rose by 28.4%. Over-

all, it was a mixed performance, as SLV outperformed two of the three miners, but SLVP surpassed SLV by a substantial 29.5 percentage points.

Notable price peaks occurred in early 2013, mid-2016, mid-2020 through the first quarter of 2021, and finally, a breakout to new all-time highs around August 1, 2025. Essentially, since the peak in early 2013, these ETFs were stagnant until August 2025, marking a dozen years of underperformance.

In contrast, during this same period, SPY returned 485.7% while QQQ advanced by 914.7%, significantly outperforming the metal and its miners. Interestingly, the bullish leveraged silver ETF AGQ actually declined by 66.7% during this timeframe. This inferior performance can be attributed to numerous market declines and flat markets, which exacerbate challenges for leveraged ETFs. However, AGQ gained 169.4% from March 9, 2020 to September 26, 2025, compared to a 163.6% increase for the non-leveraged SLV, still not a great performance. Thus, the additional risk taken with AGQ was not justified for investors. This serves as an example of how significant market fluctuations can lead to underperformance in leveraged ETFs.

Moreover, ZSL, the –2× ProShares UltraShort Silver ETF, plummeted by 95.1% during this seven-year period, even though it had gained nearly 227% from November 26, 2012 to November 5, 2014 due to a decline in metal prices. Major bull market rallies negatively impacted the performance of this ETF over the years.

Published Buy and Sell Recommendations and Ratings

The ETFaction.com website, a comprehensive ETF data and analytics company, has rated each of the ETFs discussed in this article. Figure 9 provides their recent buy and sell recommendations based on their proprietary indicators. Clearly, their strong buys overall are SILJ, SLVR, and SLVO. All others, except for the –2× ZSL, was rated a buy. Additionally, their signals were further broken down by short-, intermediate-, and long-term. Clearly, this website is very bullish on this category.

The VectorVest.com website, a subscription-based service, recently rated all these ETFs with a "buy" rating except for ZSL, which it rates a "sell." Moreover, of the 52 sectors that are tracked, mining is ranked #1 based on VectorVest's proprietary fundamental and technical factors. In addition, of the 222 industry groups that it tracks, the mining (gold/silver) stocks are ranked 7th overall. Lastly, of the 211 gold and silver stocks it tracks, there are 188 "buys" and 23 "holds." Thus, this website also seems overall very bullish on this category.

Mining stocks typically exhibit higher volatility and higher returns than physical metal ETFs during significant bullish trends.



Conclusions

So far in 2025, the silver and gold precious metal-related ETFs have performed exceptionally well, continuing in a four-year uptrend in which SLV gained 148.6% compared to GLD's 137.7% increase and SPY's advance of 105.3%. Given their recent performance, these ETFs have provided a valuable contribution to investors' portfolios, especially since they also offer some diversification from the stock market in case the stock market falters or enters bear market territory. For aggressive investors, the ETFs focused on mining companies offer stronger potential for capital appreciation, albeit with higher volatility and risk (as spelled out in their prospectuses). Conversely, the basic silver commodity ETFs would be a better choice for conservative investors since those ETFs seek to provide a more stable, less volatile performance, per their prospectuses and as reflected in their historical performances.

The well-known gold/silver ratio currently hovers around 90:1, significantly higher than its long-term average of about 50:1. This suggests that silver is undervalued compared to gold based on historical benchmarks.

Given the solid performance by some of these silver ETFs and given the recent buy recommendations mentioned earler, investors and traders may wish to consider some of these silver ETFs. Most analysts appear to have recently confirmed their bullish outlook on silver, citing strong industrial demand and ongoing supply deficits. While volatility is expected in the short term, the forecasts that I viewed generally suggested continued price appreciation.

If an investor has interest in buying an ETF, utilizing common technical indicators such as MACD, RSI, CCI, moving averages, and Bollinger Bands can help determine favorable entry and exit points. It is essential to remain aware of potential downdrafts and investors should only invest within their risk tolerance. Always employ defensive strategies to protect positions from significant losses. Lastly, consult with a tax advisor regarding the tax implications of holding silver bullion,

Continued on page 53



The focus of Traders' Tips this month is John Ehlers' article in this issue, "The One Euro Filter." Here, we present the December 2025 Traders' Tips code with possible implementations in various software.

The code for the following Traders' Tips selections is posted here:

• Traders.com → S&C Magazine → **Traders' Tips**

At Traders.com you can also right-click on any chart to open it in a new tab or window and view the chart at a much larger size.

The Traders' Tips section is provided to help readers implement a selected technique from an article in this issue or another recent issue. The entries here are contributed by software developers or programmers for software that is capable of customization.

TradeStation

✦ TRADESTATION: DECEMBER 2025 TRADERS' TIPS CODE

In "The One Euro Filter" in this issue, John Ehlers presents the one euro filter indicator, originally developed by Georges Casiez, Nicolas Roussel, and Daniel Vogel. Unlike a conventional exponential moving average (EMA) that relies on a fixed smoothing constant, this indicator dynamically adjusts its coefficient in response to the rate of change in the input signal.

A sample chart plotting the indicator is shown in Figure 1.

```
Indicator: One Euro Filter
{
    TASC DEC 2025
    One Euro Filter Indicator
    From "1€ Filter: A Simple Speed-Based Low-Pass Filter
    For Noisy Input In Interactive Systems" (CHI 2012)
    By Georges Casiez, Nicolas Roussel, and Daniel Vogel
    (C) 2025 John F. Ehlers
}

inputs:
    PeriodMin( 10 ), // Minimum cutoff frequency
    BetaVal( 0.2 ); // Responsiveness factor

variables:
    Price( 0 ),
    PeriodDX( 10 ),
    AlphaDX( 0 ),
    SmoothedDX( 0 ),
    Cutoff( 0 ),
    Alpha3( 0 ),
    Smoothed( 0 );

Price = Close;
AlphaDX = 2 * 3.14159 / (4 * 3.14159 + PeriodDX);

// Initialize
if CurrentBar = 1 then
begin
    SmoothedDX = 0;
    Smoothed = Price;
end;

// EMA the Delta Price
SmoothedDX = AlphaDX * (Price - Price[1]) + (1 -
 AlphaDX) * SmoothedDX[1];
// Adjust cutoff period based on fraction of the rate of
// change
Cutoff = PeriodMin + BetaVal * AbsValue(SmoothedDX);
// Compute adaptive alpha
Alpha3 = 2*3.14159 / (4 * 3.14159 + Cutoff);
//Adaptive smoothing
Smoothed = Alpha3 * Price +
(1 - Alpha3) * Smoothed[1];
//Plot
Plot1( Smoothed );
```

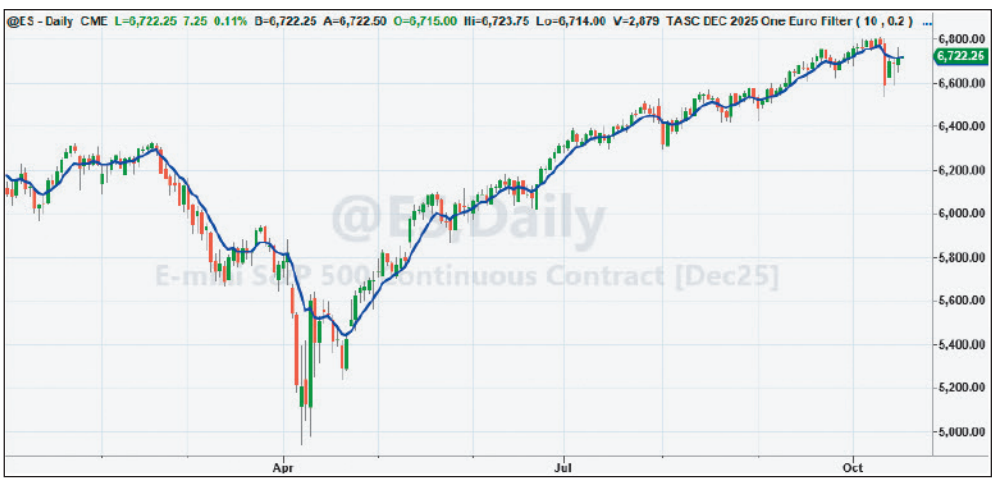


FIGURE 1: TRADESTATION. This demonstrates a daily chart of the continuous emini S&P 500 contract (ES) showing a portion of 2025 with the indicator applied.

This article is for informational purposes. No type of trading or investment recommendation, advice, or strategy is being made, given, or in any manner provided by TradeStation Securities or its affiliates.

—John Robinson
TradeStation Securities, Inc.
www.TradeStation.com

NINJATRADER®

✦ NINJATRADER: DECEMBER 2025 TRADERS' TIPS CODE

In "The One Euro Filter" in this issue, John Ehlers discussed the *one euro filter*. The indicator is available for download at the following link for NinjaTrader 8:

NinjaTrader 8: www.ninjatrader.com/SC/December2025SCNT8.zip

Once the file is downloaded, you can import the indicator into NinjaTrader 8 from within the control center by selecting Tools → Import → NinjaScript Add-On and then selecting the downloaded file for NinjaTrader 8.

You can review the indicator source code in NinjaTrader 8 by selecting the menu New → NinjaScript Editor → Indicators folder from within the control center window and selecting the file.

A sample chart is shown in Figure 2.

—Jesse N.
NinjaTrader, LLC
www.ninjatrader.com



FIGURE 2: NINJATRADER. The OneEuroFilter is demonstrated on a 5-minute chart of the emini S&P 500 (ES).



FIGURE 3: ZORRO. The OneEurFilter is applied to a daily price chart of ES.

✦ ZORRO: DECEMBER 2025 TRADERS' TIPS CODE

You know what happens when John Ehlers writes about an indicator in an article in this magazine? I crack it open and wire it straight into C for the Zorro platform. Although these days, I let ChatGPT do most of the work. The *one euro filter* is a minimalistic yet surprisingly effective low-latency smoother that reacts instantly to volatility with less lag than the usual adaptive averages tend to have. This is achieved by dynamically adapting its time period.

Here is the **OneEurFilter** function in C, converted straight from Ehlers' EasyLanguage code given in his article, with the comments left in place:

```
var OneEurFilter(vars Data, int PeriodMin, var Factor)
{
  vars SmoothedDX = series(Data[0],2), Smoothed =
series(Data[0],2);
  var Alpha = 2*PI/(4*PI + 10);
//EMA the Delta Price
  SmoothedDX[0] = Alpha*(Data[0]-Data[1]) +
(1.-Alpha)*SmoothedDX[1];
//Adjust cutoff period based on a fraction of the rate of
//change
  var Cutoff = PeriodMin + Factor*abs(SmoothedDX[0]);
//Compute adaptive alpha
  Alpha = 2*PI/(4*PI + Cutoff);
//Adaptive smoothing
  return Smoothed[0] = Alpha*Data[0] +
(1.-Alpha)*Smoothed[1];
}
```

Figure 3 shows an example of the OneEurFilter applied on an ES chart. It reproduces perfectly the chart in Ehlers' article. Cheap, efficient, low-latency—I'd say it's one euro well spent.

The code can be downloaded from the 2025 script repository on https://financial-hacker.com. The Zorro platform can be downloaded from https://zorro-project.com.

—Petra Volkova
The Zorro Project by oP group Germany
https://zorro-project.com

TradingView

✦ TRADINGVIEW: DECEMBER 2025 TRADERS' TIPS CODE

The TradingView Pine Script code given here implements the one euro filter that is discussed by John Ehlers in his article in this issue, "The One Euro Filter."

A sample chart is shown in Figure 4.

```
// TASC Issue: December 2025
//    Article: Low-Latency Smoothing
//             The One Euro Filter
//  Article By: John F. Ehlers
//    Language: TradingView's Pine Script® v6
// Provided By: PineCoders, for
// tradingview.com

//@version=6
indicator("", "TASC", false)

//#region Constants

const float PI = math.pi

//#endregion

//#region Inputs

enum OM
   HP = "High Pass Filter"
   RSI = "Relative Strength Index"
   BBW = "Bollingers Band Width %"
   CCI = "Commodity Channel Index"
   ST = "Stochastic"
   CMO = "Chande Momentum Oscillator"
   ATR = "Average True Range"
   MFI = "Money Flow Index"
   MOM = "Momentum"

float src = input.source(close, "Source:")
int period = input.int(10, "Period:")
int minPeriod = input.int(10, "Min. Period:")
float beta = input.float(0.2, "Beta:")
OM oscMethod = input.enum(OM.HP, "Osc. Method:", inline =
"osc")
int oscPeriod = input.int(20, "Osc. Period:")

//#endregion

//#region Functions

// @function High Pass Filter.
HP (float Source, int Period) =>
   float a0 = PI * math.sqrt(2.0) / Period
   float a1 = math.exp(-a0)
   float c2 = 2.0 * a1 * math.cos(a0)
   float c3 = -a1 * a1
   float c1 = (1.0 + c2 - c3) * 0.25
   float hp = 0.0
   if bar_index >= 4
      hp := c1 * (Source - 2.0 * Source[1] + Source[2]) +
         c2 * nz(hp[1]) + c3 * nz(hp[2])
   hp

// @function One Euro Filter.
one_euro (float src=close,
 int period=10, int minPeriod=10, float beta=0.2) =>
   float _a = 2.0 * PI / (4.0 * PI + period)
   float _sm = src , float _sdx = 0.0
   _sdx := _a * (src - src[1]) + (1.0 - _a) * nz(_sdx[1])
   // Adjust cutoff period based on fraction
  // of the ROC.
   float _cutoff = minPeriod + beta * math.abs(_sdx)
   // Compute adaptive alpha
   float _a3 = 2.0 * PI / (4.0 * PI + _cutoff)
   // Adaptive smoothing
   _sm := _a3 * src + (1.0 - _a3) * nz(_sm[1])
   _sm

//#endregion

//#region Calculations

float oeFilter = one_euro(src, period, minPeriod, beta)

float osc = switch oscMethod
   OM.HP => HP(src, oscPeriod)
   OM.RSI => ta.rsi(src, oscPeriod)
   OM.BBW => ta.bbw(src, oscPeriod, 2.0)
   OM.CCI => ta.cci(src, oscPeriod)
   OM.ST => ta.stoch(src, src, src, oscPeriod)
   OM.CMO => ta.cmo(src, oscPeriod)
   OM.ATR => ta.atr(oscPeriod)
   OM.MFI => ta.mfi(src, oscPeriod)
   OM.MOM => ta.mom(src, oscPeriod)
   => 0.0

float oscFilter = one_euro(osc, period, minPeriod, beta)

//#endregion

//#region Display

plot(oeFilter, force_overlay=true)

plot(osc)
plot(oscFilter, "", color.red)

//#endregion
```



FIGURE 4: TRADINGVIEW. Here you an example of the one euro filter plotted on a price chart of the daily ES. The relative strength index is plotted in the bottom pane.

The indicator is available on TradingView from the PineCodersTASC account at https://www.tradingview.com/u/PineCodersTASC/#published-scripts

—PineCoders, for TradingView
www.TradingView.com

WealthLab.com

✦ WEALTH-LAB: DECEMBER 2025 TRADERS' TIPS CODE

We have added the *one euro filter* to our "TASC Indicators" library in the latest release of the Wealth Lab 8 backtesting

platform. Figure 5 shows an example of the one euro filter plotted on a chart of SPY. In the bottom pane, we applied the one euro filter to a highpass indicator with a period of 54 to turn it into an oscillator, as John Ehlers describes in his article in this issue ("The One Euro Filter"). For that, we used Wealth Lab's **IndOnInd** indicator, which allows the user to apply one indicator to another, the perfect use case for this type of operation.

—Dion Kurczek
Wealth-Lab team
www.wealth-lab.com



✦ NEUROSHELL TRADER: DECEMBER 2025 TRADERS' TIPS CODE

The *one euro filter* and *one euro oscillator*, which are discussed in John Ehlers' article in this issue, "The One Euro Filter," can be easily implemented in NeuroShell Trader using NeuroShell Trader's ability to call external dynamic linked libraries. Dynamic linked libraries (DLLs) can be written in C, C++, or Power Basic.

After moving the code given in Ehlers' article to your preferred compiler and creating a DLL, you can insert the resulting indicator(s) as follows:

1. Select '**New Indicator …**' from the *insert* menu.
2. Choose the **External Program & Library Calls** category.
3. Select the appropriate **External DLL Call** indicator.
4. Setup the parameters to match your DLL.
5. Select the *finished* button.

Users of NeuroShell Trader can go to the STOCKS & COMMODITIES section of the NeuroShell Trader free technical support website to download a copy of this or any previous Traders' Tips.

—Ward Systems Group, Inc.
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www.neuroshell.com



FIGURE 5: WEALTH-LAB. The one euro filter is plotted on a daily price chart of SPY. In the bottom pane, an oscillator created from the one euro filter is plotted.

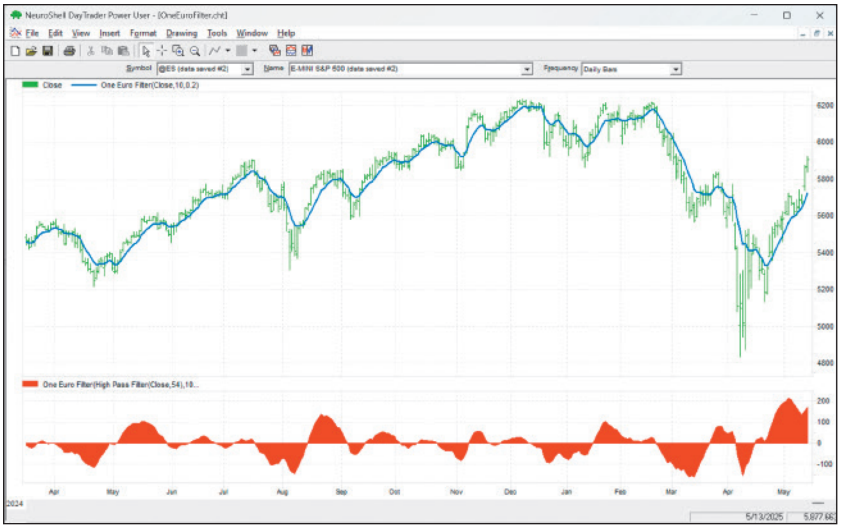

FIGURE 6: NEUROSHELL TRADER. This example NeuroShell Trader chart displays the one euro filter on a daily price chart of ES, with the one euro oscillator displayed in the bottom pane.

✦ PYTHON: DECEMBER 2025 TRADERS' TIPS CODE

In his article in this issue, "The One Euro Filter," John Ehlers discusses the *one euro filter*, which was originally developed and written about by Georges Casiez, Nicolas Roussel, and Daniel Vogel in 2012. In his article in this issue, Ehlers demonstrates how to plot this smoothing filter, discusses its effectiveness, and also discusses how this smoothing filter can be converted into an oscillator.

Following is a Python code implementation based on the EasyLanguage code provided in Ehlers' article for the one euro filter and oscillator.

An example chart is provided in Figure 7.

```
"""
Written By: Rajeev Jain, jainraje@yahoo.com

Python code to implement concepts in Technical Analysis of
S&C Magazine
December 2025 article "The One Euro Filter" by John F Ehlers.
This python
code is provided for Trader Tips section of the magazine.
```

Github link to Jupyter notebook with python code for article:
https://github.com/jainraje/TraderTipArticles/blob/main/dec_2025_one_euro_filter_final.ipynb
"""

```
# import required python libraries

import pandas as pd
import numpy as np
import yfinance as yf
import math
import datetime as dt
import matplotlib.pyplot as plt
import mplfinance as mpf

print(yf.__version__)

# three helper functions to 1) run one euro filter calculations 2) run
# oscillator calculations and to 3) plot the close vs one euro filter output
# on one subplot and the oscillator on a second subplot using built-in
# matplotlib capabilities.

def calc_one_euro_filter(close, period_min=10, beta=0.2):
    """
    One Euro Filter Indicator
    Adapted from Georges Casiez et al. (CHI 2012)
    Converted from EasyLanguage to Python

    Args:
        close (array-like): List or NumPy array of closing prices
        period_min (float): Minimum cutoff period (default=10)
        beta (float): Responsiveness factor (default=0.2)

    Returns:
        np.ndarray: Smoothed signal
    """
    close = np.asarray(close)
    n = len(close)

    # Initialize arrays
    smoothed = np.zeros(n)
    smoothed_dx = np.zeros(n)

    period_dx = 10.0
    alpha_dx = 2 * np.pi / (4 * np.pi + period_dx)

    # Initialization
    smoothed[0] = close[0]
    smoothed_dx[0] = 0.0

    for i in range(1, n):
        # Delta smoothing (EMA of price change)
        smoothed_dx[i] = alpha_dx * (close[i] - close[i - 1]) + (1 - alpha_dx) * smoothed_dx[i - 1]

        # Adjust cutoff based on rate of change
        cutoff = period_min + beta * abs(smoothed_dx[i])

        # Compute adaptive alpha
        alpha3 = 2 * np.pi / (4 * np.pi + cutoff)

        # Adaptive smoothing
        smoothed[i] = alpha3 * close[i] + (1 - alpha3) * smoothed[i - 1]

    return smoothed

def calc_highpass(price, period):
    """
    Two-pole high-pass filter (John Ehlers style)

    Args:
        price (array-like): Sequence of prices
        period (float): Filter period

    Returns:
        np.ndarray: High-pass filtered values
    """
    price = np.asarray(price, dtype=float)
    n = len(price)
    out = np.zeros(n)

    # Filter coefficients
    a1 = np.exp(-1.414 * np.pi / period)
    b1 = 2 * a1 * np.cos(math.radians(1.414 * 180 / period))
    c2 = b1
    c3 = -a1 ** 2
    c1 = (1 + c2 - c3)/4

    # Main filter loop
    for i in range(2, n):
        out[i] = (
            c1 * (price[i] - 2 * price[i - 1] + price[i - 2])
            + c2 * out[i - 1]
            + c3 * out[i - 2]
        )

    # Initialize first values (pass-through)
    out[0:2] = price[0:2]
```

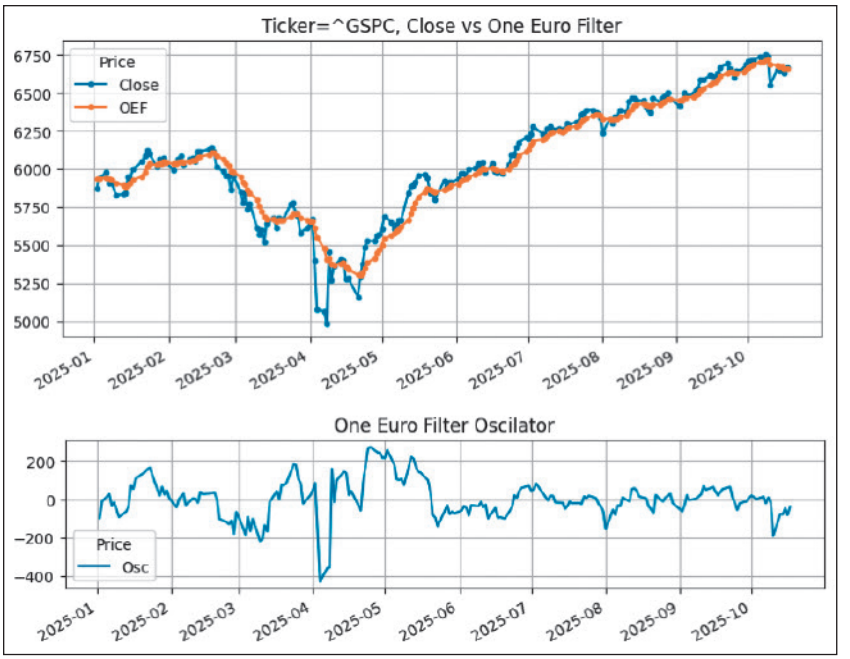

FIGURE 7: PYTHON. The one euro filter (OEF) is plotted on a chart of the S&P 500 index (GSPC) using data from Yahoo Finance, from January 2025. The one euro oscillator is plotted in the bottom pane.

```
    return out

def plot_one_euro_filter(df):

    ax = df[['Close', 'OEF']].plot(grid=True,
title=f"Ticker={symbol}, Close vs One Euro Filter", figsize=(9,4),
marker='.')
    ax.set_xlabel('')

    ax = df[['Osc']].plot(grid=True, title=f"One Euro Filter Oscilla-
tor", figsize=(9,2))
    ax.set_xlabel('')

# Use Yahoo Finance python package to obtain OHLCV data
for desired symbol

symbol = '^GSPC'
start = "1990-01-01"
end = dt.datetime.now().strftime('%Y-%m-%d')

ohlcv = yf.download(
    symbol,
    start,
    end,
    group_by="Ticker",
    auto_adjust=False
)
ohlcv = ohlcv[symbol]

# call helper functions to calculate the One Euro Filter output
(named OEF) and the
# Oscillaor output (named Osc) and then plot close, OEF and
Ocs values.

df['OEF'] = calc_one_euro_filter(df['Close'], period_min=10,
beta=0.2)
df['Osc'] = calc_highpass(df['Close'], period=54)
plot_one_euro_filter(df['2025':])
```

—Rajeev Jain
jainraje@yahoo.com

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MASONSON/WHY TRADE ETFS?

Continued from page 47

coins, or ETFs, as tax rules and tax rates can vary. And as always, caveat emptor!

S&C contributing writer and ETF columnist Leslie N. Masonson is president of Cash Management Resources, a firm focusing on ETF trading strategies. He is an active NASDAQ futures day trader and the author of seven books. His new book is The QQQ & TQQQ ETF Profit Machine: A Roadmap For Trading And Investing In Cutting-Edge AI-Focused Tech Titans. *Contact him at lesmasonson@yahoo.com or 845 323-7276.*

FURTHER READING & RESOURCES

Masonson, Leslie [2025]. "Gold ETFs: A Good Time To Buy This Flashy Metal?" *Technical Analysis of* STOCKS & COMMODITIES, Volume 43: January.

Smith, Richard [2025]. "Anatomy Of A Crisis," https://www.youtube.com/watch?v=5repG5yp8m8

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Machine Learning Corner



Domenico D'Errico

MACHINE LEARNING MEETS TECHNICAL TRADING

Want to better understand complex concepts like pattern recognition, forecasting, and classification—in plain English without complex formulas? Domenico D'Errico has over 20 years of experience in the financial markets, including as a quant developer for small hedge funds. He is the author of TradeStation EasyLanguage for Algorithmic Trading *(2024). He offers the EasyLangage Crash Course at https://gandalfproject.com/easylanguage-crash-course-beginner-level/. In this column, he explains how the core concepts of machine learning for pattern recognition often have more in common with traditional trading techniques than you might expect. Have a question? Send it to dderrico@tradingalgo.it. Selected questions will appear in a future issue of S&C.*

USING TRADESTATION IN MACHINE LEARNING MODEL DEVELOPMENT

Last month, you mentioned that Python programmers could follow your roadmap for the analysis you described. Can EasyLanguage be used to the same end?

Yes, EasyLanguage can definitely be used to follow similar roadmaps for machine learning (ML) purposes—although in a different, more hands-on way than Python. Since EasyLanguage doesn't have built-in complex mathematical libraries, you often need to work a bit more "manually," explicitly coding the mathematical relationships between features and targets. (For a refresher on these terms, see sidebar, "Features And Targets," or see my column in the September 2025 issue.)

But that's not necessarily a drawback. In fact, it often promotes greater transparency and helps avoid the blackbox effect that can sometimes accompany machine learning.

According to my experience, there are three main ways you can use EasyLanguage for machine learning:

1. Hybrid approach: Python and EasyLanguage (model developed in Python)

In this approach (see Figure 1), TradeStation exports raw OHLCV data as a CSV file, then Python handles everything—feature creation, target engineering, model training, prediction generation. Then the out-of-sample (OOSS) predictions are exported as CSV and imported into TradeStation for analysis and execution.

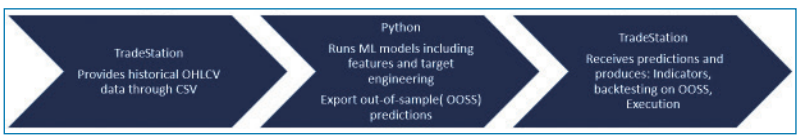


FIGURE 1: HYBRID APPROACH, PYTHON AND EASYLANGUAGE, WITH MODEL DEVELOPMENT IN PYTHON. In this approach, all the modeling work is performed in the Python environment using Python tools and libraries. The results (model predictions) are exported to TradeStation for backtesting, charting, and analysis as well as live trading.

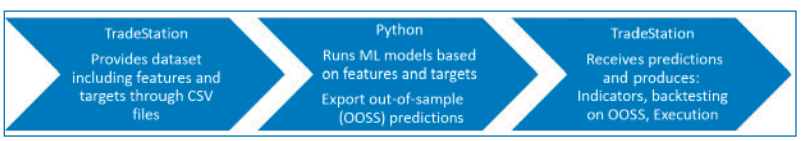


FIGURE 2: HYBRID APPROACH, PYTHON AND EASYLANGUAGE, WITH MODEL DEVELOPMENT IN TRADESTATION. In this approach, the features and targets for the trading model originate in TradeStation. This prebuilt dataset is then imported into Python for training, validation, and generating predictions. The results (model predictions) are exported back to TradeStation for backtesting, charting, and analysis as well as live trading.



FIGURE 3: EASYLANGUAGE-ONLY APPROACH. In this approach, only the TradeStation platform is used for model creation, backtesting, analysis, and live trading.

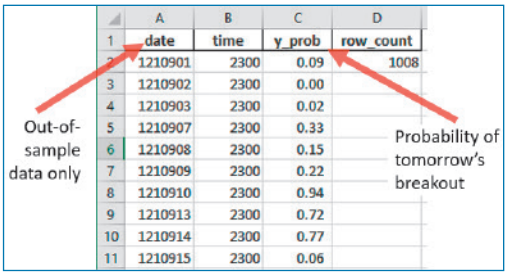
Python skill level: Advanced
Requires solid knowledge of data handling libraries such as Pandas, NumPy, and machine learning toolkits such as Scikit-learn and TensorFlow.

2. Hybrid approach: Python and EasyLanguage (model developed in EasyLanguage)

In this approach (see Figure 2), TradeStation exports a prebuilt dataset (with features and targets) as a CSV file. Then, Python trains and validates ML models on that dataset, produces predictions, and exports them as CSV to be imported into TradeStation for analysis and execution.

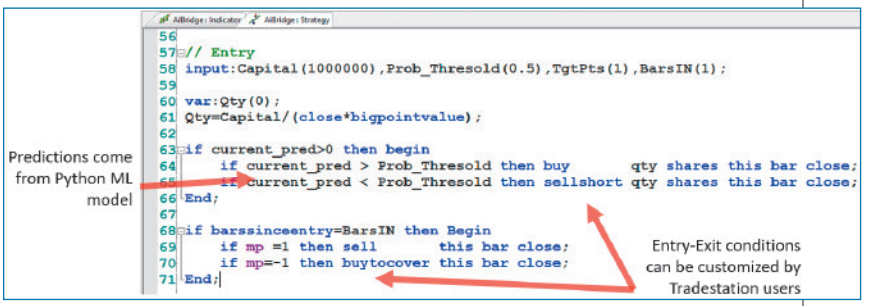
The "features" could be any custom indicator you plot on your charts; there is no need to program it in Python or to disclose the indicators, which are coded in EasyLanguage.

Python skill level: Basic
To use this approach, you need to know how to work with CSV files and understand basic ML models. One helpful tool geared toward nonprogrammers that users can



	A	B	C	D
1	date	time	y_prob	row_count
2	1210901	2300	0.09	1008
3	1210902	2300	0.00	
4	1210903	2300	0.02	
5	1210907	2300	0.33	
6	1210908	2300	0.15	
7	1210909	2300	0.22	
8	1210910	2300	0.94	
9	1210913	2300	0.72	
10	1210914	2300	0.77	
11	1210915	2300	0.06	

FIGURE 4: SAMPLE PYTHON OUTPUT (CSV FILE). After the Python environment is used to develop and validate a model, the model's predictions are exported as a CSV file, as shown here. In this example, each row represents a trading day and includes the model's probability estimate for tomorrow's breakout.




```
// Entry
input:Capital(1000000),Prob_Thresold(0.5),TgtPts(1),BarsIN(1);

var:Qty(0);
Qty=Capital/(close*bigpointvalue);

if current_pred>0 then begin
    if current_pred > Prob_Thresold then buy       qty shares this bar close;
    if current_pred < Prob_Thresold then sellshort qty shares this bar close;
End;

if barssinceentry=BarsIN then Begin
    if mp =1 then sell       this bar close;
    if mp=-1 then buytocover this bar close;
End;
```

FIGURE 5: EASYLANGUAGE. After the CSV file from Figure 4 containing the model predictions is imported into TradeStation, EasyLanguage can be used to backtest and execute the ML model.

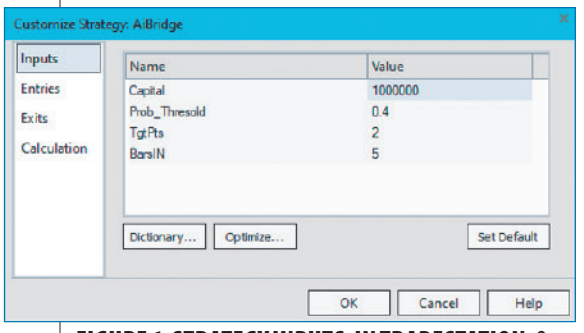


FIGURE 6: STRATEGY INPUTS, IN TRADESTATION. Once the model developed in Python is imported into TradeStation for backtesting and analysis, users can customize the strategy using TradeStation's familiar strategy input settings, as demonstrated here. However, entry signals will come only from out-of-sample probability predictions provided by the machine learning model.

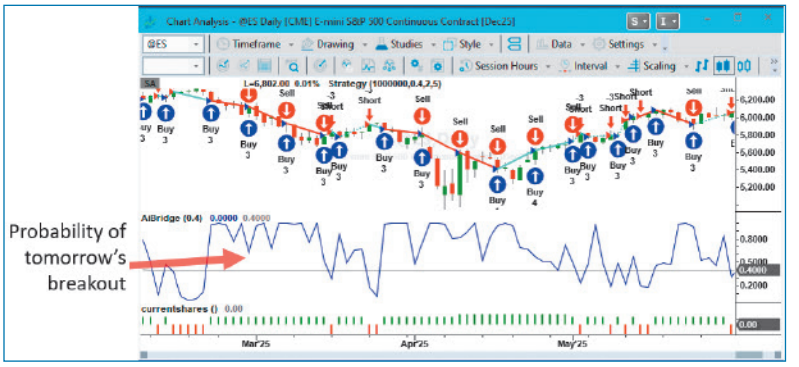


FIGURE 7: STRATEGY SIGNALS, IN TRADESTATION. After the resulting model is imported into TradeStation and set up as a strategy using the settings in Figure 6, the user can view the strategy and predictive model on a chart. Here, you see example entry/exit signals from the strategy on a price chart of ES, with the predictive model (based on the predictions exported from Python) plotted in the bottom pane. In this example, the predictive model is the probability for tomorrow's breakout.

consider using to help with this approach is Orange Data Mining (Orangedatamining.com), a visual machine learning and data analysis tool built in Python. It was designed for users who prefer a no-code or low-code approach.

3. EasyLanguage only (no Python)

As shown in Figure 3, in this approach, everything is implemented inside TradeStation using EasyLanguage—from model logic (for example, linear or logistic regression) to backtesting to live execution. This approach is simpler but you are limited to using only basic ML methods.

Python skill level: None

Python not required; all logic is coded and executed in EasyLanguage and TradeStation.

Let's look at a practical example of using the first approach listed above that uses Python for the machine learning models and TradeStation for the backtesting and analysis platform. For this example, we'll continue the research from last month on predicting breakouts in the emini S&P 500 futures (ES). Specifically, we want to determine whether the high of the next one to ten forward days will be at least *n* points higher than today's close.

The workflow integrates machine learning in Python with TradeStation's EasyLanguage environment, enabling statistical validation in Python and financial backtesting in EasyLanguage. By displaying the predictive model directly on the chart, traders gain greater confidence in its reliability—they can visualize predictions on the same charts they are already familiar with, using the trading tools they've customized to their own style.

In Figure 4, you can see the output generated by Python for this example. It's a CSV file containing out-of-sample predictions, where each row represents a trading day and includes the model's probability estimate for tomorrow's breakout. This file acts as a bridge between the Python model and TradeStation, ensuring that only unseen data are used for backtesting.

Figure 5 demonstrates how EasyLanguage can be used to backtest and execute the ML model. The code here is intentionally minimal, since the main math has been done in Python.

In Figure 6, you can see the strategy inputs, where the users can customize

their strategy by setting the capital to trade, the probability threshold, and the exit conditions, just as in a normal strategy. However, remember that this is not a conventional strategy, as it takes entry signals only from out-of-sample probability predictions provided by a machine learning model.

In Figure 7 you can see a chart with both the probability for tomorrow's breakout and the entry/exit signals.

In Figure 8, you can see the out-of-sample equity line produced by the TradeStation backtest. Python trained the model using historical data from 2005 to September 2021, then tested and statistically validated it on data from 2021 to 2025. Finally, the out-of-sample predictions were passed to TradeStation for financial backtesting.



FIGURE 8: EQUITY CURVE FROM BACKTEST, IN TRADESTATION. This shows an example out-of-sample equity line produced by the TradeStation backtest, based on the out-of-sample model predictions that were passed from Python to TradeStation for backtesting.

To recap the research introduced in last month's issue:

We can build a machine learning model using TradeStation data for emini S&P 500 futures (ES) to predict tomorrow's breakout probability. Once Python validates the model statistically, we can export the out-of-sample predictions and backtest them in EasyLanguage.

The real advantage of combining TradeStation with Python isn't just brokerage execution—it's giving traders greater control and confidence in their strategy, helping them trust what is often seen as an unfamiliar task: applying machine learning to the markets. By being able to put their fingers on the charts, visualize the predictions, and compare the model's output on historical data with what they have experienced in real life, traders can develop a much deeper level of understanding and trust.

This file acts as a bridge between the Python model and TradeStation, ensuring that only unseen data are used for backtesting.

Anyway, the key takeaway is simple: Every trader should use the analytical tools they feel most comfortable with. These tools must be intuitive for them, not necessarily for everyone else. That's why electronic engineers often use formulas from signal processing, why biologists prefer classification methods inspired by plant taxonomy, and why data scientists rely on AI models that, to them, are perfectly transparent.

So the question isn't "Which tool is best?" but rather "Which tool do I trust—and understand well enough—to base my trading decisions on?"

It takes time, study, and a touch of customization, but the journey can start with good old-style EasyLanguage—your doorway to algorithmic trading and machine learning, which at the end of the story are just two sides of the same coin.

READING & RESOURCES

D'Errico, Domenico [2024]. *TradeStation EasyLanguage For Algorithmic Trading: Discover Real-World Institutional Applications Of Equities, Futures, And Forex Markets*, Packt Publishing.

D'Errico, Domenico [2025]. "Machine Learning Corner," *Technical Analysis of* STOCKS & COMMODITIES, Volume 43: September.

- Orangedatamining.com
- EasyLangage Crash Course at https://gandalfproject.com/easy-language-crash-course-beginner-level

‡TradeStation

‡See Editorial Resource Index

FEATURES AND TARGETS

In machine learning, a model is trained on thousands of past examples where a known outcome occurred. It then learns to associate that outcome (called the *target*) with the conditions that came before it (called the *features*).

Essentially, ML starts from the outcome and works backward to learn the signals that preceded it.

Thus, in this regard, a pattern is composed of two parts:

Features—Measurable pieces of information from the past

Target—What you want to predict.

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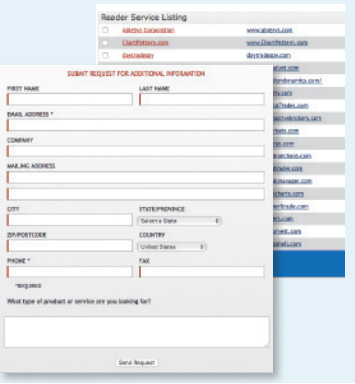

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FUTURES LIQUIDITY

Trading liquidity is often overlooked as a key technical measurement in the analysis and selection of commodity futures. The following explains how to read the futures liquidity chart published by *Technical Analysis of* STOCKS & COMMODITIES every month.

COMMODITY FUTURES

The futures liquidity chart shown below is intended to rank publicly traded futures contracts in order of liquidity. Relative contract liquidity is indicated by the number of dots on the right-hand side of the chart.

This liquidity ranking is produced by multiplying contract point value times the maximum conceivable price motion (based on the past three years' historical data) times the contract's open interest times a factor (usually 1 to 4) for low or very high volumes. The greatest number of dots indicates the greatest activity; futures with one or no dots show little activity and are therefore less desirable for speculators.

Courtesy of CBOT



All futures listed are weighted equally under "contracts to trade for equal dollar profit." This is done by multiplying contract value times the maximum possible change in price observed in the last three-year period. Thus, all numbers in this column have an equal dollar value.

Columns indicating percent margin and effective percent margin provide a helpful comparison for traders who wish to place their margin money efficiently. The effective percent margin is determined by dividing the margin value ($) by the three-year price range of contract dollar value, and then multiplying by one hundred.

STOCKS

Trading liquidity has a significant effect on the change in price of a security. Theoretically, trading *activity* can serve as a proxy for trading liquidity and equals the total volume for a given period expressed as a percentage of the total number of shares outstanding. This value can be thought of as the turnover rate of a firm's shares outstanding.

Trading Liquidity: Futures

Commodity Futures	Symbol	Exchange	% Margin	Effective % Margin	Contracts to Trade for Equal Dollar Profit	Relative Contract Liquidity
S&P 500 E-Mini (Dec '25)	ESZ25	CME	6.8	14.6	3	>>>>
Nasdaq 100 E-Mini (Dec '25)	NQZ25	CME	6.5	10.9	2	>
Gold (Dec '25)	GCZ25	COMEX	5.2	8.8	2	>
Soybean Meal (Dec '25)	ZMZ25	CBOT	1	1.3	4	
Ultra T-Bond (Dec '25)	UDZ25	CBOT	4.6	25	22	
10-Year T-Note (Dec '25)	ZNZ25	CBOT	1.8	25.4	61	
Soybean (Jan '26)	ZSF26	CBOT	2	4.1	9	
5-Year T-Note (Dec '25)	ZFZ25	CBOT	1.3	23.1	83	
Russell 2000 E-Mini (Dec '25)	QRZ25	CME	4	11.4	6	
2-Year T-Note (Dec '25)	ZTZ25	CBOT	0.6	19.3	73	
30-Year T-Bond (Dec '25)	ZBZ25	CBOT	3.4	26.3	32	
Corn (Dec '25)	ZCZ25	CBOT	5	7.9	37	
Ultra 10-Year T-Note (Dec '25)	TNZ25	CBOT	2.4	31.3	56	
Euro FX (Dec '25)	E6Z25	CME	2	12.2	20	
Silver (Dec '25)	SIZ25	COMEX	8.9	14.9	4	
Sugar #11 (Mar '26)	SBH26	ICE/US	6.2	6.6	32	
Crude Oil WTI (Dec '25)	CLZ25	NYMEX	11.1	20.3	15	
Wheat (Dec '25)	ZWZ25	CBOT	6.9	9.6	26	
Natural Gas (Dec '25)	NGZ25	NYMEX	10.1	11	14	
ULSD NY Harbor (Dec '25)	HOZ25	NYMEX	8.2	12.9	8	
Bitcoin Futures (Oct '25)	BTV25	CME	25.5	29.3	1	
Dow Futures Mini (Dec '25)	YMZ25	CBOT	6.3	18.5	6	
Hard Red Winter Wheat (Dec '25)	KEZ25	CBOT	6.8	7.4	21	
Live Cattle (Dec '25)	LEZ25	CME	3.8	11.2	16	
3-Month SOFR (Dec '25)	SQZ25	CME	0.1	5.1	114	
Coffee (Dec '25)	KCZ25	ICE/US	8.7	13.7	5	
Gasoline RBOB (Dec '25)	RBZ25	NYMEX	9.6	15.9	11	
High Grade Copper (Dec '25)	HGZ25	COMEX	7.7	22	11	
S&P 500 VIX (Nov '25)	VIX25	CFE	41.8	29.1	19	
30-Day Fed Funds (Nov '25)	ZQX25	CBOT	0.1	4	80	
Cotton #2 (Dec '25)	CTZ25	ICE/US	4.4	6.7	23	
S&P Midcap E-Mini (Dec '25)	EWZ25	CME	7.3	24.4	5	
British Pound (Dec '25)	B6Z25	CME	2.6	16.1	36	
Nasdaq 100 Micro (Dec '25)	NMZ25	CME	6.5	10.9	16	
Cocoa (Dec '25)	CCZ25	ICE/US	13.3	12.2	7	
Ether Futures (Oct '25)	ERV25	CME	32.9	43.8	3	
Platinum (Jan '26)	PLF26	NYMEX	7.6	16.3	13	
S&P 500 Micro (Dec '25)	ETZ25	CME	6.8	14.6	31	
Swiss Franc (Dec '25)	S6Z25	CME	3.1	14.4	14	
Feeder Cattle (Jan '26)	GFF26	CME	3.7	7.7	6	
Lean Hogs (Dec '25)	HEZ25	CME	5.7	14.5	39	
Australian Dollar (Dec '25)	A6Z25	CME	3.2	33.6	80	

CBOT	Chicago Board of Trade, Division of CME
CFE	CBOE Futures Exchange
CME	Chicago Mercantile Exchange
COMEX	Commodity Exchange, Inc. CME Group
ICE-EU	Intercontinental Exchange-Futures—Europe
ICE-US	Intercontinental Exchange-Futures—US
KCBT	Kansas City Board of Trade
MGEX	Minneapolis Grain Exchange
NYMEX	New York Mercantile Exchange

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Trading Liquidity: Futures is a reference chart for speculators. It compares markets according to their per-contract potential for profit and how easily contracts can be bought or sold (i.e., trading liquidity). Each is a proportional measure and is meaningful only when compared to others in the same column.

The number in the "Contracts to Trade for Equal Dollar Profit" column shows how many contracts of one commodity must be traded to obtain the same potential return as another commodity. Contracts to Trade = (Tick $ value) x (3-year Maximum Price Excursion).

"Relative Contract Liquidity" places commodities in descending order according to how easily all of their contracts can be traded. Commodities at the top of the list are easiest to buy and sell; commodities at the bottom of the list are the most difficult. "Relative Contract Liquidity" is the number of contracts to trade times total open interest times a volume factor, which is the greater of:

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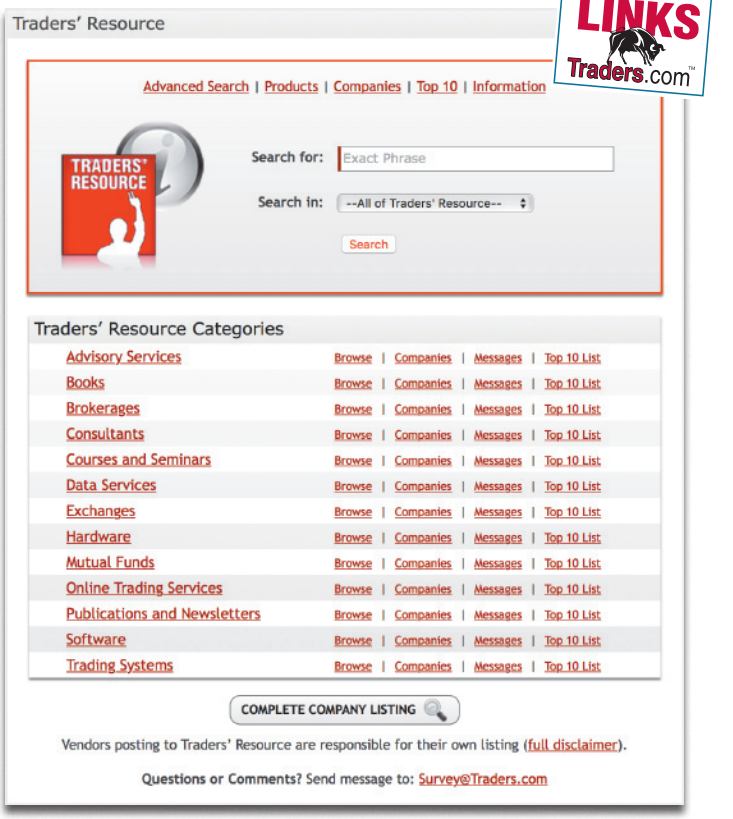

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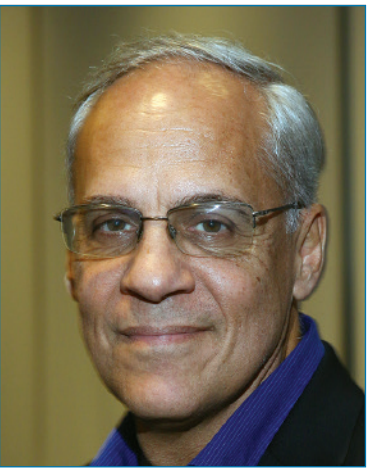

Jay Kaeppel

GOT A QUESTION ABOUT OPTIONS?

Jay Kaeppel has over three decades of experience in the options markets. He was a head trader for a CTA firm, an options trading software developer, and was a portfolio manager for an investment management firm. He is presently Senior Research Analyst for Sentimentrader.com. He is the author of several books, including The Four Biggest Mistakes In Option Trading*;* The Option Trader's Guide To Probability, Volatility, And Timing*; and* Seasonal Stock Market Trends. *Send your questions or topic suggestions to Jay Kaeppel at jay@sentimentrader.com. Selected questions will appear in a future issue of S&C.*

RATIO COLLARS

I have been riding the wave in gold by holding shares of GLD. I keep reading that the trend could continue much higher and want to remain invested. At the same time, I would hate to give back my profits at this point. Any suggestions?

Buying a put option can make sense if your primary goal is to limit downside risk. However, this can result in paying out a lot of premium, with upside potential reduced by the price of the premium paid. Another alternative is a long collar, which involves selling an out-of-the-money call and buying an out-of-the-money put option. However, that strategy will completely limit upside potential beyond the strike price of the call option sold.

So, for this situation, let's consider a strategy best referred to as a *ratio collar*. While holding long at least 200 shares of the underlying security, this position involves selling an out-of-the-money call option and using the proceeds to help offset the cost of buying two put options.

A CLOSER LOOK AT GLD

In Figure 1, we see the massive advance experienced by the SPDR Gold Trust ETF (GLD) in recent months. A trader holding 200 shares of GLD would be sitting on a nice open profit. And while they hope/expect even more upside in the months ahead, the potential for a sharp pullback—and a giveback of a significant amount of open profit—is high. So let's consider the following position:

- While holding long 200 shares of GLD @ $364.38 a share
- Sell 1 GLD Dec31 2025 395 call @ $4.10
- Buy 2 GLD Dec31 2025 350 puts @ $5.08

Let's first break this down into two parts. Figure 2 shows the equity curve (i.e., the expected P/L at a given price for GLD as of a given date) for holding 200 shares of GLD. As you can see,

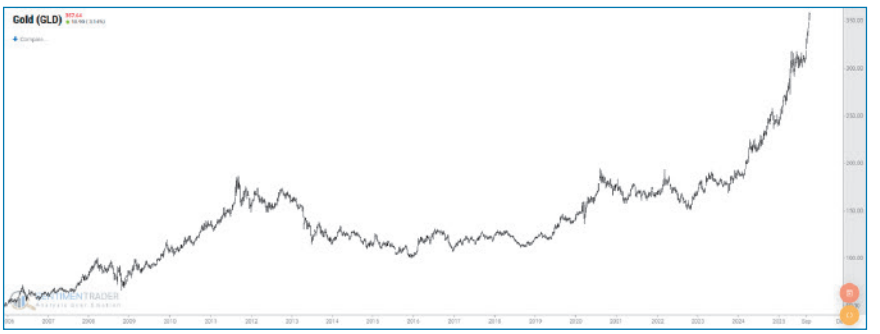

FIGURE 1: SPDR GOLD TRUST ETF (GLD). GLD recently advanced significantly, raising the potential for a pullback.



FIGURE 2: EQUITY CURVE, LONG SHARES (GLD). This shows an equity curve (the expected P/L at a given price as of a given date) for the example of holding long shares in GLD. Here, the "curve" is a straight line since for every $1 rise in price, the position will gain that amount multiplied by the number of shares held.

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it is a straight line, because for every $1 GLD rise in price, the position will gain $200 and vice versa.

Figure 3 shows the equity curve for only the option portion—i.e., short one 390 call and long two 350 puts. Note that above $390 a share, the option portion will lose $100 for each $1 GLD rises in price. Below $350 a share, the option portion will gain $200 for each $1 GLD declines in price.

Figure 4 shows the particulars for the adjusted position, and Figure 5 shows the risk curves for the adjusted position, which combines the two equity curve charts in Figures 2 and 3.

ABOUT THE ADJUSTED, HEDGED POSITION

There are some key things to note about the adjusted position:

- To enter this position, we pay $1,106 to buy the two 350 puts at $5.08 and take in $410 to sell the 395 call. This results in a net outlay of $606.
- Because we hold 200 shares of stock but only sold one call, we retain unlimited profit potential on the second 100 shares if GLD rallies above the 395 strike price.
- We are giving up some upside potential to limit downside risk. Our delta for holding 200 shares of GLD is 200. Once we enter the new position involving the call and put options, our delta declines to 125. So, for each $1 GLD rises or falls in price, we will gain or lose roughly $125 (instead of $200 if we only held the shares).
- A gamma of 1.248 means we will gain that many deltas if GLD rises $1 or lose that many deltas if GLD declines $1.
- A vega of $61.71 means that the position will gain roughly that dollar amount if implied option volatility rises by one percentage point, and vice versa. This means an increase in implied volatility is good for this position, and a decline in implied volatility is bad.
- A theta of –$2.67 means that the position will lose that much value due to time decay from the passage of one day of time.
- Because we are paying out cash to enter the adjusted position, our breakeven price at option expiration rises to $367.41 a share.



FIGURE 3: EQUITY CURVE, RATIO COLLAR OPTION POSITION (GLD). This shows an equity curve for only the option portion of the example trade in GLD (the option portion consists of being short one 390 call and long two 350 puts). Above $390 a share, the option portion will lose $100 for each $1 GLD rises in price; below $350 a share, the option portion will gain $200 for each $1 GLD declines in price.

Stock: GLD Stock News
Name: SPDR GOLD SHARES
Sector: Investment Offices
Dividend: 0 %
100 Day SV: 15.51%
Trade: GLD -25Dec31 -350-395 Put Call

Quote Type	Entry Debit	Profit	Rate of Return	Max Profit	Max Risk	Delta (Shares)	Gamma	Vega	Theta
Natural	$73482.00	$-21.00	-0.6%	$Unlimited	$-3482.00	124.98	1.248	$61.71	$-2.67

Downside Breakeven	Upside Breakeven	Max Profit/Max Risk	Max Profit/Cost
367.41	367.41	0%	Unlimited%

Leg Date	Position	Num	Option Symbol	Expire	Type	Entry	Bid/Ask	Leg Profit	IV %	Vol	OI	Days	Delta %	Gamma %	Vega %IV	Theta $/day
2025-10-06	Sold	1	GLD251231C395	2025 Dec 31	395 Call	4.10	4.05 4.15	$-5.00	18.43	9157	9673	86	-22.73	-0.92	-53.3	6.6
2025-10-06	Bought	2	GLD251231P350	2025 Dec 31	350 Put	5.08	5.00 5.15	$-16.00	17.26	755	625	86	-26.15	1.08	57.5	-4.6
2025-10-06	Bought	200			Stock	364.38		$0.00	0	16842854	0		100			

FIGURE 4: TRADE PARTICULARS, LONG SHARES WITH RATIO COLLAR OPTION POSITION. In the example trade, the trader buys shares long, sells an out-of-the-money call, and buys two puts, all on the same symbol.

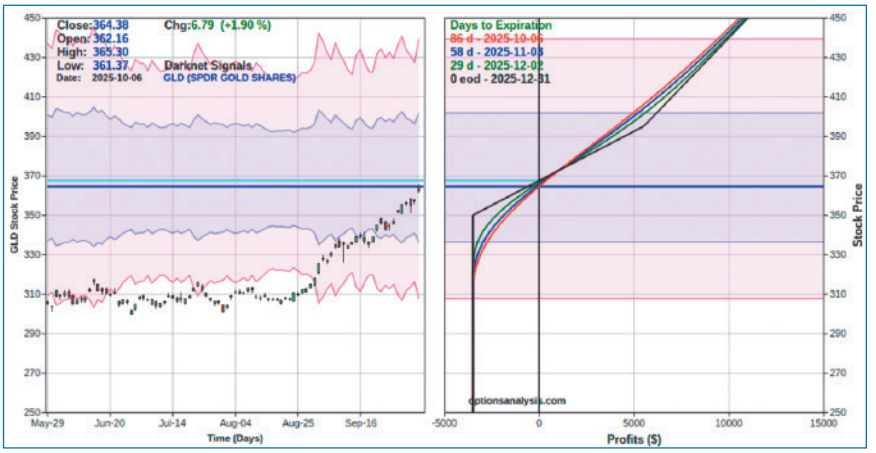

FIGURE 5: RISK CURVES, ADJUSTED POSITION (LONG SHARES PLUS RATIO COLLAR OPTION POSITION). This shows the risk curves for the example trade in GLD that combines long shares with a ratio collar option position. The risk curves essentially combine the two equity curve charts seen in Figures 2 and 3.



FIGURE 6: RISK CURVES, LONG SHARES VS. ADJUSTED POSITION. This compares the risk curves of the long-only position versus the long position *plus* the ratio collar option position combined.

COMPARING THE ADJUSTED POSITION TO THE INITIAL POSITION

Figure 6 shows the risk curves for the initial position (long 200 shares of GLD) and the adjusted position (long 200 shares of GLD, short one 395 call, and long two 350 puts). Here we can also visualize the tradeoffs involved:

- Above the breakeven price of $367.41 to the call strike price of $395, the adjusted position will rise dollar for dollar with the long 200 shares position.
- Above the call strike price of $395, the long 200 shares position will continue to gain $200 for each point GLD rises in price. The adjusted position will make only $100 for each point GLD rises in price.
- If GLD rallied to $450 a share, the long 200 shares position would gain $17,124 from its current value. The adjusted position would gain roughly $10,400.
- On the downside, the adjusted position holds an advantage. If GLD declines to the put strike price of $350, the net position can lose up to $3,643 from its current level. However, that is the maximum amount it can lose, as the two long put options offset any losses from the 200 long shares below the 350 strike price.
- If GLD fell to $300 a share, the long 200-share position would lose $12,938 from its current value, while the adjusted position would lose only $3,643.

SUMMARY

For a trader holding a significant open profit and wanting to maintain unlimited profit potential while limiting downside risk, selling a call option to help pay for enough put options to limit downside risk to a specific amount can make great sense.

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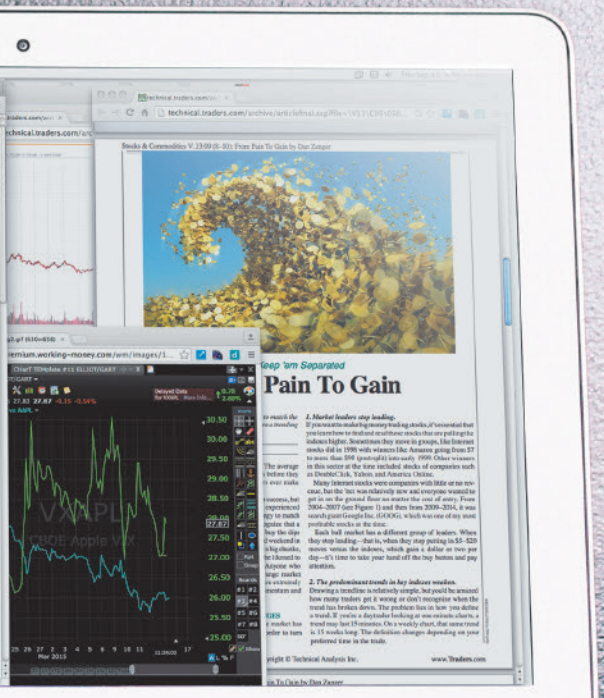

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