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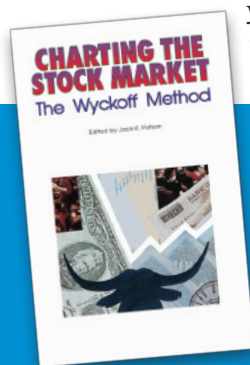


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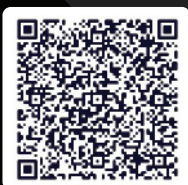
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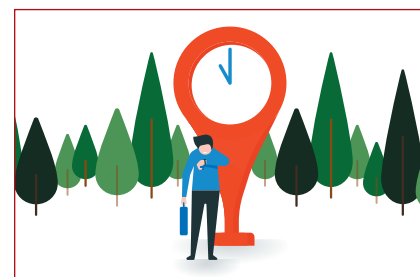
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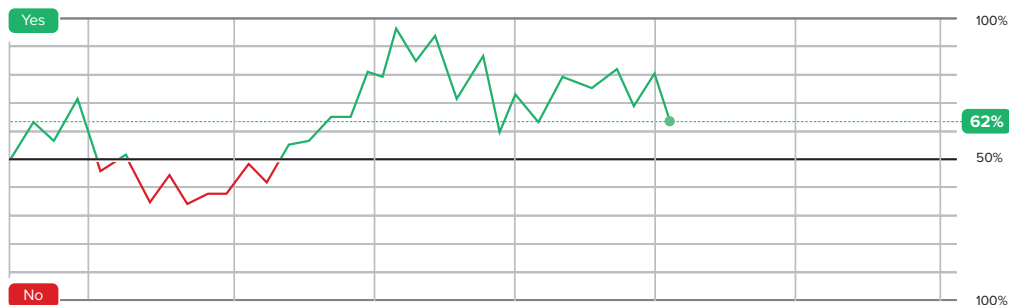


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CHARTING THE MARKETS

Stella Osoba, CMT, Esq., is an attorney, trader, and financial writer in New York, NY, and is also the Senior Editor, Trading and Investing, for Investopedia.com. Her work in financial litigation involving regulatory bodies and large multinational corporations led to an interest in the financial markets, then technical analysis and the psychological aspects of market behavior. She earned a CMT charter in 2013 and was a director-at-large on the board of the CMT Association for four years. This column will focus on recognizing and applying technical chart patterns to trading with flexibility and astuteness for better decision-making in trading. She can be reached at stellaosoba@gmail.com.



Stella Osoba

READING VOLATILITY USING THE ATR

The average true range (ATR) is a technical tool that measures the volatility of a given security. J. Welles Wilder Jr. developed the ATR for commodities trading and wrote about it in his book *New Concepts In Technical Trading* in the 1970s. It has since been embraced by stock traders and is useful as a measure of a security's volatility. When using the ATR as an indicator, the true range of the present day (high – low) is added to the previous 13 days' true ranges

(14 is the default value, though Wilder often used 8) and then divided by 14. Many trading platforms have the ATR as one of their indicators. And even though it is no longer necessary to calculate the ATR, it is useful to know how the values are calculated so that you can understand what they mean.

WHAT DOES THE ATR TELL US?

The true range is a number depicting the range of a security's price for a

given amount of time. Usually, daily values are used. The average of the true range is a moving average depicting the true ranges over a specified period of time. Wilder believed that the true range of a given security was proportional to its volatility. The ATR is depicted as a moving average line of all the true range values derived for a specified time period. When the line rises to the top of its range, it could mean that the stock is in a trend, up or down. Because of the way the true range is calculated, the smaller number (low or close) will always be subtracted from the larger number (high or previous day's close), so the values are always positive. One thing to note is that when used as a moving average, it is a lagging indicator.

The ATR could mean any of the following:

- A rising ATR line could mean the stock is trending up or down.
- A falling ATR line could mean the stock is moving sideways or consolidating.



FIGURE 1: ARM HOLDINGS PLC (ARM) WITH ATR. A one-year daily chart of ARM is shown with the ATR in the bottom panel. In the area of the green box, price rises sharply and ATR spikes. In the red box area, price declines sharply and ATR again spikes. In between, the ATR mostly slopes downward during sideways movement or areas of price consolidation.

The average true range (ATR) is a technical tool that measures the volatility of a given security.

ATR DIVERGENCES

When the ATR is going up and the stock price is falling, the stock is in a downtrend.

When the ATR is going down and the stock price is high, it is consolidating.

When the ATR is going up and the stock price is going up, the stock is in an uptrend.

INTERPRETING THE ATR

Figure 1 is a daily chart of Arm Holdings Plc (ARM) showing one year of price history. In the panel below price is the ATR. The first spike highlighted by the green box shows price rising sharply in February 2024 as the ATR also rises. Remember that the rise in the ATR does not indicate the direction of the trend, just that price is trending. We see a similar rise in the ATR in July 2024 (red box) when price experiences a sharp decline. For most of the period in between the two boxes, the ATR is sloping downward. This depicts sideways movement or consolidation on the price chart. The brief short spike in the ATR in mid-April is reflected in the sharp decline in price seen on the chart.

The ATR is not an indicator you can use on its own. It does not show trend direction and because of the way it is calculated, it lags price. Its purpose is in reflecting how volatile a move is and this information can then be used to interpret market interest or disinterest in a particular move.

The first move depicted in the green box in Figure 1 shows a strong upward move. Price gaps up, buyer enthusiasm is reflected in the spike in volume, and the ATR moves to the top of its range. But this move peters out as price trends sideways and then breaks below the 50-day moving average. The strong, convincing, earlier move drifts lethargically, and even though price finds the momentum to push upward



FIGURE 2: ARTERIS INC. (AIP) WITH ATR. A one-year daily chart of AIP is shown with the ATR in the bottom panel. Red and green boxes highlight spikes in the ATR. Lower-priced stocks such as this will generally have lower ATR values (see ATR scale on right) than higher-priced stocks will (compare to Figure 1).

and rise to new highs, it soon breaks down, giving in to increasing selling pressure as the ATR spikes again.

Figure 2 is a daily chart of Arteris Inc. (AIP) showing one year of price history. It is a choppy chart. The red and green boxes point out spikes in the ATR; red boxes show price declines while green boxes show price rises. Note the numbers on the right y-axis. Lower-priced stocks will have lower ATR values than higher-priced stocks. Here, the values range from 0.30 to 0.50, reflecting the low stock price. You can see the difference between the values here and those for ARM in Figure 1, which, as a higher-priced stock, has values ranging from 4 to 12.

Unless you convert the ATR to a percentage, the values for different securities are not comparable with each other and reflect only what is happening with the stock you are analyzing.

ATR measures volatility and is derived from the difference between

the open and close; therefore, it often fails to produce clear signals, especially when volatility is low. It is often the case that a stock that has been in a trend for a substantial period of time will have an ATR that gives very little useful information. ATR signals are often most important at price extremes. This is why it can be wise to not rely on just one indicator. Also, always take your signals and confirmation from price, not the indicator.

Figure 3 is a daily price chart of Affirm Holdings Plc. (AFRM) showing one year of price history. Here we see the usual price spikes marked by corresponding volatility spikes in the ATR. But one other thing to note is how the ATR becomes less useful

Continued on page 17

Many trading platforms have the ATR.



Less Lag, More Data

Ultimate Strength Index (USI)

Introducing a new version of the RSI that has an exceptionally small amount of lag. Here's how you can calculate and use it.



Undoubtedly the most popular indicator used by technical traders is J. Welles Wilder's RSI (relative strength index). Its popularity is well deserved because it provides a normalized output regardless of the instrument being analyzed, because it clearly shows cyclic variations in the data, and because it simultaneously shows the strength of trends. A major key to the art of its application and interpretation is the length of data used in its calculations. However, like all technical indicators, it has lag due to the use of historical data in its computation. Indicator lag is the bane of technical traders. The purpose of this article is to derive a variation of the RSI that offers a significant reduction in lag.

First, I will review the computation of the RSI. I will use my own notation of the variables to facilitate the derivation from the RSI to my *ultimate strength index* (USI).

COMPUTATION

If the close of the current bar is higher than the close of the previous bar, their difference is the *strength up* (SU) for that bar, otherwise SU = 0. Similarly, if the close of the previous bar is higher than the close of the current bar, their difference is the *strength down* (SD) for that bar, otherwise SD = 0. Both SU and SD are positive numbers. The next step is to average SU and SD over the length of data to be analyzed. The RSI is then calculated as the average of *strength up* to the average of the *total strength*. Its equation is:

$$RSI = \text{Avg}(SU) / (\text{Avg}(SU) + \text{Avg}(SD))$$

If the average of SU is zero, the value of the RSI is

zero. If the average of SD is zero, the value of the RSI is 1. So, the RSI swings between the values of 0 and 1. The classical RSI multiplies the result by 100.

I prefer the indicator to swing between the limits of -1 and +1 because the zero value becomes the balance point between bullish and bearish conditions. The math operation is a simple dilation and translation to do this. That is, multiply the RSI by 2 so it swings between 0 and 2, and then subtract 1 from that product. After a little algebraic manipulation, the revised RSI becomes:

$$\text{MyRSI} = (\text{Avg}(SU) - \text{Avg}(SD)) / (\text{Avg}(SU) + \text{Avg}(SD))$$

Both RSI and MyRSI have a lot of high-frequency jitter and require additional filtering to sufficiently smooth the indicator to be truly useful. In one of my previous articles, “(Yet Another) Improved RSI,” which received the 2022 Readers’ Choice Award, I recognized that an average is just a low-pass filter, and I replaced the average with a \$Hann FIR low-pass filter to get a much smoother indicator. I called that indicator *MyRSIH*. Although smoother, MyRSIH still had substantial lag.

I developed the UltimateSmoother low-pass filter to minimize filter lag. (See my April 2024 S&C article, “The Ultimate Smoother.”) Basically, the UltimateSmoother filters by cancellation, subtracting the result of high-pass filtering from the unfiltered data. This operation in the calculation avoids the necessity of using the very long wavelengths of information in the data, with the result that filtering lag is almost insignificant.

With this background, it is only a small step to create a version of the RSI that has an exceptionally small amount of lag. All I do is replace the average function in MyRSI with an UltimateSmoother low-

by John F. Ehlers



FIGURE 1: THE ULTIMATE STRENGTH INDEX (USI) VS. MYRSIH. The USI has less lag than the MyRSIH although it's using twice as much data. In this example, the USI (blue) uses a length of 28 bars compared to MyRSIH (red) using a length of 14 bars. Zero crossings of the USI typically precede zero crossings of the MyRSIH by about three bars.

pass filter. I call this new indicator the *ultimate strength index* (USI). The equation for USI is:

$$USI = (Ult(SU) - Ult(SD)) / (Ult(SU) + Ult(SD))$$

EasyLanguage code for the UltimateSmoother function is given in the sidebar “The Ultimate Smoother, In EasyLanguage.” The name of the function in code is \$UltimateSmoother. The dollar sign in the function name puts this function at the top of the list of functions in the library.

EasyLanguage code for the USI is given in the sidebar “The Ultimate Strength Index, In EasyLanguage.”

result. This smoothing within the function calls carries a penalty of two bars of lag. The conditional clause in the USI calculation avoids a divide-by-zero problem and cases when both USU and USD have small values.

Interestingly, the USI requires much more data than an RSI to get a useful indicator. Figure 1 shows the USI (in blue) using a length of 28 bars compared to MyRSIH (in red) using a length of 14 bars. Although the USI uses twice as much data in its calculation, it has significantly less lag. For example, the zero crossings of the USI typically precede the zero crossings of the MyRSIH by three bars or so. Both indicators show bullish conditions when they are above zero and bearish conditions when they are below

The variables SU and SD are exceptionally ragged waveforms, and therefore I chose a four-bar average within the function calls for the computation of the variables USU and USD. The short averages further reduce the amount of high-frequency chop in the

THE ULTIMATESMOOTHER FUNCTION, IN EASYLANGUAGE

```
{
    Ultimate Smoother Function
    (C) 2004-2024 John F. Ehlers
}

Inputs:
    Price(numericseries),
    Period(numericsimple);

Vars:
    a1(0),
    b1(0),
    c1(0),
    c2(0),
    c3(0),
    US(0);

c3(0),
US(0);

a1 = expvalue(-1.414*3.14159 / Period);
b1 = 2*a1*Cosine(1.414*180 / Period);
c2 = b1;
c3 = -a1*a1;
c1 = (1 + c2 - c3) / 4;

If CurrentBar >= 4 Then US = (1 - c1)*Price + (2*c1 - c2)*Price[1]
- (c1 + c3)*Price[2] + c2*US[1] + c3*US[2];
If CurrentBar < 4 Then US = Price;

$UltimateSmoother = US;
```


zero. It is obvious that the USI is not as smooth as MyRSIH. Reducing lag comes at the expense of filtering efficiency.

The filtering character of the USI changes when the data length is changed, but there is a minimal impact on lag when this is done. This means that, in general, the data length will be less sensitive when optimized in a strategy.

When used in a strategy, the zero crossings can be used for the timing of buy and sell signals. For example, buy when the indicator crosses over zero and exit or go short when the indicator crosses under zero. Using more data will hold the trend positions longer with less chop. However, using longer data will not have a large effect on the trade entry and exit points.

THE ULTIMATE STRENGTH INDEX (USI), IN EASYLANGUAGE

```
{
  Ultimate Strength Index (USI)
  (C) 2024 John F. Ehlers
}
```

Inputs:
Length(14);

Vars:
SU(0),
USU(0),
SD(0),
USD(0),
USI(0);

```
If Close > Close[1] Then SU = Close - Close[1] Else SU = 0;
USU = $UltimateSmoother(Average(SU,4), Length);
If Close < Close[1] Then SD = Close[1] - Close Else SD = 0;
USD = $UltimateSmoother(Average(SD, 4), Length);
If (USU + USD <> 0 and USU > .01 and USD > .01) Then USI =
(USU - USD) / (USU + USD);
```

```
Plot1(USI, "", blue, 4, 4);
Plot2(0, "", black, 1, 1);
```



FIGURE 2: DIFFERENT LOOKBACK LENGTHS. Trend traders can use a longer data length in the computation of the USI to avoid whipsaw trades. The bottom subgraph is the USI using 28 bars of data (same as in Figure 1) while the top subgraph is the USI using a data length four times longer at 112 bars—so that it is tuned for trends. Despite using a long data length, the trend reversals in May 2024 are still identified by the USI.

Trend traders will want to use a longer data length in the computation of the USI to avoid whipsaw trades. With reference to Figure 2, the bottom subgraph is the USI using 28 bars of data—the same as in Figure 1—while the USI in the first subgraph is tuned for trends using a data length four times longer at 112 bars. The result is that the whipsaws from bullish to bearish and back again, as indicated by the zero crossings of the indicator in the bottom subgraph, are eliminated. While the whipsaws are eliminated, the timing of the onset of the trend in November 2023 is not greatly affected. The trend reversals in May 2024 are also identified. The message here is that the USI still identifies the trend onset in a timely manner even when a large amount of data is used.

When using the shorter data length, it is important to note that the peaks and valleys in the USI are almost perfectly aligned with the peaks and valleys in the price data. In a strategy, we would like to make a long trade entry at the valley and a short trade entry at a peak to make the maximum profit on each swing in the data. We can approach

The USI is an indicator that includes many of the advantages of a traditional RSI with the added benefit of reduced lag in its computation.



FIGURE 3: USI CROSSOVERS. Trade entry and exits are identified by crossovers of USI with itself delayed by two bars.

identification of the peaks and valleys by examining the crossovers of the USI with itself delayed by two bars, as shown in Figure 3. There will be some whipsaw trades using this approach, but they can be reduced by altering the USI data length or using some auxiliary rules.

CONCLUSIONS

The *ultimate strength index* (USI) is an indicator that includes many of the advantages of a traditional RSI with the added benefit of reduced lag in its computation. It shows bullish and bearish conditions that can be altered using different lengths of data. The USI generally uses much more data than an RSI to get similar results. The USI can be successfully used in trend trading by using a long data length. When the data length is shorter, the peaks and valleys of the USI are almost aligned with the major peaks and valleys in the price data. This makes the USI a successful timer for swing trading.

With these attributes, the USI is a valuable asset to keep in your trading toolbox.

John Ehlers is a retired electrical engineer and a retired technical analyst, specializing in the application of DSP (digital signal processing) to trading. For more information, see www.mesasoftware.com.

FURTHER READING

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‡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 46 for implementation of John Ehlers’ technique in various technical analysis and trading platforms. Code found in the Traders’ Tips section is also posted to Traders.com.*

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The USI can be successfully used in trend trading by using a long data length.



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Taking A Generic Approach To Bollinger Bands

Indicator Deviation Bands: Extending The Bollinger Bands Concept

Apply the concept of trading bands to technical indicators to create effective trading strategies. Here's an example.

by Richard Poster, PhD

The Bollinger Bands indicator has been an effective tool in support of trading strategies since John Bollinger developed the indicator in 1983. The indicator is typically made up of a midline for the moving average of the closing price, and upper and lower lines that are plus and minus two standard deviations from the midline. In addition to using the bar close price, Bollinger Bands can use different combinations of the bar high, low, open, and close prices.

The Bollinger Bands indicator uses a basic statistical method that is readily extendable to other technical

indicators. This is hardly a new idea, but rarely used! The midline of the Bollinger Bands indicator is a moving average of a characteristic of the price. For other technical indicators, the midline becomes the smoothed value of the indicator. The upper and lower lines are set at a selected factor of the measured standard deviation above and below the midline. These lines are called “indicator deviation bands” and will be used to define the upper and lower boundaries of overbought and oversold indicator zones.

WHAT'S AHEAD

In the following sections, I describe a trading strategy based on overbought and oversold zones whose boundaries are defined by indicator deviation bands. A detailed description of overbought and oversold zones is presented and then the trading strategy is described. Three indicators will be analyzed: fast SMA, RSI, and

TANAKORN AKKARAKULCHAI
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stochastic oscillator. Using a MetaTrader 4 expert advisor, I show the trading performance of three indicators for four currency pairs:

- Fast SMA (EURUSD, GBPUSD, USDCAD, USDJPY)
- RSI indicator (EURUSD, GBPUSD, USDCAD, USDJPY)
- Stochastic oscillator (EURUSD, GBPUSD, USDCAD, USDJPY)

DEFINITION OF OVERBOUGHT AND OVERSOLD ZONES

Overbought and oversold zones for indicators, including Bollinger Bands, can be established by using two sets of bands, with different standard deviations. For example, instead of using one band with the typical 2.0 standard deviation factor, two sets of bands can be used with standard deviation factors of 1.5 and 2.0. Figure 1 illustrates this configuration for the Bollinger Bands indicator.

Bollinger Bands use the computed standard deviation over the chosen smoothing period, typically 20 bars. However, I have found that computing standard deviations for the positive deviations and negative deviations separately is more effective for trading performance. The positive and negative deviations are defined as:

$$\sigma_{+} = \sqrt{\left(\frac{1}{N_{+}}\right) \sum_{i=1}^{N_{+}} ((xi - \mu)^2)}$$

Eq. 1

for $(xi - \mu) > 0$, where μ is the indicator average over the band period.

$$\sigma_{-} = \sqrt{\left(\frac{1}{N_{-}}\right) \sum_{i=1}^{N_{-}} ((xi - \mu)^2)}$$

Eq. 2

for $(xi - \mu) < 0$ and $(N_{+} + N_{-}) = \text{Band period}$.

With the measured positive deviation (Sigma_Pos) and negative deviation (Sigma_Neg), overbought and oversold, upper and lower boundaries are defined as:

- Oversold _Lwr = Average (Ind Value) - Sigma_Neg*SigmaFctr_2
- Oversold _Upr = Average (Ind Value) - Sigma_Neg*SigmaFctr_1

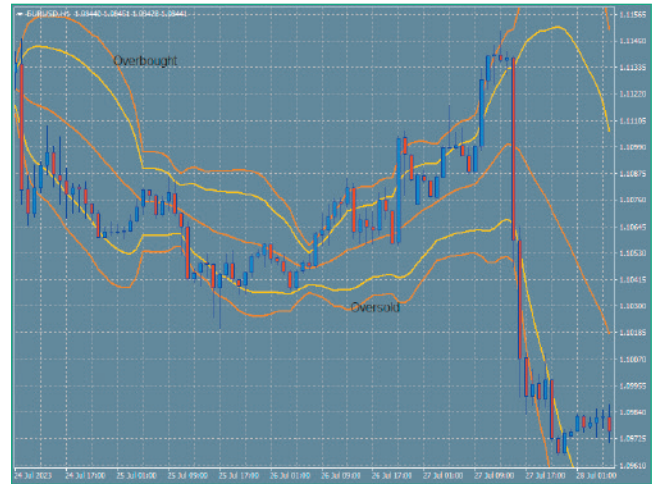


FIGURE 1: DUAL BOLLINGER BANDS FOR EURUSD H1. Two sets of Bollinger Bands with different standard deviations form the boundaries of oversold and overbought zones.

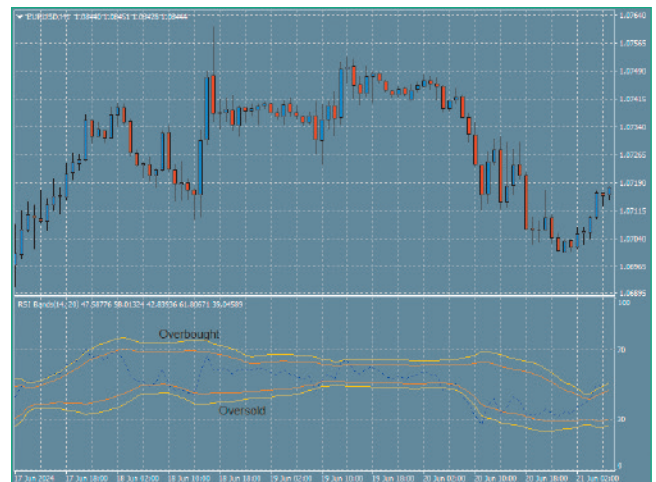


FIGURE 2: DUAL DEVIATION BANDS FOR RSI. Two sets of indicator deviation bands with different standard deviations form the boundaries of oversold and overbought zones for the RSI indicator, shown by the dashed curve.

- Overbought _Upr = Average (Ind Value) + Sigma_Pos*SigmaFctr_2
- Overbought _Lwr = Average (Ind Value) + Sigma_Pos*SigmaFctr_1

where $\text{SigmaFctr}_2 > \text{SigmaFctr}_1$.

SigmaFctr_1 and SigmaFctr_2 are the selected factors of the standard deviations and are typically between 1.5 and 2.5.

Overbought and oversold zones can be used with many technical indicators. As an example, Figure 2 illustrates these zones for the relative strength index (RSI) indicator.

Typically, overbought and oversold zones for the RSI indicator are defined by fixed numbers such as 70 and 30. But indicator deviation bands are based on statistical

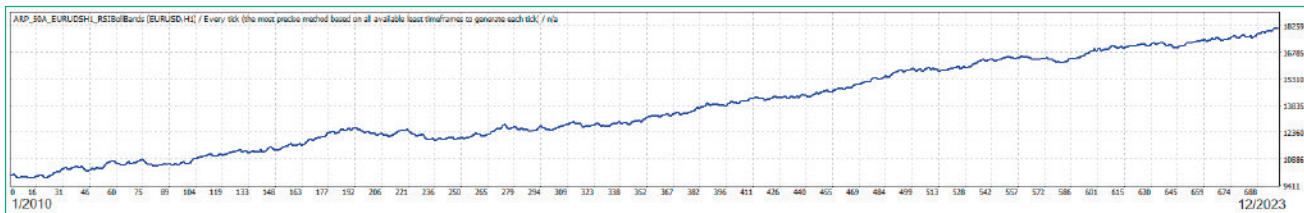


FIGURE 3: PROFIT PROFILE. The profit profile for the RSI indicator for EURUSD H1 is uniform over a 14-year period.

measurements of RSI data and provide dynamic values for the boundaries of these zones.

THE OVERBOUGHT AND OVERSOLD ZONE (OBOSZ) TRADING STRATEGY

The OBOSZ strategy is a trend reversal strategy. The strategy criteria are:

- Buy signal: Indicator enters oversold zone; indicator change > Limit
- Sell signal: Indicator enters overbought zone; indicator change < -Limit
- Only one trade is open at a time
- Stop-loss, take-profit, and trailing stop are used
- Bollinger Bands spread is within lower and upper bounds.

The Bollinger Bands spread serves as a volatility filter.

The key parameters for optimization during backtesting are:

1. Standard deviation factor 1
2. Standard deviation factor 2
3. Technical indicator smoothing period
4. Indicator change limit
5. Technical indicator period(s)
6. Take-profit, stop-loss, trailing stop
7. Bollinger Band spread limits.

OBOSZ TRADING PERFORMANCE

Using the MetaTrader 4 strategy tester, I have measured the trading performance for three indicators:

1. Fast SMA (fast period = 3 or 4)
2. RSI
3. Stochastic oscillator

The currency pairs tested are EURUSD, GBPUSD, USDCAD, and USDJPY, from one-hour charts. The test period is 1/2010–12/2023. Over the 14-year test period, the profit curves are very uniform. As an example, Figure

Currency Pair	# Trades	Profit (0.1 Lot)	Profit Factor	Payoff
EURUSD—Fast SMA	1055	\$10,651	1.38	10.10
EURUSD — RSI	698	\$8370	1.62	11.99
EURUSD—Stochastic Oscil	843	\$11,969	1.52	14.20
GBPUSD—Fast SMA	527	\$7372	1.71	13.99
GBPUSD—RSI	955	\$9759	1.46	10.22
GBPUSD—Stochastic Oscil	1068	\$12,081	1.46	11.31
USDCAD—Fast SMA	923	\$8549	1.47	9.26
USDCAD—RSI	1021	\$9519	1.43	9.32
USDCAD—Stochastic Oscil	727	\$5841	1.47	8.04
USDJPY—Fast SMA	784	\$10,115	1.51	12.90
USDJPY—RSI	783	\$6283	1.40	8.02
USDJPY—Stochastic Oscil	635	\$7873	1.59	12.40

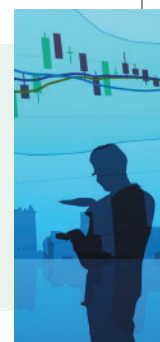
FIGURE 4: PROFIT PERFORMANCE SUMMARY. Test results are shown for three indicators (fast SMA, RSI, and stochastic oscillator) and four currency pairs.

3 illustrates the profit profile for the RSI indicator with the EURUSD currency pair.

Performance results are measured by the profit factor (profit/loss) and payoff (average profit per trade for 0.1 lots). Figure 4 shows the backtesting performance results for the fast SMA, RSI, and stochastic oscillator.

Over the test period, the profit factor has an average of 1.50, the payoff values are generally high, the number of trades generated is usually large, and the profit uniformity is excellent.

Indicator deviation bands are based on statistical measurements of RSI data and provide dynamic values for the boundaries of these zones.



CONCLUSIONS

- Deviation bands for technical indicators can be used to define dynamic boundaries of overbought and oversold zones for trend reversal trading.
- Asymmetric indicator deviation bands work well for trend reversal trading strategies.
- The OBOSZ reversal strategy performs well over a long test period, across multiple currency pairs, and with multiple technical indicators.

FURTHER THOUGHTS

In this article I have explored using indicator deviation bands, an extension of Bollinger Bands, for technical indicators. I have focused on reversal strategies for oscillator-type indicators, which lend themselves well to reversal strategies. However, indicator deviation bands should also be useful in support of trend-following strategies. So, there are many promising applications of indicator deviation bands to be explored.

Asymmetric indicator deviation bands work well for trend reversal trading strategies.



Richard Poster, PhD, has been designing and implementing FX trading models for more than a decade along with private forex trading. He has a PhD in physics and has used the many techniques and methodologies from his experience in elementary particle physics research and later developing electronic warfare systems. He is interested in applying neural networks, fuzzy logic, fractal analysis, and quantum mechanics to forex trading models. He may be reached at raposterbnl@gmail.com.

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The Savvy Technician

OSOBA

Continued from page 7

during sustained trends. From late December 2023 until August 2024, AFRM was in a downtrend, marked by price making lower lows and lower highs. During this time, ATR values fell, with occasional spikes marked by red arrows on the chart. The arrows depict the increasing volatility during the price decline. Price began to rise after the low in August, but this was not reflected by the ATR, which began to level off until roughly halfway through the price rise.

The ATR is useful to know and understand. Some traders use it to mark stops, especially if you have a platform that has ATR trailing stops as an indicator. But as popular as it is, it does not provide buy or sell

ATR signals are often most important at price extremes.

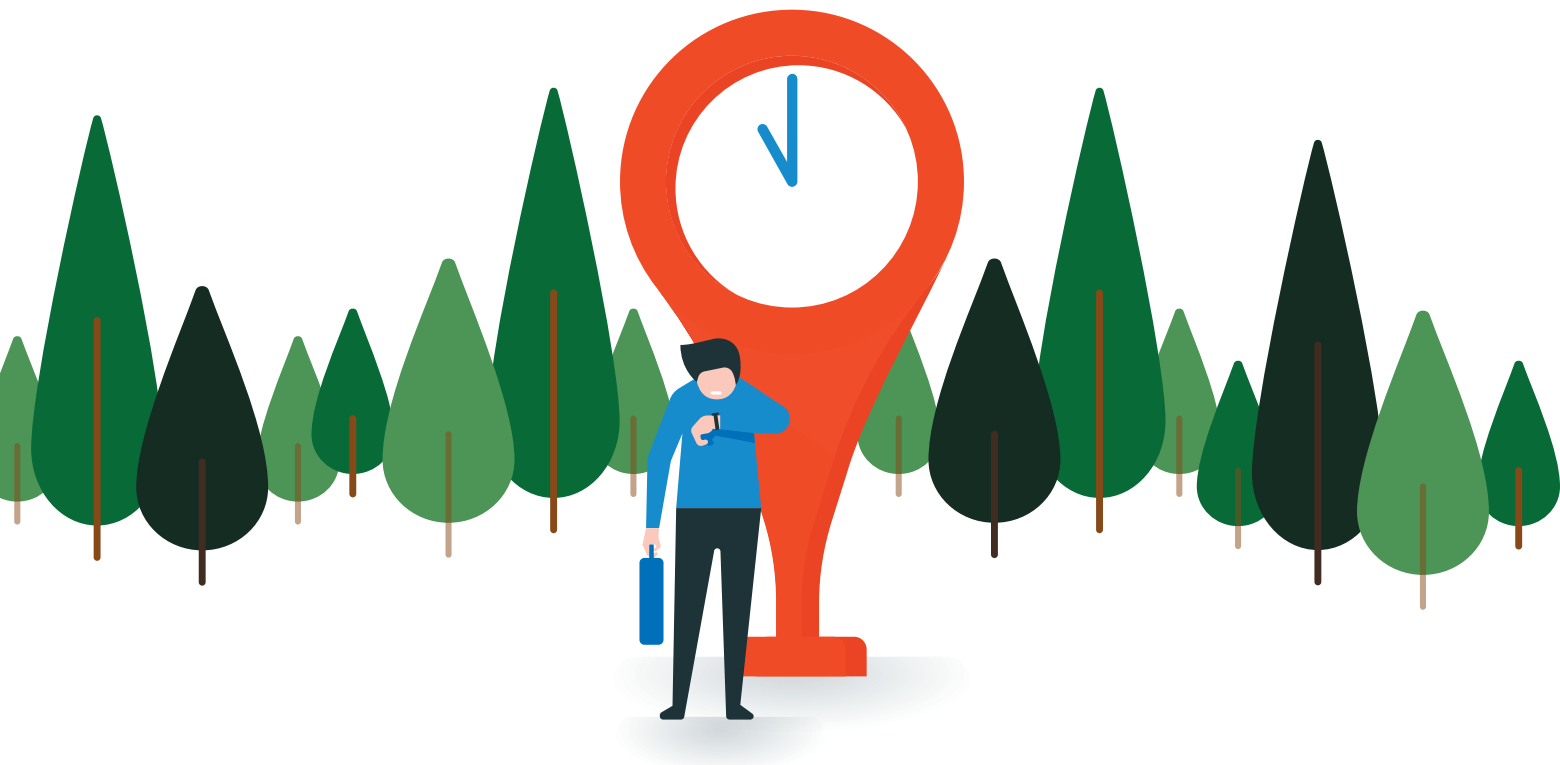


FIGURE 3: AFFIRM HOLDINGS PLC. (AFRM) WITH ATR. A one-year daily chart of AFRM is shown with the ATR in the bottom panel. Red and green boxes highlight price spikes accompanied by volatility spikes in the ATR. Note the ATR becomes less useful during sustained trends.

signals. A more useful indicator for that purpose is Wilder's parabolic stop-and-reverse system, which allows the trader to always be in the

market, either long or short. That will be the topic of a future article.

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Wait For A Pullback, Or Get In Early?

Trading A Breakout System

When trading a breakout system, does it improve results to get in either early or late? Here's a test to find out.

by Perry J. Kaufman

My

own preference for a trend system is an N -day breakout. It may have similar returns to a moving average, but much higher reliability (percentage of profitable trades). In exchange, it has higher per-trade risk.

That doesn't mean that the drawdowns are worse than for a moving average system. Using a moving average you can get three or four (sometimes more) losing trades in a row, adding up to a significant drawdown.

Once you are in a long breakout trade, you don't exit until there is a new N -day low. That allows prices to flop around between the N -day highs and lows without getting you out. I see that as a more realistic way to treat price movement, although sometimes a bit frustrating.

BREAKOUT STRATEGY RULES

Typical rules for an N -day breakout system are simple:

- Buy on a new N -day high
- Sell on a new N -day low

Let's first start by comparing the results of a moving average system and a breakout system on the S&P ETF SPY (Figure 1).

For SPY, we will only take long positions. My experience is that selling stocks short (especially the S&P) is a losing strategy. While you may have done well in 2008, you would have lost those profits many times over in other short sales.

If we compare the average profits of the moving average test with the breakout system test, we find the moving averages gained \$111K while the breakout system gained \$129K. In Figure 1, you can see that the orange bars are generally higher than the blue bars.

ADDING MORE STRATEGY RULES

Anyone who has tried to execute a stop order on a new breakout high has found that there is a lot of competition. If it's a long-term high, recognized by lots of traders, you can end up with a fill far from your order. What can we do to avoid that?

- 1 We can anticipate the breakout, entering a few points ahead
- 2 We can enter after a breakout occurs (at a higher price)
- 3 We can wait for a pullback after a breakout, back into the previous range.

In the first case, we hope to get “free exposure,” a price jump associated with the breakout that would have given us a bad execution price. If the anticipated breakout doesn’t happen, we will need to exit our position, probably at a small loss.

We measure where we enter as a percentage of the high–low range based on the N -day calculation period. We then subtract that point value from the highs and add it to the lows to get the adjusted entry points.

As for the third option above, waiting for a better price is good—unless the price never pulls back. Not entering on a strong breakout, while we wait for a better price, can affect your long-term success.

The pullback is measured the same way as the anticipated breakout, using a percentage of the current breakout range.

I’ve used the coding in the sidebar “Code For Different Entry Approaches In A Breakout System, In EasyLanguage” to test these combinations. Later, we will look at other markets to compare the results.

ANTICIPATING THE BREAKOUT

Figure 2 shows sample results for both *anticipating* the breakout (option 1 above) and *delaying* the breakout (option 2 above). We use the 95-day breakout results (nearly the best). The “0” in the bottom scale represents the normal breakout results. The values to the left of the zero are *anticipation* (entering before the breakout) and the values to the right of the zero are *delays* (entering after the breakout). The “0.05” means we enter an adjusted order at 5% below the upper breakout range subtracted from the N -day high.

Figure 2 shows that a small amount of anticipation, 1% to 5% of the range, gets similar returns as entering on the breakout but should not have the slippage associated with entering on a breakout. On the right, we see that entering after the breakout trims profits considerably in the test on SPY.

WAITING FOR A PULLBACK

The third option, waiting for a pullback back into the high–low range after a breakout, is shown in Figure 3. The “0” on the bottom scale is the normal breakout. Using a pullback entry improves returns up through 7% of the

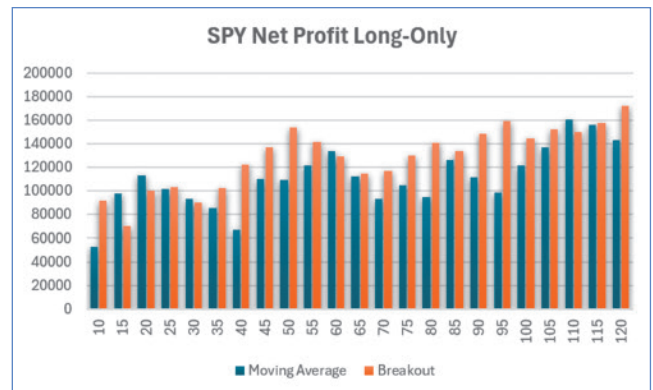


FIGURE 1: MOVING AVERAGE SYSTEM VS. BREAKOUT SYSTEM, SPY (LONG ONLY). This compares a moving average system and a breakout system for the same calculation periods using SPY, with data starting from 2000. In the test, the moving average system (blue bars) gained \$111K while the breakout system (orange bars) gained \$129K. The orange bars are generally higher than the blue bars.

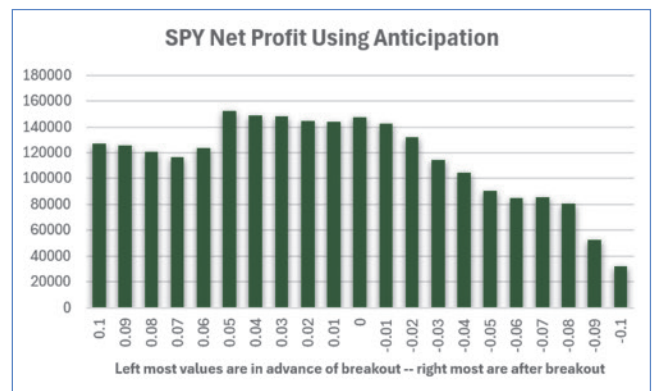


FIGURE 2: BREAKOUT SYSTEM, SPY. Anticipating the breakout (seen to the left of the zero) by a small amount (1% to 5% of the recent high–low range) to enter early gets similar returns in the SPY test as entering on the actual breakout, but with potentially less slippage. Delaying entry until after a breakout (right of the zero) reduces profits considerably in the test.

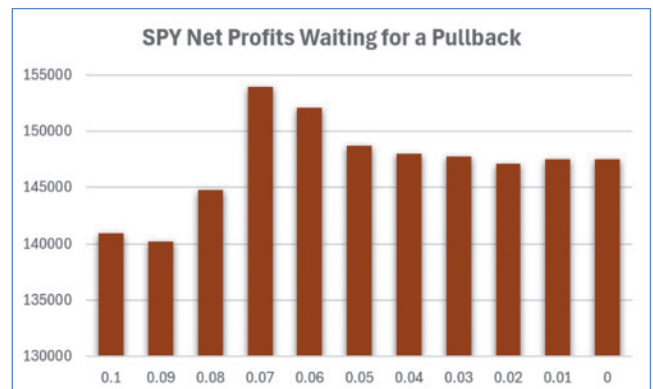


FIGURE 3: WAITING FOR A PULLBACK, SPY. The test on SPY shows that waiting for a better price after a breakout is beneficial—unless price never pulls back. In the test using SPY, waiting for a pullback to enter improves returns up through 7% of the range, after which the improvement falls off.

CODE FOR DIFFERENT ENTRY APPROACHES IN A BREAKOUT SYSTEM, IN EASYLANGUAGE

The following code can be used to test several approaches to entering a market while using a breakout trading system. Options include anticipating the breakout and entering a few points ahead of the expected breakout, or waiting after a breakout for a pullback into the previous range.

Different markets or stocks will have different price patterns, so you may want to test the market you intend to trade to find out if one of these entry approaches tends to work best in that particular market.

```
{ PJK Breakout with options
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{ period = length of calculation
  entryoption = 0 buy/sell on current close
    = 1 buy/sell on next open (only for stocks)
    = 2 enter ahead of breakout by percentage
    = 3 enter ahead of breakout by points
    = 4 enter after breakout back into BOrange
    "value" in percent (0.01 = 1%)
  longonly true then only long positions
}
input: period(100), entryoption(1), entryvalue(0),
longonly(false),
usefutures(false), printfile(false);
vars: signal(0), trend(0), size(0), equity(0), MA(0), BOrange(0),
prevhigh(0), prevlow(0), breakouthigh(o), breakoutlow(0),
adjhigh(0), adjlow(0), adate(" "), PL(0), returns(0),
NAV(100),
stockinvestment(100000), futuresinvestment(25000);

prevhigh = highest(high[1],period);
prevlow = lowest(low[1],period);
if high > prevhigh then begin
  trend = 1;
end
else if low < prevlow then Begin
  trend = -1;
end;

if usefutures then
  size = futuresinvestment/(AvgTrueRange(20)*bigpointvalue)
Else
  size = stockinvestment/close;

// normal entry
if entryoption <= 1 then begin
  if trend = 1 then signal = 1
  else if trend = -1 then signal = -1;
End

// enter before breakout as a percent
else if entryoption = 2 then Begin
  BOrange = prevhigh - prevlow;
  if signal <= 0 then begin
    adjhigh = prevhigh -
```

```
    BOrange*entryvalue;
    if high > adjhigh then signal = 1;
    End
  else if signal >= 0 then Begin
    adjlow = prevlow +
    BOrange*entryvalue;
    if low < adjlow then signal = -1;
  end;
end

// enter before breakout in points
else if entryoption = 3 then Begin
  BOrange = prevhigh - prevlow;
  if signal <= 0 then begin
    adjhigh = prevhigh - entryvalue;
    if high > adjhigh then signal = 1;
    End
  else if signal >= 0 then Begin
    adjlow = prevlow + entryvalue;
    if low < adjlow then signal = -1;
  end;
end

// wait for reentry after breakout using percentage
else if entryoption = 4 then Begin
  if high > highest(high[1],period) then begin
    trend = 1;
    breakouthigh = high;
    end
  else if low < lowest(low[1],period) then begin
    trend = -1;
    breakoutlow = low;
    end;
  BOrange = prevhigh - prevlow;
  if signal <= 0 and trend = 1 then begin
    adjhigh = prevhigh -
    BOrange*entryvalue;
    if low < adjhigh then signal = 1;
    end
  else if signal >= 0 and trend = -1 then begin
    adjlow = prevlow +
    BOrange*entryvalue;
    if high > adjlow then signal = -1;
  end;
end;

// Exits and entries
if marketposition >= 0 and signal < 0 then begin
  sell all shares next bar on open;
  if longonly = false then begin
    sell short size shares next bar on open;
  end;
end
else if marketposition <= 0 and signal > 0 then begin
  buy to cover all shares next bar on open;
  buy size shares next bar on open;
end;

If printfile then begin
  equity = netprofit + openpositionprofit;
  PL = equity - equity[1];
  if usefutures then
    returns = PL/futuresinvestment
```

CODE FOR DIFFERENT ENTRY APPROACHES IN A BREAKOUT SYSTEM, IN EASYLANGUAGE

```

Else
    returns = PL/stockinvestment;
    NAV = NAV[1]*(1 + returns);
    adate = ELdate tostring(date);
    If Currentbar = 1 then begin
        print(file("c:\tradedstation\Breakout_PL.csv"),
            "Date,size,netPL,PLtoday,Return,NAV");
        print(file("c:\tradedstation\Breakout_Detail.csv"),
            "Date,Open,High,Low,Close,",
            "PrevH,PrevL,AdjHigh,AdjLow,Trend,Size,Entr
            y,NetPL,PLtoday,Return,NAV");
    end;
    print(file("c:\tradedstation\Breakout_PL.csv"),adate,"",
        size:8:3,"",equity:8:4,"",PL:8:4,"",
        returns:6:5,"",NAV:6:4);
    print(file("c:\tradedstation\Breakout_Detail.csv"),adate,
        "",open:8:3,"",high:8:3,"",
        low:8:3,"",close:8:03,"",prevhigh:8:3,"",prev-
        low:8:3,"",adjhigh:8:3,"",adjlow:8:3,"",trend:8:3,"",
        signal*currentcontracts:8:3,"",entryprice:8:3,"",equity:8:4,
        "",PL:8:4,"",returns:6:5,"",NAV:6:4);
    end;

```

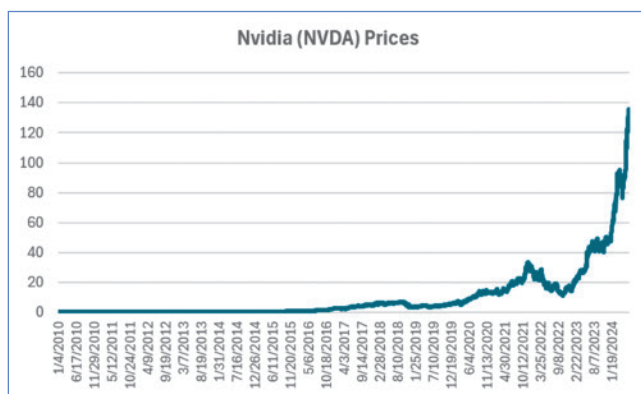


FIGURE 4: AN EXTREME MARKET EXAMPLE (NVDA). The stock seen here is Nvidia (NVDA) from 2010 to early 2024. Would anticipating a breakout to enter early improve results in an extreme or “hot” market such as this?

the range, after which it falls off.

Looking at the charts in Figures 2 and 3, the best of both options (that is, anticipating a breakout or waiting for a pullback after a breakout) improves returns by about the same amount. Choosing between the two, the more reasonable choice is *anticipation*. There is always a chance a pullback won’t happen, while anticipation is always going to get you in. If you don’t get in, you will miss whatever profit follows.

EXTREME MARKETS

So far, we applied the test to the SPY. Next, let’s look at other markets to compare results. We’ll start with two stocks that have been known for their strong or dramatic bullish price action.

Nvidia (NVDA)

One of the more touted stocks in the news in recent times has been Nvidia (NVDA). It has had a remarkable run, as seen in the price chart in Figure 4. Although it has had a few setbacks, it seems clear that waiting for a pullback is not going to be a good strategy in a case such as this.

Figures 5 and 6 show the results of anticipating a breakout and waiting for a pullback in NVDA. Even with

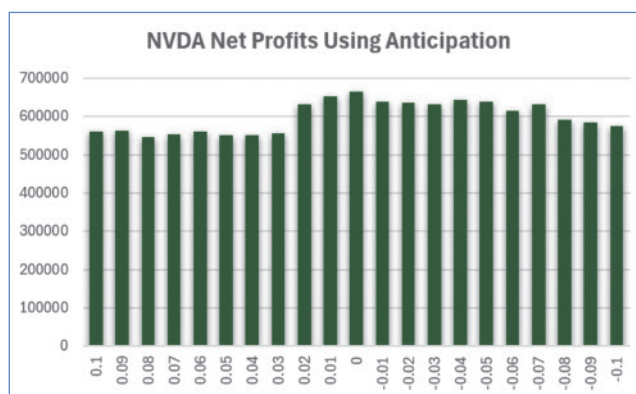


FIGURE 5: ANTICIPATING A BREAKOUT (NVDA). For a stock with a rapid price rise such as NVDA (see Figure 4), there was only a small benefit in the test to anticipating a breakout versus entering on the actual breakout.

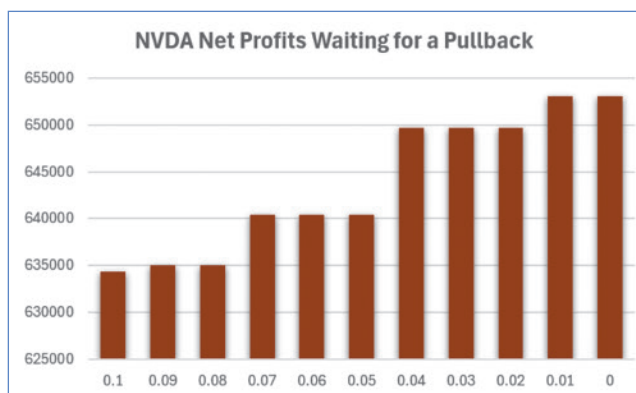
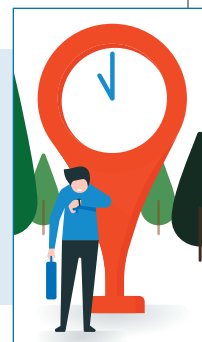


FIGURE 6: WAITING FOR A PULLBACK (NVDA). For a “hot” stock seeing a rapid price rise, waiting for a pullback may be futile. The test on NVDA showed that waiting for a better price was not a good strategy.

Anyone who has tried to execute a stop order on a new breakout high has found that there is a lot of competition.



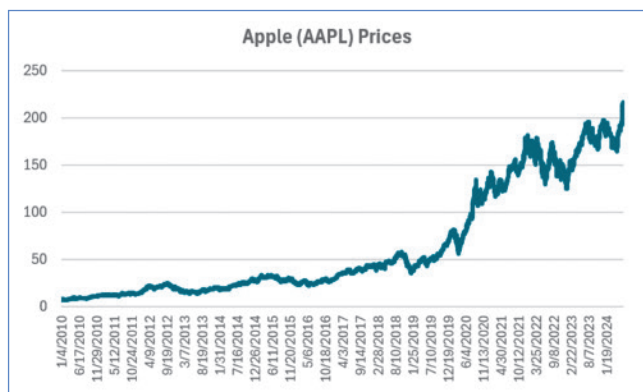


FIGURE 7: ANOTHER EXTREME MARKET EXAMPLE (AAPL). Here you see Apple (AAPL) stock from 2010 to early 2024. The long price history shows some volatility within a strong trend up. Would finding an early entry by anticipating a breakout have some benefit in a stock such as this?

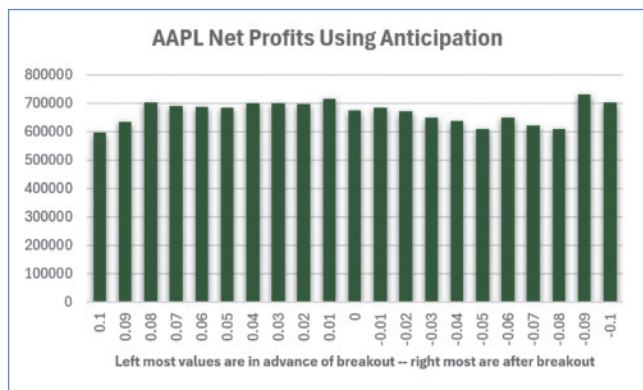


FIGURE 8: ANTICIPATING A BREAKOUT (AAPL). Anticipating, even by a few points, generally has a positive return here, about the same as entering on the breakout. Delaying market entry until after the breakout generally decays returns up to the point of entering at 8% of the breakout range.

the rapid rise in prices, there is only a small benefit from anticipating a breakout. Small delays, entering after the breakout, are also negative, but over the long term they have only a minor effect on the returns.

Waiting for a pullback in NVDA turns out to be a bad idea. You may be able to capture a price near the breakout, but the more you wait, the worse your fill.

Apple (AAPL)

Apple has been one of the most desirable stocks for a portfolio over the years, but it has had ups and downs along the way, as you can see in Figure 7. The chart starts in 2010 so the volatility is more apparent.

Given this type of price movement, we would expect delayed entries and pullback entries to have some benefit, but that wasn't necessarily the case. Figure 8 shows that anticipating from 1% to 9% of the current range is much the same as buying on the actual breakout. Meanwhile, delaying has the usual pattern of decay up to 8%, then a

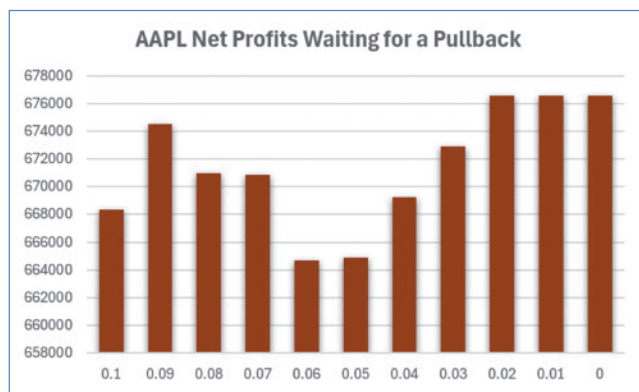


FIGURE 9: WAITING FOR A PULLBACK (AAPL). The test on AAPL—a stock with a strong, long-term uptrend—shows that looking for a better entry price by waiting for a pullback after a breakout did not seem to be a smart strategy.

jump. In my experience, the jump is often a single trade distorting the results.

Figure 9 shows that pullbacks are not reliable. You may be able to gain a small edge over the breakout, but waiting too long is most likely going to reduce returns substantially. There is a small window of opportunity for a pullback, but more than that can be a problem.

With these two highly desirable markets, NVDA and AAPL, we see that anticipating, even by a few points, has a positive return, while waiting for a better price is not a good strategy.

A MORE “NORMAL” MARKET

When we started with SPY, we saw that anticipation of a few points was good and delays quickly deteriorated the returns. But pullbacks generally worked well with SPY. With Nvidia, we saw a much different case.

If we test a more “typical” market, such as a Bank of America (BAC), than we used in the previous two examples (NVDA and AAPL), we can see whether the general tendency seen in SPY holds up.

Bank of America (BAC)

Figure 10 shows price history for the stock. BAC was a major factor in the 2008 financial crisis, losing 50%. After 2008 it has had a slow, erratic move higher.

If we apply the anticipation and pullback rules to BAC, we get the results in Figures 11 and 12.

BAC shows a very different picture of performance for the two rules. Anticipating the breakout results in lower returns while delaying the breakout is generally better (it guarantees that a breakout has occurred). For the pullback test, we see a small opportunity to buy lower and a larger opportunity if we wait until about 25% into the pullback range. So while the anticipation is different from SPY, the pullbacks are not.



FIGURE 10: A MORE TRADITIONAL MARKET (BAC). Here you see Bank of America (BAC) from 2000 to early 2024. This stock represents a more typical market in that it has ups and downs, as opposed to one that goes straight up. Will the general tendency seen in Figure 2 for SPY be similar for this type of stock?

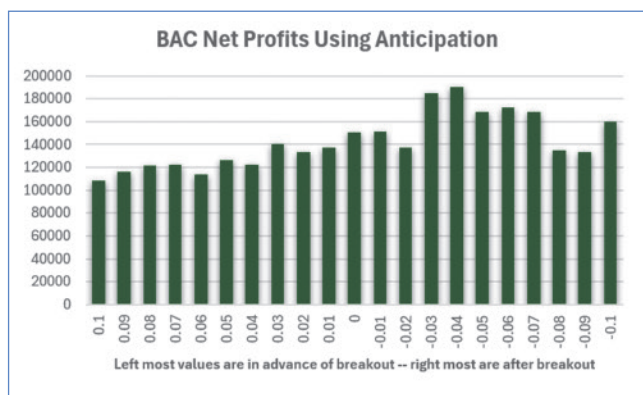


FIGURE 11: ANTICIPATING A BREAKOUT (BAC). Using the anticipation rule on Bank of America (BAC) gives mixed results. Anticipating the breakout to enter early results in lower returns, while delaying entry until after the breakout is generally better. This is a different result than was attained earlier on SPY, as seen in Figure 2.

HOW CAN WE DRAW SOME CONSISTENCY AROUND THIS?

I like rules that work for everything. But rules for a breakout are not one of them. Yes, the market tends to go up in the long run, so anticipating a breakout is going to be the safest rule.

Markets that are “hot” (such as the NVDA example) are very likely to break their resistance and continue making new highs, so anticipating is also going to be best. Slightly ahead of the breakout will be better than farther away.

What I call a “normal” market has more ups and downs. Breakouts are not followed by a major move up, so waiting for a pullback could increase your returns. The pullback can be anywhere from 10% to 30% of the range. If a pullback does not occur, wait for the next trade! Entering at a higher price than the breakout (that

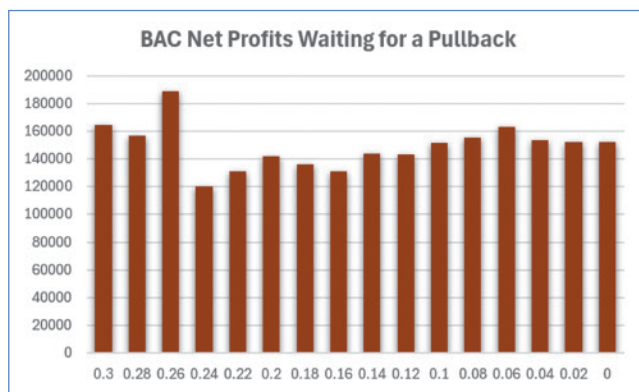


FIGURE 12: WAITING FOR A PULLBACK (BAC). Using the pullback rule on Bank of America (BAC) shows results similar to the test on SPY. Waiting for a better price during a pullback can improve results in this type of market, since breakouts are not typically followed by a major move up. However, it’s possible that a pullback won’t occur.

is, not entering early by anticipating and not waiting for a pullback) will reduce your returns and likely results in a loss.

You can use the code given in the sidebar to see the pattern of the market you want to trade. There is an option (number 3) in the code that allows you to anticipate the breakout using points rather than a percentage of the range. That is not likely to be a help testing with daily data but could be useful for intraday breakouts.

Perry J. Kaufman is a trader and financial engineer. He is the author of many books on trading and market analysis, including the sixth edition (2020) of Trading Systems and Methods (with the first edition published in 1978 as a seminal book in the field of technical analysis), as well as Kaufman Constructs Trading Systems (2020), and Learn To Trade (2022). For questions or comments, please go to www.kaufmansignals.com.

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

FURTHER READING

- Kaufman, Perry J. [2022]. *Learn To Trade*, Amazon.
- ____ [2020]. *Trading Systems and Methods*, 6th Edition, Wiley.
- ____ [2020]. *Kaufman Constructs Trading Systems* (print and ebook editions), Amazon.
- ____ [2024]. “Which Is Better: The N-Day Breakout Or The Swing Breakout?” *Technical Analysis of STOCKS & COMMODITIES*, Volume 42: September.

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Using A Triple-Leveraged ETF

Trading Leveraged QQQ ETFs

Part 2: TQQQ

Can you beat buy & hold, with favorable reward-to-risk measures, by including a leveraged QQQ ETF in your portfolio allocation with market timing? In part 1, the study tested a 2× ETF. Here, a 3× ETF is tested. Do results improve, or worsen? We find out.

by Massoud Metghalchi, PhD

In

this article, I'll continue with my study on trading QQQ-based leveraged ETFs. Last time in part 1, I focused on QLD (ProShares Ultra QQQ ETF), which seeks to mimic two times (2×) the daily performance of the NASDAQ-100 index. In this study, I use TQQQ (ProShares UltraPro QQQ ETF), which seeks daily investment results that correspond to three times (3×) the daily performance of NASDAQ-100 index.

In part 1, I showed that using a trend trading system based on a 200-day simple moving average (SMA) applied to a portfolio of 50% QLD and 50% TLT beats the market handsomely, risk-adjusted. In addition, I showed that using a 150-day SMA trading rule and using QQQ

to generate buy/sell signals, instead of using QLD to generate signals, and applying the signals to portfolios of either 40/60 or 50/50 of QLD and TLT could beat the market, risk-adjusted.

So if the study in part 1 showed very good results using a portfolio with a 2× QQQ ETF, would using a portfolio containing a 3× QQQ ETF provide even better results? How might the portfolios compare? The test presented here can suggest some takeaways.

To review the test setup: I use a basic trading system based on moving average crossovers of price. In different iterations of the test, I vary the MA trading rules that generate the buy/sell signals; I use two different price series to generate the trading signals for comparison; I vary the portfolio allocations; and I compare using leverage (buying on margin) versus not buying on margin. Varying the tests in these ways will allow us to consider the effects of:

- the timing system versus buy & hold (B&H)
- the SMA signals based on the TQQQ price series versus signals based on the QQQ price series

- the results of the signals on portfolios made up of different allocations of TQQQ
- buying on margin using 50% leverage to double the investment.

THE PORTFOLIO HOLDINGS: TQQQ AND TLT

I use a hypothetical portfolio for this study consisting of allocations of two ETFs: *TQQQ* and *TLT*. As mentioned, *TQQQ* is a triple-leveraged ETF. *TLT* is an iShares ETF from Blackrock that tracks the U.S. treasury 20+ year bond index.

I set up portfolio allocations consisting of 40%, 50%, 60%, and 70% *TQQQ*, and 60%, 50%, 40%, and 30% *TLT*. (For example, for the 40–60 portfolio, I use 40% *TQQQ* and 60% *TLT*.)

I then estimated the daily returns of these portfolios. This can serve to represent the buy & hold benchmark.

DATA AND ESTIMATION

All ETF data are taken from Yahoo Finance. The *TQQQ* ETF was launched on 2/11/2010. Since we lose 200 days when estimating an SMA of 200 days, all estimations are made from 12/1/2010 to 2/29/2024.

Various statistics are estimated as follows:

$$\text{Daily return of each ETF} = \text{Log} (P_t / P_{t-1}) \quad \text{Eq. 1}$$

$$\text{Annual return} = \text{Exponential (average daily returns} \\ * 250) - 1 \quad \text{Eq. 2}$$

$$\text{Annual standard deviation} = \sigma_A = \sigma_d * \sqrt{250} \quad \text{Eq. 3}$$

$$\text{Reward-to-risk ratio (R/R)} = \text{Annual return} / \\ \text{Annual standard deviation} \quad \text{Eq. 4}$$

where P_t and P_{t-1} are the ETF's price levels on day t and $t-1$, and σ_d is the daily standard deviation (SD) of the daily returns of each ETF, assuming there are 250 trading days in a year.

THE TRADING MODEL

The trading system for timing the investments, to be compared against the buy & hold case, uses trading rules based on simple moving averages (SMAs) of various lookback lengths, with price crossovers of the SMA as the buy/sell signals.

I use five SMA lookback lengths: 30, 50, 100, 150, and 200 days (abbreviated as SMA30, SMA50, SAM100, SMA150, and SMA200).

First, I apply the SMAs to the *TQQQ* price series to obtain buy/sell signals, and second, I apply the SMAs

to the *QQQ* price series to obtain buy/sell signals, for comparison. I test both sets of signals using the four different portfolio allocations described above.

(For more detailed examples of the test iterations, see part 1 of this article in the October 2024 issue.)

Here's a snapshot of the technical trading approach:

Trading rules for signal generation—Five trading rules based on SMAs of different lookback lengths are used to generate signals. Buy signals are emitted when price is above its SMA; sell signals are emitted when price goes below its SMA.

Price series used for signal generation—The five SMA trading rules are applied in turn to *both* the *TQQQ* and *QQQ* price series to generate buy/sell signals to test.

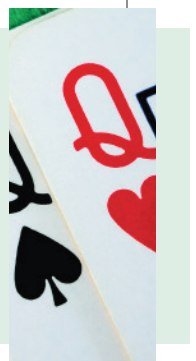
Portfolio allocations—I test the trading rules (the five different SMA lengths) on *each* portfolio (that is, the four hypothetical portfolios consisting of 40–60, 50–50, 60–40, and 70–30 allocations of *TQQQ* and *TLT*).

Strategies 1 & 2—I also repeat the trading rules (the various SMA lengths) for two approaches, which I'll refer to as *strategies 1 and 2*, as follows:

1. long/money market
2. leverage/money market

The *long/money market* is a conservative investment strategy, whereas *leverage/money* is a riskier strategy. For strategy 1, if *in* the market (the trading system signals a buy), I buy *TQQQ* and *TLT* in one of the four portfolio allocations. If *out* of the market (the trading system signals a sell), I invest in *SHV* (a short-term treasury fund, which is similar to investing in a money market). For strategy 2, a riskier strategy, if *in* the market, I use leverage to buy on margin the portfolio of *TQQQ* and *TLT* (that is, the allocation of *TQQQ* is bought on 50% margin, and the allocation of *TLT* is also bought on 50% margin.) If *out* of the market, I invest the portfolio in *SHV*/money market.

In this study, I use TQQQ, a ProShares UltraPro QQQ, which seeks daily investment results that correspond to three times (3X) the daily performance of NASDAQ-100 index.



ETF & Portfolio	Daily Return%	Daily SD%	Annual Return%	Annual SD%	Reward to Risk
SPY	0.044	1.090	11.54	17.24	0.67
TQQQ	0.135	3.888	40.14	61.47	0.65
TLT	-0.001	0.966	-0.33	15.27	-0.02
40-60	0.053	1.526	14.23	24.13	0.59
50-50	0.067	1.889	18.19	29.87	0.61
60-40	0.080	2.273	22.28	35.93	0.62
70-30	0.094	2.668	26.52	42.18	0.33

SD stands for *standard deviation*, R/R stands for reward-to-risk ratio. The first column shows the percentage combination of TQQQ and TLT in the portfolio.

FIGURE 1: RETURN & RISK METRICS FOR SPY, TQQQ, TLT, AND VARIOUS COMBINATIONS OF TQQQ AND TLT. 12/1/2010–2/29/2024. Here you see the estimated returns and estimated risks for the three ETFs used in this study (SPY, TLT, and TQQQ) along with risk and return estimations for portfolios consisting of different allocations of TQQQ and TLT (40/50/60/70%) from 12/1/2010–2/29/2024. No market timing or investment timing system is used in this case, so this can be considered the buy & hold case.

THE BUY & HOLD CASE

The table in Figure 1 shows the risk and return metrics for each ETF and various portfolios consisting of TQQQ and TLT without performing any SMA trading rules (that is, without timing the investments). This represents the buy & hold case. As can be seen from the table, SPY had an annual average return of 11.54% with a standard deviation of 17.24% for the period under study.

When comparing the risk–return of SPY and portfolios consisting of TQQQ and TLT, we can see that simply forming a portfolio of $x\%$ TQQQ and $y\%$ TLT cannot beat “the market” (as represented by SPY, the SPDR S&P 500 ETF Trust).

STUDY RESULTS AFTER APPLYING THE TRADING RULES

For the sake of space, I will only present the results of the best SMA trading rules.

Signal generation from SMA200 on TQQQ prices

In the table in Figure 2, I show the results from applying the SMA200 trading rule to the TQQQ price series for signals. The metrics in Figure 2 with these trading system results should be compared with the metrics seen in Figure 1 showing risk and return metrics for the SPY (which represents the case of buying & holding the market). In the period under study, the SPY had an annual average return of 11.54%, risk of 17.24%, and a reward-to-risk ratio of 67.

Let’s look at the results for the 40/60 portfolio shown in Figure 2. In that scenario, a trader applies the SMA200 trading rule to TQQQ prices; when the TQQQ price

Portfolio %	Strategy 1			Strategy 2		
	Annual Return	Annual SD	R/R	Annual Return	Annual SD	R/R
40-60	12.57%	17.18%	0.73	26.68%	34.37%	0.78
50-50	15.62%	21.04%	0.74	33.65%	42.09%	0.80
60-40	18.76%	25.18%	0.74	41.00%	50.38%	0.81
70-30	21.98%	29.53%	0.74	48.75%	58.98%	0.83

SD stands for *standard deviation*, R/R stands for reward-to-risk ratio. The first column shows the percentage combination of TQQQ and TLT in the portfolio.

FIGURE 2: RETURN & RISK METRICS, SMA200 SIGNALS ON TQQQ PRICES. Here you see the return and risk metrics resulting from trading signals generated by the SMA200 trading rule applied to TQQQ prices for the period 12/1/2010–2/29/2024.

Portfolio %	Strategy 1			Strategy 2		
	Annual Return	Annual SD	R/R	Annual Return	Annual SD	R/R
40-60	13.55%	17.93%	0.76	28.92%	35.87%	0.81
50-50	16.80%	21.92%	0.77	36.39%	43.85%	0.83
60-40	20.13%	26.20%	0.74	44.29%	52.41%	0.85
70-30	23.56%	30.64%	0.77	52.64%	61.30%	0.86

SD stands for *standard deviation*, R/R stands for reward-to-risk ratio. The first column shows the percentage combination of TQQQ and TLT in the portfolio.

FIGURE 3: RETURN & RISK METRICS, SMA150 SIGNALS ON QQQ PRICES. Here you see the return and risk metrics resulting from trading signals generated by the SMA150 trading rule applied to QQQ prices for the period 12/1/2010–2/29/2024.

is above its SMA200, the trader buys 40% TQQQ and 60% TLT, and when the TQQQ is below its SMA200, the trader buys SHV. As seen in Figure 2, this trader would have an annual average return of 12.57% and a risk of 17.18%. Using *strategy 2*, when the buy signal is emitted, the 40/60 portfolio is bought on leverage, and when a sell signal is emitted, the portfolio is invested in the SHV. The annual average return with strategy 2 is 26.68% with a risk of 34.37%.

Thus, although the reward-to-risk of applying SMA200 to a mix of portfolios consisting of TQQQ and TLT are all higher than the reward-to-risk of SPY, only the SMA200 applied to the 40/60 portfolio with strategy 1 has a higher return and lower risk than the market. The other combinations have higher returns and higher risk.

Simply forming a portfolio of $x\%$ TQQQ and $y\%$ TLT cannot beat the market as represented by the SPY.



Signal generation from SMA150 on QQQ prices

In the table in Figure 3, I present the results from applying the SMA150 trading rule to the QQQ price series for signals. TQQQ and TLT are again bought accordingly in the various portfolio allocations described earlier.

We can again compare to Figure 1 showing the buy & hold case for the SPY and the various portfolio allocations.

Figure 3 shows that, when using QQQ prices for signal generation, all the reward–risk ratios are higher than the reward–risk ratio of the SPY. However, only the SMA150 trading rule applied to the 40/60 portfolio following strategy 1 has higher return than the market and has similar risk.

DOUBLE- VS. TRIPLE-LEVERAGED ETFs: COMPARISON OF QLD AND TQQQ RESULTS

Part 1 of this article in the October 2024 issue tested a double-leveraged ETF, the QLD, and compared the risk/return metrics from the trading models with metrics from buy & hold of the portfolios and of the SPY (“the market”). I found that the best trading model (I’ll refer to it as “QLD model 1”) was to apply the SMA200 trading rule to QLD prices, and when a buy signal is generated, buy the 50/50 portfolio (50% QLD and 50% TLT); when a sell signal is generated, park the funds in SHV. This model’s average annual return was estimated to be 12.31% compared to 7.28% for the SPY. The model’s risk was estimated to be 14.29% compared to 20.21% for the SPY.

Here in part 2, I tested a triple-leveraged ETF, the TQQQ. I found that the best trading model (I’ll refer to it as “TQQQ model 1”) is to apply the SMA200 trading rule to TQQQ prices for trading signals, and when a buy signal is generated, buy the 40/60 portfolio (40% TQQQ and 60% TLT); when a sell signal is generated, park the funds in SHV. This model’s average annual return was estimated to be 12.57% (see Figure 2) compared to 11.54% for the SPY (Figure 1). The model’s risk was estimated to be 17.18% (Figure 2) compared to the risk of the SPY at 17.24% (Figure 1).

Based on these results, we can conclude that in the long run, it is much better to use QLD model 1 (the SMA200 applied to QLD prices and buying the 50/50 portfolio), which handsomely beats the market in the test, rather than using TQQQ model 1 (the SMA200 applied to TQQQ prices and buying the 40/60 portfolio), which

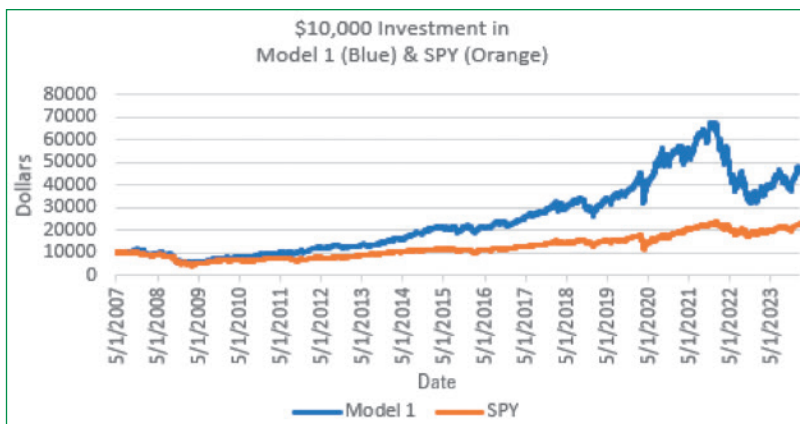


FIGURE 4: GROWTH OF CAPITAL IN SPY VS. QLD TRADING MODEL 1. In part 1 of this article, a double-leveraged QQQ-based ETF was tested (QLD). Here you see how a \$10,000 investment in SPY fares versus investing \$10,000 in QLD model 1 (that is, applying the SMA200 trading rule to the QLD price series and buying the 50% QLD/50% TLT portfolio accordingly). The SPY investment grows to \$23,114, while the QLD model grows to \$47,787. See Figure 5 to compare the TQQQ model 1.

barely beats the market.

(Note that the reason there are different risk/return metrics shown for the SPY in parts 1 and 2 of this article is that the QLD and TQQQ were launched in different years, so the periods under study are different.)

Given that the standard deviation (representing risk) of QLD model 1 is less than the standard deviation (risk) of TQQQ model 1, which in turn has a lower standard deviation (risk) than the SPY, another way of comparing leveraged QQQ trading with buying & holding is to estimate the growth of \$10,000 invested in SPY, \$10,000 in the QLD model, and \$10,000 in the TQQQ model. You can see these comparisons in Figures 4 and 5.

Figure 4 shows the growth of \$10,000 invested in QLD model 1 versus \$10,000 invested in SPY. The \$10,000 invested in SPY grows to \$23,114 over the study period (5/2/2007–1/24/2024). The \$10,000 invested in QLD model 1 grows to \$47,787 over the same period.

Figure 5 shows the growth of \$10,000 invested in TQQQ model 1 versus \$10,000 invested in SPY. The \$10,000 invested in SPY grows to \$34,402 over the study period (12/1/2010–2/29/2024). The \$10,000 invested in TQQQ model 1 grows to \$39,350 over the same period.

Only the SMA200 applied to the 40/60 portfolio with strategy 1 has a higher return and lower risk than “the market.”

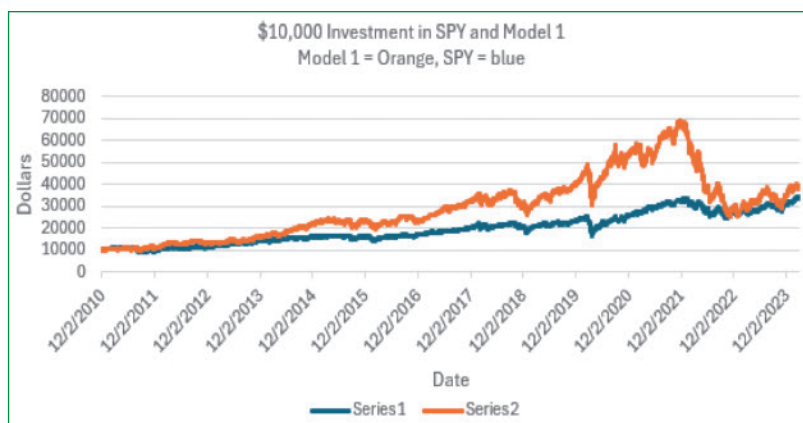


FIGURE 5: GROWTH OF CAPITAL IN SPY VS. TQQQ TRADING MODEL 1. Here you see how a \$10,000 investment in SPY fares versus investing \$10,000 in TQQQ trading model 1 (that is, applying the SMA200 trading rule to TQQQ prices for signal generation and buying the 40% TQQQ/60% TLT portfolio accordingly). The SPY investment grows to \$34,402 while the TQQQ model grows to \$39,350.

SUMMARY AND CONCLUSIONS

In part 1 of this article, I formed various portfolios consisting of QLD and TLT, and in this article, I formed various portfolios consisting of TQQQ and TLT. I apply some well-known SMA trading rules to these portfolios variously using QQQ, QLD, and TQQQ prices for signal generation. When the SMA rule emits a buy signal, I invest in the combined portfolio for strategy 1, and for strategy 2, when a buy signal is emitted, I buy on leverage the combined portfolio. When the rule emits a sell signal, I park the funds in SHV (a money market fund).

In the test, I found that it is marginally better to use QLD and TQQQ prices for signal generation rather than using QQQ prices for signal generation.

In addition, I conclude that it is better to use the double-leveraged QLD ETF and not the triple-leveraged TQQQ ETF for long-run trading. Using the QLD ETF beats the market handsomely whereas using the TQQQ ETF barely beat the market in my tests. Further, the best combination of QLD and TLT in the test was 50% QLD and 50% TLT for the portfolio. (When a buy signal is generated, we invest 50% in QLD and 50% in TLT;

when a sell signal is generated, we park the funds in SHV.)

Another observation is that it may be better to use a long SMA such as a 200-day moving average; in the study, the best results came from using a SMA200 trading rule.

As for comparing strategies 1 and 2 (that is, no leverage versus buying on margin), we can conclude that strategy 1 is appropriate for most traders, whereas strategy 2 has very high returns but also has very high risks, only appropriate for risk lovers.

Please keep in mind that the results presented here are based on the specific period under consideration; it is possible that results may differ when using a different test period.

Massoud Metghalchi, PhD, is a professor of finance at the University of Houston-Victoria. He may be reached at Metghalchim@uhv.edu.

FURTHER READING

Metghalchi, Massoud [2024]. "Trading Leveraged QQQ ETFs, Part 1: QLD," *Technical Analysis of STOCKS & COMMODITIES*, Volume 42: October.

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I conclude that it is better to use the double-leveraged QLD and not the triple-leveraged TQQQ for long-run trading.



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GOT A QUESTION ABOUT USING TRADING STRATEGIES?

Dave Mabe has 25 years of experience in trading strategy development. With a background as a computer engineer and chief technology officer for Trade-Ideas, he is interested in the design of innovative algorithms for rules-based trading systems as well as the intersection of artificial intelligence and finance. He launched DaveMabe.com to help other traders learn how they can improve their trading performance and consistency in results. Through his website he offers a road map for trading strategy development and offers one-on-one coaching. Send your questions or topic suggestions to Dave Mabe at dave@davemabe.com. Selected questions will appear in a future issue of S&C.



Dave Mabe

WANT MORE CONSISTENCY? SYSTEMATIZE YOUR EXITS

My biggest issue is not being patient enough to wait for my setups and taking subpar trades, leading to overtrading. How can I fix this?

When traders tell me they're too impulsive during the trading day, the problem isn't poor self-control. It's usually that their trading system isn't as well-defined as it could be. They end up creating a strategy on the fly during market hours when situations come along that seem like they might be good opportunities.

Many traders waste a lot of time and effort when the market is open by trying to decide whether an opportunity is worth trading. When you leave it to the heat of the moment in the trading day to weigh the pros and cons of a particular situation, you're going to end up making plenty of mistakes.

Have you ever taken a trade only to review it later on and wonder why you took it in the first place?

How about a trade that you talked yourself out of taking only to find it would have been your best trade this month?

These mistakes are inevitable if you haven't fully defined the rules for your trading system.

Think about your trading day and all the decisions you make about your trades. Each decision you haven't researched and planned for ahead of time is an opportunity for you to improve your trading by systematizing.

Your trading day should be a systematic execution of a pre-planned script. Imagine when the market closes and you're evaluating your trading performance: the question you should be asking yourself is not "did I make money today," but "did

I follow my plan?"

When your trading plan is thorough and well-researched, evaluating your performance is a completely different experience.

A GREAT FIRST STEP: SYSTEMATIZE YOUR EXITS

Perhaps you're not at the point of systematizing your entire trading workflow. But that's okay because an excellent first step is to routinize your exit orders.

Most traders are tempted to tinker with their exits during a trade. When they see certain price movements, they can't resist taking some action: moving a stop order a little tighter, taking a partial profit, etc.

More often than not, what ends up happening is they worsen the trade outcome by intervening (Figure 1).

When you zoom out and consider all aspects of your trading system, your exit orders are a prime opportunity to remove your discretion. Not only does this remove the anxiety during the trading day, it will improve your trading results as well.

Continued on page 36

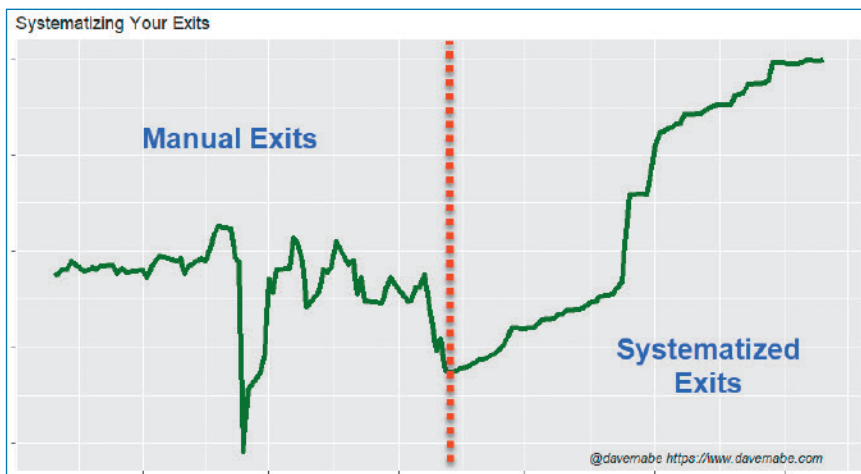


FIGURE 1: MANUAL EXITS VS. SYSTEMATIZED EXITS. Systematizing exits removes discretion.

Have you ever taken a trade only to review it later on and wonder why you took it in the first place?



An Agricultural Commodity

Trading Commodities: Crafting A Bias Strategy To Leverage Orange Juice Seasonality

You can use seasonality characteristics to develop a trading strategy. Here's an example of developing a strategy after identifying a seasonal pattern in an agricultural commodity.

by Andrea Unger

Orange juice futures (@OJ) began trading in 1966 at the New York Board of Trade (NYBOT), following the 1947 invention of frozen concentrated orange juice (FCOJ). Before FCOJ, orange juice was primarily consumed fresh-squeezed. This made it difficult to trade due to its perishable nature. FCOJ revolutionized the industry, opening doors to international markets previously out of reach.

Weather conditions significantly influence the orange juice futures market. Hurricanes, frosts, and tropical storms can cause major market shifts if they occur near harvest time. This sensitivity to adverse weather, coupled with the fact that over 98% of U.S. FCOJ comes from Florida, often leads to extreme market volatility. In the past two years, climate effects and citrus greening dis-

Here, we'll delve into the unique and often overlooked commodity of orange juice.

Even if you're not a financial market enthusiast, you might recall the movie *Trading Places*, where characters played by Eddie Murphy and Dan Aykroyd strike it rich trading orange juice futures. Beyond amusing stories, this market holds fascinating characteristics worth exploring.

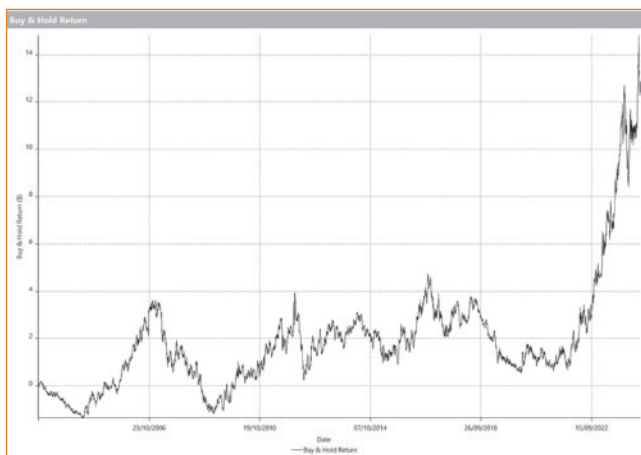


FIGURE 1: ORANGE JUICE FUTURES (@OJ), 2002–2024. In the past two years (2022–2024), prices in @OJ more than tripled their 50-year average. In 2024 alone, prices rose by 77% to reach approximately \$400 per pound.

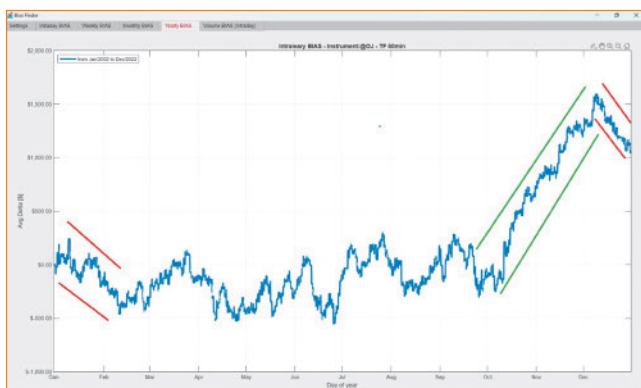


FIGURE 2: AVERAGE ANNUAL PRICE TREND, 2002–2022. Plotting the price average for orange juice futures over a 20-year period from 1/1/2002 to 12/31/2022 helps to reveal price trends. A bullish trend is highlighted in green and bearish trends are highlighted in red.

ease have driven prices to more than triple the 50-year average. In 2024 alone, prices soared by 77%, reaching around \$400 per pound. (See Figure 1.)

EXPLORING THE SEASONALITY OF ORANGE JUICE FUTURES

Beyond the factors behind price fluctuations, we aim to determine if orange juice futures, like other well-known agricultural commodities, show seasonal price trends throughout the year. If so, can we leverage this seasonality with simple strategies?

Using our proprietary Bias Finder software, we will identify recurring seasonal price movements (bias) in orange juice. Given the medium-to-long-term seasonal cyclicity, we'll use a larger dataset than usual to ensure statistically significant results. We'll analyze 20 years of data, from 2002 to the end of 2022, excluding the last two years of aggressive price rises for a more objective analysis.



FIGURE 3: SEASONAL YEARLY BIAS, 2002–2022. The market doesn't behave the exact same way every year, but a bias may still be present. To check for the persistence of the seasonal bias over the years considered in the backtest, the period under study was divided into shorter periods: 2002–2008, 2009–2015, and 2016–2022. That way, the yearly bias over the full period 2002–2022 (blue line) can be compared with other date ranges (other colors) to see if the bias still holds. You can see a strong bullish trend from early October to late November, followed by a bearish phase until January. Here, the two recent years 2023–2024 were not included due to their very strong trend. Compare to Figure 4, which includes the years 2023–2024.

As shown in the seasonal chart (Figure 2), orange juice futures tend to be bullish in autumn (roughly October to early December), then decline from mid-December to late January/early February. Spring and summer show mixed performances and generally sideways movement.

Why does this happen? The annual rally occurs because speculators buy aggressively in autumn, betting on potential frosts in central Florida that could damage crops. Once the danger passes, a bearish phase begins in December as bullish positions are liquidated with a successful harvest in sight.

Returning to our study, we observed a graphical representation of the seasonality over the entire historical period (2002–2022), but this doesn't mean the market behaved the same way every year. To verify the persistence of the bias over all the years considered for our backtest, we divided the historical period into shorter periods: 2002–2008, 2009–2015, and 2016–2022.

The annual bias representation for different timeframes (Figure 3) confirms a strong bullish trend from early October to late November, followed by a bearish phase until January. For the rest of the year, no well-defined

This market holds fascinating characteristics worth exploring.



trend and significant differences between periods prevent identifying any valid long-term statistical recurrence.

Including data from 2023 and 2024 would show the



FIGURE 4: SEASONAL YEARLY BIAS, 2002-2024. Including data from 2023 and 2024 shows the strong bullish trend in recent months, confusing the analysis of seasonality persistence. Thus, this recent data is set aside for later out-of-sample testing.

strong bullish trend of recent months (Figure 4), confusing an objective analysis of seasonality persistence. Thus, we set aside these more recent data for now to use them as out-of-sample (OOS) for developing our strategy.

DEVELOPING A TRADING STRATEGY TO EXPLOIT MARKET SEASONALITY

Let's now create a simple trading system based on our seasonal analysis results. Here are the basic rules:

- LONG entry at the beginning of October
- LONG exit at the end of November
- SHORT entry in December
- SHORT exit in January of the following year

We'll use data from 2002 to the end of 2022 and, considering the low-frequency operation, a daily bar timeframe will suffice.

To calculate our entry levels, we'll use a Donchian channel based on the highest highs and lowest lows over N periods. Within the months specified by the bias, we'll enter long on a breakout of the upper channel band (UpperChannel) and enter short on a breakout of the lower channel band (LowerChannel).

Here's the PowerLanguage code:

```
inputs: MyLength(0);
input: entry_day_
long(1),entry_day_
short(1),exit_day_
long(20),exit_day_
short(20);
```

```
var: UpperChannel(0),
LowerChannel(0);
var: mm(0),
yy(0),nday(0),nday_
short(0);
```

```
mm = Month(d);
yy= year(d);
```

```
if mm<>mm[1] and
```

Spreadsheet	2D Graph	3D Graph	Net Profit	Total Trades	% Profitable	Avg Trade	Max Intraday Drawdown	Win Loss Ratio	Profit Factor	MyLength (UA_Tasc_stag Orange Juice 1)
1			14,047.50	27	62.96 %	520.28	-16,290.00	0.97	1.65	2
2			12,435.00	27	62.96 %	460.56	-16,680.00	0.92	1.57	3
3			15,787.50	27	66.67 %	584.72	-16,290.00	0.88	1.76	4
4			17,025.00	27	70.37 %	630.56	-16,290.00	0.76	1.82	5
5			15,712.50	26	69.23 %	604.33	-16,290.00	0.77	1.74	6
6			13,860.00	25	68.00 %	554.40	-16,290.00	0.77	1.64	7
7			12,615.00	25	68.00 %	504.60	-16,290.00	0.74	1.58	8
8			28,605.00	27	74.07 %	1,059.44	-10,462.50	0.91	2.60	9
9			27,787.50	27	74.07 %	1,029.17	-10,597.50	0.89	2.55	10
10			26,820.00	27	74.07 %	993.33	-10,860.00	0.87	2.48	11
11			24,765.00	27	74.07 %	917.22	-10,987.50	0.82	2.35	12
12			20,512.50	25	72.00 %	820.50	-12,720.00	0.80	2.06	13
13			22,110.00	24	70.83 %	921.25	-9,892.50	1.01	2.46	14
14			17,880.00	23	69.57 %	777.39	-9,892.50	0.94	2.14	15
15			16,410.00	23	69.57 %	713.48	-9,892.50	0.89	2.04	16
16			15,442.50	23	69.57 %	671.41	-10,455.00	0.86	1.96	17
17			17,002.50	21	76.19 %	809.64	-10,005.00	0.69	2.21	18
18			16,875.00	20	80.00 %	843.75	-10,005.00	0.56	2.24	19
19			16,005.00	20	80.00 %	800.25	-10,005.00	0.53	2.14	20

Spreadsheet	2D Graph	3D Graph	Net Profit	Total Trades	% Profitable	Avg Trade	Max Intraday Drawdown	Win Loss Ratio	Profit Factor	entry_day_long (UA_Tasc_stag Orange Juice 1)	exit_day_long (UA_Tasc_stag Orange Juice 1)
1			32,820.00	31	74.19 %	1,058.71	-11,385.00	1.02	2.92	1	10
2			32,820.00	31	74.19 %	1,058.71	-11,385.00	1.02	2.92	2	19
3			31,987.50	31	74.19 %	1,031.85	-11,385.00	1.00	2.87	3	19
4			31,087.50	31	70.97 %	1,002.82	-11,385.00	1.13	2.77	4	19
5			30,772.50	30	73.33 %	1,025.75	-12,120.00	1.02	2.81	6	19
6			30,592.50	31	70.97 %	986.85	-11,385.00	1.10	2.69	5	19
7			30,022.50	32	68.75 %	938.20	-11,647.50	1.16	2.56	1	18
8			30,022.50	32	68.75 %	938.20	-11,647.50	1.16	2.56	2	18
9			29,190.00	32	68.75 %	912.19	-11,647.50	1.14	2.52	3	18
10			28,875.00	32	68.75 %	902.34	-11,917.50	1.13	2.50	1	15
11			28,875.00	32	68.75 %	902.34	-11,917.50	1.13	2.50	2	15
12			28,605.00	27	74.07 %	1,059.44	-10,462.50	0.91	2.60	1	20
13			28,605.00	27	74.07 %	1,059.44	-10,462.50	0.91	2.60	2	20
14			28,290.00	32	65.63 %	884.06	-11,647.50	1.28	2.45	4	18
15			28,267.50	32	68.75 %	883.36	-12,270.00	1.12	2.46	1	17

Spreadsheet	2D Graph	3D Graph	Net Profit	Total Trades	% Profitable	Avg Trade	Max Intraday Drawdown	Win Loss Ratio	Profit Factor	entry_day_short (UA_Tasc_stag Orange Juice 1)	exit_day_short (UA_Tasc_stag Orange Juice 1)
1			44,362.50	31	83.87 %	1,431.05	-6,680.50	2.29	11.89	8	10
2			42,817.50	31	83.87 %	1,381.21	-6,680.50	2.09	10.86	9	19
3			42,292.50	31	83.87 %	1,364.27	-6,680.50	1.94	10.10	10	19
4			41,722.50	31	77.42 %	1,345.89	-6,255.00	2.48	8.49	8	11
5			41,475.00	32	75.00 %	1,296.09	-7,012.50	1.94	5.82	11	4
6			41,467.50	31	87.10 %	1,337.66	-6,630.00	1.38	9.33	8	18
7			41,190.00	31	77.42 %	1,328.71	-6,315.00	1.90	7.61	8	17
8			41,167.50	32	84.38 %	1,286.48	-9,892.50	0.96	5.17	4	19
9			40,912.50	31	77.42 %	1,319.76	-6,465.00	2.26	7.74	8	12
10			40,777.50	32	75.00 %	1,274.30	-7,012.50	1.89	5.67	5	11
11			40,470.00	32	84.38 %	1,264.69	-8,892.50	0.93	5.04	5	19
12			40,410.00	32	75.00 %	1,262.81	-7,012.50	1.95	5.85	4	10
13			40,335.00	31	74.19 %	1,301.13	-5,955.00	2.37	6.80	8	15
14			40,267.50	31	74.19 %	1,298.95	-6,142.50	2.45	7.03	8	16
15			40,177.50	31	74.19 %	1,296.05	-6,255.00	2.84	8.16	9	11

FIGURE 5: OPTIMIZATION OF INPUTS (ENTRY & EXIT). After a basic strategy is set up in the code to enter and exit long and enter and exit short at the times of the year found to be seasonally advantageous, inputs such as the entry and exit days and amount of time the trade is held are varied to identify the values with the best overall outcomes in the backtest.

```

d<>d[1] then nday=1 else nday=nday+1;

if yy<>yy[1] and mm<>mm[1] and d<>d[1] then nday_
short=1 else nday_short=nday_short+1;

UpperChannel = HighestFC(h, MyLength);
LowerChannel = LowestFC(l, Mylength);

//LONG
if mp=0 and month(d)=10 and nday>=entry_day_long then
begin
    buy next bar UpperChannel stop;
end;

if mp=1 and month(d)=11 and nday>=exit_day_long then
sell next bar at market;

//SHORT
if mp=0 and month(d)=12 and nday>=entry_day_short
then begin

    sellshort next bar LowerChannel stop;
end;

if mp=-1 and month(d)=1 and nday_short>=exit_day_short
then buy to cover next bar at market;

setstopcontract;

```

Our code uses variables like “UpperChannel” and “LowerChannel” for the Donchian channel, “mm”

and “yy” for defining month and year, and “nday” and “nday_short” as counters for trading days each month to identify the best entry and exit days within the basic rules.

Next, we’ll optimize our inputs. Figure 5 shows our optimization of the inputs “MyLength,” “entry_day_long,” “exit_day_long,” “entry_day_short,” and “exit_day_short” to identify the most effective values.

IMPROVING THE PERFORMANCE OF THE ORANGE JUICE BIAS STRATEGY

Figure 6a shows the equity curve for the strategy after optimizing the inputs, and Figure 6b shows the perfor-

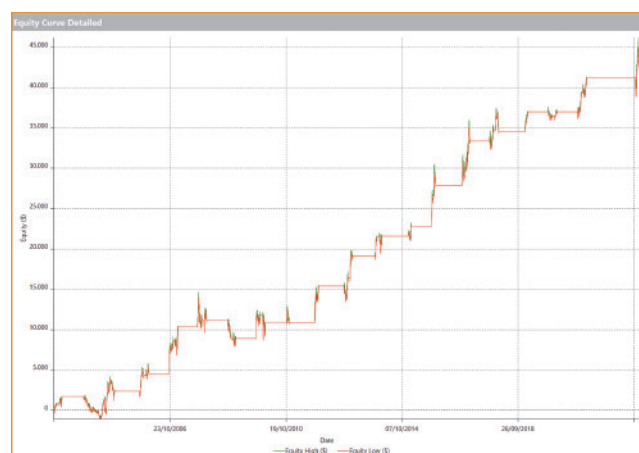


FIGURE 6A: EQUITY CURVE FOR SEASONAL STRATEGY AFTER OPTIMIZATION OF INPUTS. This shows the equity curve for the strategy after optimizing inputs such as the entry and exit days and trade hold times. The equity curve appears regular, which is a good sign.

Strategy Performance Sumr				Total Trade Analysis			
	All Trades	Long Trades	Short Trades		All Trades	Long Trades	Short Trades
Net Profit	44,362.50 \$	29,617.50 \$	14,745.00 \$	Total # of Trades	31	17	14
Gross Profit	48,435.00 \$	32,640.00 \$	15,795.00 \$	Total # of Open Trades	1	0	1
Gross Loss	(4,072.50 \$)	(3,022.50 \$)	(1,050.00 \$)	Number Winning Trades	26	14	12
Adjusted Net Profit	33,042.34 \$	19,149.05 \$	9,442.91 \$	Number Losing Trades	5	3	2
Adjusted Gross Profit	38,936.11 \$	23,916.59 \$	11,235.38 \$	Percent Profitable	83.87%	82.35%	85.71%
Adjusted Gross Loss	(5,893.78 \$)	(4,767.54 \$)	(1,792.46 \$)	Avg Trade (win loss)	1,431.05 \$	1,742.21 \$	1,053.21 \$
Select Net Profit	29,490.00 \$	18,390.00 \$	11,100.00 \$	Average Winning Trade	1,862.88 \$	2,331.43 \$	1,316.25 \$
Select Gross Profit	31,192.50 \$	19,042.50 \$	12,150.00 \$	Average Losing Trade	(814.50 \$)	(1,007.50 \$)	(525.00 \$)
Select Gross Loss	(1,702.50 \$)	(652.50 \$)	(1,050.00 \$)	Ratio Avg Win / Avg Loss	2.29		2.51
Account Size Required	2,370.00 \$	2,370.00 \$	877.50 \$	Largest Winning Trade	5,085.00 \$	5,085.00 \$	3,645.00 \$
Return on Account	1871.84%	1249.68%	1680.34%	Largest Losing Trade	(2,370.00 \$)	(2,370.00 \$)	(877.50 \$)
Return on Initial Capital	44.36%	29.62%	14.74%	Avg # Bars in Trades	38.5	48.2	26.8
Max Strategy Drawdown	(6,682.50 \$)	(5,857.50 \$)	(4,455.00 \$)	Avg # Bars in Winning Trades	40.3	51.9	26.8
Max Strategy Drawdown (%)	(5.83%)	(5.25%)	(4.26%)	Avg # Bars in Losing Trades	29	30.7	26.5
Max Close To Close Drawdown	(2,370.00 \$)	(2,370.00 \$)	(877.50 \$)	Avg # Bars Between Trades	n/a	n/a	n/a
Max Close To Close Drawdown (%)	(2.13%)	(2.19%)	(0.85%)	Avg # Bars Between Winning Trades	162.6	324.9	412.8
Return on Max Strategy Drawdown	6.64	5.06	3.31	Avg # Bars Between Losing Trades	1026.2	1728	2611.5
Profit Factor	11.89	10.8	15.04				
Adjusted Profit Factor	6.61	5.02	6.27				
Select Profit Factor	18.32	29.18	11.57				
Max # Contracts Held	1	1	1				
Slippage Paid	0.00 \$	0.00 \$	0.00 \$				
Commission Paid	0.00 \$	0.00 \$	0.00 \$				
Open Position P/L	(570.00 \$)	n/a	(570.00 \$)				
Annual Rate of Return	2.13%	1.42%	0.71%				
Monthly Rate of Return	0.18%	0.12%	0.06%				
Buy Hold Return	463,149.35 \$	463,149.35 \$	471,499.18 \$				
Avg Monthly Return	180.22 \$						
Monthly Return StdDev	739.84 \$						
Total # of Trades	31	17	14				

FIGURE 6B: METRICS FOR SEASONAL STRATEGY AFTER OPTIMIZATION OF INPUTS. This shows the strategy performance summary and total trade analysis of the bias strategy on orange juice futures after performing a backtest using the optimized inputs. The metrics are reassuring about the strategy’s development.

mance summary and total trade analysis for the strategy after performing the backtest using the optimized inputs. The equity curve is quite regular, and the metrics reassure us about our strategy development.

At this point, we have a solid seasonal-based system that captures the recurring biases of orange juice futures. Could we improve it further? We don't need additional filters for an already sparse operation; instead, we'll focus on overall position risk management.

Aside from bias-based entries and exits, the trade is

```
//EXIT
input:per (10), stop_loss (3), profit_target (3), breakeven (0);
value1=AvgTrueRange (per);

setstoploss (value1*stop_loss*bigpointvalue);
setprofittarget (value1*profit_target*bigpointvalue);
```

FIGURE 7: CODE TO IMPLEMENT STOP-LOSS/PROFIT TARGET. A stop-loss and/or profit target can be added to the existing strategy. This shows coding in PowerLanguage for a stop-loss and profit target based on using the average true range (ATR) indicator to gauge volatility.

entirely free to develop without stop-loss or profit target. Let's implement this aspect using the average true range (ATR) indicator for dynamic stop-loss and profit-target management based on volatility. We'll modify our script with the code shown in Figure 7 and proceed with input optimization.

In Figure 8, we show the optimization of inputs "per," "stop_loss," and "profit_target" to identify the optimal values. In Figure 9, we show strategy performance summary and total trade analysis of the bias strategy on orange juice futures after applying a stop-loss and profit target. In Figure 10, you see the trade metrics with and without a stop-loss and profit target.

Comparing the backtest results of the strategy with and without the stop-loss and profit target shows clear benefits of their application. Adding these exits results in significant improvements in both net profit, which increases from \$44,362.50 to \$52,710.00, and maximum drawdown, which significantly improves from -\$6,682.50 to -\$4,305.00. Clearly, relying not only on bias-based

Spreadsheet	2D Graph	3D Graph										
			Net Profit	Total Trades	% Profitable	Avg Trade	Max Intraday Drawdown	Win Loss Ratio	Profit Factor	per (UA_Tascstag Orange Juice 1)	stop_loss (UA_Tascstag Orange Juice 1)	target_profit (UA_Tascstag Orange Juice 1)
1			52,710.00	36	86.11 %	1,464.17	-4,305.00	2.05	12.71	11	5	5
2			51,397.50	36	86.11 %	1,427.71	-4,342.50	2.00	12.40	13	5	5
3			51,217.50	36	86.11 %	1,422.71	-4,312.50	1.99	12.34	10	5	5
4			50,872.50	36	83.33 %	1,413.13	-4,260.00	1.82	9.08	11	4	5
5			50,152.50	36	86.11 %	1,393.13	-4,365.00	1.92	11.91	14	5	5
6			49,692.00	36	83.33 %	1,380.33	-4,237.50	1.79	8.94	10	4	5
7			49,650.00	36	86.11 %	1,379.17	-4,365.00	1.92	11.92	12	5	5
8			49,095.00	36	83.33 %	1,363.75	-4,342.50	2.27	11.34	15	5	5
9			49,051.50	36	83.33 %	1,362.54	-4,440.00	1.76	8.80	13	4	5
10			47,733.00	36	86.11 %	1,325.92	-6,337.50	1.97	12.20	6	5	5

FIGURE 8: OPTIMIZATION OF INPUTS (STOP-LOSS & PROFIT TARGET). Inputs having to do with the stop-loss and profit target are varied and tested to identify values with the best overall outcomes in the backtest.

Strategy Performance Summary				Total Trade Analysis			
	All Trades	Long Trades	Short Trades		All Trades	Long Trades	Short Trades
Net Profit	52,710.00 \$	34,102.50 \$	18,607.50 \$	Total # of Trades	36	21	15
Gross Profit	57,210.00 \$	37,725.00 \$	19,485.00 \$	Total # of Open Trades	1	0	1
Gross Loss	(4,500.00 \$)	(3,622.50 \$)	(877.50 \$)	Number Winning Trades	31	17	14
Adjusted Net Profit	40,422.32 \$	23,141.59 \$	12,522.41 \$	Number Losing Trades	5	4	1
Adjusted Gross Profit	46,934.78 \$	28,575.34 \$	14,277.41 \$	Percent Profitable	86.11%	80.95%	93.33%
Adjusted Gross Loss	(6,512.46 \$)	(5,433.75 \$)	(1,755.00 \$)	Avg Trade (win_loss)	1,464.17 \$	1,623.93 \$	1,240.50 \$
Select Net Profit	28,500.00 \$	17,100.00 \$	11,400.00 \$	Average Winning Trade	1,845.48 \$	2,219.12 \$	1,391.79 \$
Select Gross Profit	31,005.00 \$	18,727.50 \$	12,277.50 \$	Average Losing Trade	(900.00 \$)	(905.63 \$)	(877.50 \$)
Select Gross Loss	(2,505.00 \$)	(1,627.50 \$)	(877.50 \$)	Ratio Avg Win / Avg Loss	2.05	2.45	1.59
Account Size Required	1,995.00 \$	1,995.00 \$	877.50 \$	Largest Winning Trade	4,830.00 \$	4,830.00 \$	3,877.50 \$
Return on Account	2642.11%	1709.4%	2120.51%	Largest Losing Trade	(1,995.00 \$)	(1,995.00 \$)	(877.50 \$)
Return on Initial Capital	52.71%	34.1%	18.61%	Avg # Bars in Trades	23.2	23.1	23.3
Max Strategy Drawdown	(4,305.00 \$)	(3,300.00 \$)	(4,455.00 \$)	Avg # Bars in Winning Trades	22.2	21.2	23.5
Max Strategy Drawdown (%)	(3.75%)	(2.57%)	(4.24%)	Avg # Bars in Losing Trades	29.2	31.3	21
Max Close To Close Drawdown	(1,995.00 \$)	(1,995.00 \$)	(877.50 \$)	Avg # Bars Between Trades	n/a	n/a	n/a
Max Close To Close Drawdown (%)	(1.76%)	(1.82%)	(0.85%)	Avg # Bars Between Winning Trades	148	289.2	353.4
Return on Max Strategy Drawdown	12.24	10.33	4.18	Avg # Bars Between Losing Trades	1026	1287.8	525.5
Profit Factor	12.71	10.41	22.21				
Adjusted Profit Factor	7.21	5.26	8.14				
Select Profit Factor	12.38	11.51	13.99				
Max # Contracts Held	1	1	1				
Slippage Paid	0.00 \$	0.00 \$	0.00 \$				
Commission Paid	0.00 \$	0.00 \$	0.00 \$				
Open Position P/L	(570.00 \$)	n/a	(570.00 \$)				
Annual Rate of Return	2.53%	1.64%	0.89%				
Monthly Rate of Return	0.21%	0.14%	0.07%				
Buy Hold Return	463,149.35 \$	463,149.35 \$	471,499.18 \$				
Avg Monthly Return	214.57 \$						
Monthly Return StdDev	755.03 \$						
Total # of Trades	36	21	15				
Percent Profitable	86.11%	80.95%	93.33%				

FIGURE 9: METRICS FOR SEASONAL STRATEGY AFTER OPTIMIZATION OF INPUTS. This shows the strategy performance summary and total trade analysis of the bias strategy on orange juice futures after performing the backtest using the optimized inputs found for the stop-loss and profit target.

	Net Profit	Average Trade	Max Drawdown
Without stop-loss or profit target	\$44,362.50	\$ 1,431.05	-\$6,682.50
With stop-loss and profit target	\$52,710.00	\$ 1,464.17	-\$4,305.00

FIGURE 10: METRICS FOR STRATEGY AFTER OPTIMIZATION OF INPUTS. Comparing the backtest results with and without the stop-loss and profit target shows clear benefits for their application. Adding the precise position-management exits in addition to the existing seasonality-based exits results in significant improvements in both net profit and maximum drawdown.

exits but also having precise position management offers several advantages.

APPLYING THE STRATEGY TO MARKET TRENDS IN 2023–2024

Let's now verify if our development work confirms the positive results seen in Figure 9 by extending the test to 2023 and part of 2024. In Figure 11, you see updated trade metrics through the end of May 2024. The equity curve is shown in Figure 12. You can see a strategy performance summary and total trade analysis for the bias strategy in Figure 13. We can see our system meets expectations and captures the strong run-up of the underlying asset in recent months.

CONCLUSIONS AND DEVELOPMENT PROSPECTS BASED ON COMMODITY SEASONALITY

In this study, we explored seasonal biases and how to exploit them through a simple trading system. We

	Net Profit	Average Trade	Max Drawdown
Without stop-loss or profit target	\$44,362.50	\$ 1,431.05	-\$6,682.50
With stop-loss and profit target	\$52,710.00	\$ 1,464.17	-\$4,305.00
With stop-loss and profit target through May 31, 2024	\$66,202.50	\$1,697.50	-\$4,545.00

FIGURE 11: METRICS FOR STRATEGY, 2002–2024. Prices in orange juice futures in 2023 and 2024 showed a very strong bullish trend, much more so than in past years. Extending the strategy backtest through May 2024 confirms that the strategy remains effective through this period.

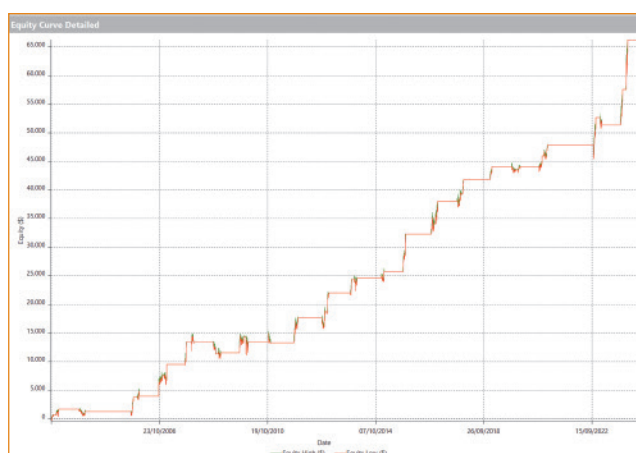


FIGURE 12: EQUITY CURVE FOR STRATEGY, 2002–2024. This shows the equity curve for the strategy after extending the backtest through May 2024. The system captures the strong run-up in orange juice futures in 2023 and 2024 (through May).

Strategy Performance Summary				Total Trade Analysis			
	All Trades	Long Trades	Short Trades		All Trades	Long Trades	Short Trades
Net Profit	66,202.50 \$	40,327.50 \$	25,875.00 \$	Total # of Trades	39	22	17
Gross Profit	72,060.00 \$	43,950.00 \$	28,110.00 \$	Total # of Open Trades	0	0	0
Gross Loss	(5,857.50 \$)	(3,622.50 \$)	(2,235.00 \$)	Number Winning Trades	33	18	15
Adjusted Net Profit	51,267.15 \$	28,157.14 \$	17,036.65 \$	Number Losing Trades	6	4	2
Adjusted Gross Profit	59,515.96 \$	33,590.89 \$	20,852.03 \$	Percent Profitable	84.62%	81.82%	88.24%
Adjusted Gross Loss	(8,248.81 \$)	(5,433.75 \$)	(3,815.38 \$)	Avg Trade (win loss)	1,697.50 \$	1,833.07 \$	1,522.06 \$
Select Net Profit	48,517.50 \$	31,267.50 \$	17,250.00 \$	Average Winning Trade	2,183.64 \$	2,441.67 \$	1,874.00 \$
Select Gross Profit	52,380.00 \$	32,895.00 \$	19,485.00 \$	Average Losing Trade	(976.25 \$)	(905.63 \$)	(1,117.50 \$)
Select Gross Loss	(3,862.50 \$)	(1,627.50 \$)	(2,235.00 \$)	Ratio Avg Win / Avg Loss	2.24	2.7	1.68
Account Size Required	1,995.00 \$	1,995.00 \$	1,357.50 \$	Largest Winning Trade	8,625.00 \$	6,225.00 \$	8,625.00 \$
Return on Account	3318.42%	2021.43%	1906.08%	Largest Losing Trade	(1,995.00 \$)	(1,995.00 \$)	(1,357.50 \$)
Return on Initial Capital	6620250%	40327500%	2587500%	Avg # Bars in Trades	22.8	22.9	22.7
Max Strategy Drawdown	(4,545.00 \$)	(3,300.00 \$)	(4,545.00 \$)	Avg # Bars in Winning Trades	21.8	21.1	22.8
Max Strategy Drawdown (%)	(438.68%)	(438.68%)	(150.73%)	Avg # Bars in Losing Trades	28.2	31.3	22
Max Close To Close Drawdown	(1,995.00 \$)	(1,995.00 \$)	(1,357.50 \$)	Avg # Bars Between Trades	n/a	n/a	n/a
Max Close To Close Drawdown (%)	(56%)	(126.05%)	(23.16%)	Avg # Bars Between Winning Trades	149.2	292.5	353.5
Return on Max Strategy Drawdown	14.57	12.22	5.69	Avg # Bars Between Losing Trades	912.5	1379.8	2800
Profit Factor	12.3	12.13	12.58				
Adjusted Profit Factor	7.22	6.18	5.47				
Select Profit Factor	13.56	20.21	8.72				
Max # Contracts Held	1	1	1				
Slippage Paid	0.00 \$	0.00 \$	0.00 \$				
Commission Paid	0.00 \$	0.00 \$	0.00 \$				
Open Position P/L	n/a	n/a	n/a				
Annual Rate of Return	297386.09%	181153.85%	116232.24%				
Monthly Rate of Return	24782.17%	15096.15%	9686.02%				
Buy Hold Return	12.41 \$	12.41 \$	12.61 \$				
Avg Monthly Return	258.60 \$						
Monthly Return StdDev	931.40 \$						
Total # of Trades	39	22	17				
Percent Profitable	84.62%	81.82%	88.24%				

FIGURE 13: STRATEGY PERFORMANCE SUMMARY AND TOTAL TRADE ANALYSIS. An updated strategy performance summary and total trade analysis of the bias strategy applied to orange juice futures is shown for the period 1/1/2002 to 5/31/2024.

confirmed the orange juice seasonal bias persists due to intrinsic factors related to the nature and geographic location of the underlying asset, consistently impacting its occurrence.

Discovering other biases in less well-known markets, like the one analyzed here, could lead to building profitable systems.

Happy trading!

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,*

The annual bias representation for different timeframes confirms a strong bullish trend from early October to late November.



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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Strategy Corner

MABE

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MOTIVATION USING A JOURNAL

Even successful traders find it hard to believe that their intervening during a trade ends up worsening the outcome. I was skeptical as well, until I took a hard look at my trading journal and analyzed the trades where I had intervened on the exit in some way and compared those to ones where I simply let my original plan play out.

I started by tagging my trades with “intervened” when I made a change to the original plan. Then I filtered just the trades with that tag.

I could quickly see that my discretion didn't work nearly as

well as I thought it had. If I hadn't intervened and simply followed the plan, it was obvious I would have made more money.

All the attention I was devoting to watching my trades was just being overinvolved and not providing any value. Don't be a helicopter parent for your trades—let them play out as designed.

HALFWAY TOWARDS SYSTEMIZATION

Once you establish a process for entering your exits immediately after entering, you can simply let them play out knowing that any modification after the entry is more trouble than it's worth.

Instead of agonizing over every tick when you're in a position, you'll

These mistakes are inevitable if you haven't fully defined the rules for your trading system.

have less anxiety because you've done the research ahead of time. Once you become unglued from your screen, you'll have more time to research how to systematize the remaining part of your strategy: the entries.

Think of every trading decision you make during market hours as an opportunity to systematize and watch your consistency improve.

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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.



Kevin J. Davey

MARGIN ALTERNATIVES

Futures margins have gotten so large lately. Are there any good alternatives?

You are definitely not imagining things. Overnight margins have gone up quite a bit recently (I'll ignore day-trading margins for this discussion). Figure 1 shows a comparison of some major markets, with margins pre-Covid (February 2020) compared to today (September 2024).

While not every market has gone up in the last 4.5 years, most markets have. This presents a dilemma for any algo trader who wants to trade multiple strategies in multiple markets. Higher margins mean decreased ability to trade a diversified portfolio of multiple strategies in varying markets.

Thankfully, in many cases there are some alternatives. One possibility is with ETFs. The universe of ETFs has expanded in recent years, and now there are many commodity-specific ETFs. I definitely recommend first testing any of these alternatives before trading them. Of course, with ETFs the leverage is much lower than with futures, and that might be an important consideration.

If you want to stick with futures, many instruments now have smaller size "micro" contracts. For example, the mini S&P is \$50 per point, but the

micro mini S&P (MES) is only \$5 per point. I find this micro market ideal for running small tests and also for having better resolution with position sizing.

There are drawbacks to the micro contracts, though. The commissions, when viewed as a percentage of contract value, will be higher. And slippage for these markets is generally higher as well. This increase in trading costs can lead to significantly

price action you see on the full-sized contracts is quite a bit different on the micros. For example, you might see a favorite candlestick pattern on the full-sized contract, but not on the micro. So, should you take the micro trade if the candlestick signal only shows up on either the full or micro version?

Another potential drawback is in live trading and backtesting. Ideally, you would create a strategy on the full-size contracts, verify the backtest is acceptable, and then trade that full contract live. If you wanted to switch to a micro version, the simplest solution is to just trade the micro instead of the full size (the strategy still calculates on the full-sized contract). Not all trading platforms allow this sort of symbol swapping, and instead you might have to create a version of your strategy that gets its signals off the full-size (data2 datatream) while executing trades on the micro (data1 datastream). This is not always easy nor possible.

A simpler solution is to create the backtest with the full-sized contract, and then in live trading, simply use the micro contract (the strategy calculates on the micro contract). The nice thing about this is that the contract switch can also be backtested, allowing you to see if the micro

Higher margins mean decreased ability to trade a diversified portfolio of multiple strategies in varying markets.

reduced performance, especially with active trading.

Another drawback with the micros is that they usually have less liquidity and volume, and many times the

Instrument	Symbol	Initial Margin, Sept 2024	Initial Margin, Feb 2020	Percent Increase
Light Sweet Crude Oil	CL	\$6,543	\$4,125	159%
E-Mini S&P 500 Futures	ES	\$15,180	\$6,930	219%
Gold (COMEX)	GC	\$11,550	\$4,950	233%
E-Mini Nasdaq 100 Futures	NQ	\$23,100	\$7,920	292%
Soybeans	S	\$2,310	\$1,650	140%
30 Year US Treasury Bond	US	\$4,070	\$2,970	137%

FIGURE 1: OVERNIGHT MARGINS SAMPLING. A comparison of overnight margins in some major markets, pre-Covid (February 2020) versus today (September 2024). Margins have generally increased significantly over recent years.

Continued on page 41



Riding The Market Momentum

Catching Profitable Market Opportunities By Harnessing Dominant Trends

Here's a strategy for forex trading that uses moving averages alongside critical price levels to identify trading opportunities as major trends develop.

by Azeez Mustapha

In

the dynamic world of forex trading, success often hinges on the ability to decipher the ever-shifting market landscape. One powerful tool in a trader's arsenal is the use of moving averages, specifically the 50-day simple moving average (SMA) and the 200-day SMA. By using these indicators along with spotting important levels, traders can move through the market's challenges with more accuracy and certainty.

The strategy I'll discuss in this article harnesses the insights provided by the 50-day and 200-day SMAs to discern dominant trends and potential reversal points.

Incorporating critical levels adds an additional layer of confirmation. Here, I'll delve into the mechanics of the strategy, exploring how it offers a strategic framework for capturing profitable opportunities in the forex market.

THE CONCEPT OF THE STRATEGY

I will be using both the 50-day moving average and the 200-day moving average alongside major critical levels to identify and harness opportunities presented by the development of major trends. The strategy is based on crossovers of the two averages, popularly called the "golden cross" and "death cross." Crosses of the moving averages on the chart can indicate when major trends in the market may be developing.

Golden cross: This occurs when the shorter-term moving average (such as the 50SMA) crosses above the longer-term moving average (such as the 200SMA).

It suggests a potential bullish trend reversal.

Death cross: Conversely, the death cross is when the shorter-term moving average crosses below the longer-term moving average. It signals the beginning of a possible bearish trend.

Integrating critical price levels into this strategy can enhance its effectiveness. Here's how you might do it:

- **Support and resistance levels:** Identify key support and resistance levels on the price chart. These are levels where the price has historically reversed or stalled. When combined with the moving average crosses, they can act as confirmation signals.
- **Confirmation signals:** Look for the golden/death cross to occur near significant support or resistance levels. For example, if the 50SMA crosses above the 200SMA near a strong support level, it adds weight to the bullish signal. Conversely, if the death cross happens near a major resistance level, it strengthens the bearish signal.
- **Volume analysis:** Analyze trading volume when the moving average crossover occurs. A surge in volume along with the crossover can validate the signal, indicating strong market participation.

One reason that it's important to integrate critical levels into this analysis is that it adds depth and confirmation to trend assessments. Critical levels, such as support and resistance zones, represent price levels where significant buying or selling pressure historically occurs. When the SMAs intersect near these levels, it reinforces the significance of the trend development or potential reversal, enhancing the reliability of trading signals.

By meticulously observing the interplay between the 50-day and 200-day SMAs alongside critical levels, traders gain valuable insights into the strength and sustainability of market trends. This comprehensive approach enables traders to make informed decisions, identifying opportune moments to enter, exit, or adjust positions based on the evolving market dynamics. Ultimately, the synergy between these technical elements empowers



FIGURE 1: GOLDEN CROSS, EUR/USD. Here you can see the 50-day (in red) and 200-day (in green) simple moving averages cross on a daily chart of euro/US dollar. Two price levels are identified based on historical market dynamics.

traders to navigate the complexities of the forex market with greater precision and confidence, positioning them for success in capitalizing on trend developments.

Following is an explanation of the strategy:

Strategy details

- **Strategy name:** The golden cross and death cross method
- **Strategy type:** Following the prevailing trend
- **Suitability:** Good for part-time traders
- **Trading style:** Position trading
- **Timeframe:** Daily charts
- **Indicators:** 50-day and 200-day simple moving average curve, horizontal lines, and the Bollinger Bands indicator for measuring the volatility level
- **Price levels:** Round numbers, especially ones having 3 or 4 zeros
- **Bullish setup:** After the bullish momentum turns the market upward, we are to wait for the golden cross, even if price action crosses the key price level before taking a long position
- **Bearish setup:** After bearish momentum turns the market in a downward direction, we are to wait for the death cross, even if price action crosses the key support level before taking a short position

This strategy harnesses the insights provided by the 50-day and 200-day SMAs to discern dominant trends and potential reversal points.



FIGURE 2: DEATH CROSS AND GOLDEN CROSS, EUR/USD. The close proximity of the two moving averages and narrowing bandwidth suggests an upcoming consolidation period.



FIGURE 3: GOLDEN CROSS, USD/JPY. After a bull market started at the 130.000 price level and the market surged strongly, a golden cross appeared. After waiting for price to rebound from the 138.000 level, a bullish trading position is entered at 142.000. Price eventually hit the take-profit target for a profit on August 11, 2023.

- Position size: Using 0.01 lots for each \$2,000
- Stop-loss: 100 pips
- Take-profit: 300 pips
- Risk-to-reward ratio: 1:3
- Breakeven stop: A stop at breakeven can be set after a gain of about 100 pips
- Exit: Exit at the stop, breakeven, or profit targets

USING THE STRATEGY

First, let's find important price levels that act as support and resistance based on past market behavior. We'll draw horizontal lines to mark these levels, also known as psychological levels. When these levels are crossed after the moving averages change direction, it could signal the start of a profitable trend, especially if trading volume supports the move. If trading volume stays strong even after crossing these levels, it confirms the price breakout or breakdown.

In Figure 1, we'll use the euro against the US dollar as an example. Two key price levels have been identified

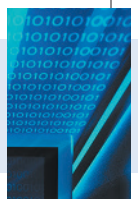
here: 1.10000 as resistance and 1.04000 as support. The market started getting bullish around the 0.96000 level, but the golden cross of the moving averages happened around 1.04000. Notice how volatility increased as the market got closer to this major level. Without the moving averages, it might seem like the market could break down around 1.04000 due to supply and demand pressures. However, as the cross predicted, bullish forces won, causing a significant upward surge.

Approaching the 1.1000 level, we see another struggle between bulls and bears. Historically, this level was once support before breaking down, so some investors might still feel bearish about it. But the moving averages stayed positive despite this, and the market made more highs despite the

presence of bears.

Looking at the example in Figure 2, as the EUR/USD market stays bullish above the important 1.1000 price level, there are signs that the bullish trend might be ending. The two moving averages are getting closer and closer together, which could indicate a change in trend. Bears gained momentum around the 1.12000 level before the death cross occurred. Even though bulls are strong at the support level and bears are resisting at the resistance level, the moving averages are now moving sideways close to each other. This is happening alongside a decrease in the width of the price channel, suggesting a potential slowdown in market movement.

The golden cross suggests a potential bullish trend reversal.



For the next example, I'll use the USD/JPY as a case study (Figure 3).

After the bull market started at the 130.000 price level and the market surged strongly, briefly crossing the 144.000 price level, we had a golden cross. Although the price was rejected, the moving averages remained optimistic for a bullish outcome despite the clear difference from the price action. We waited patiently as the price retraced, but the moving average kept a positive outlook. Noting the high volatility around the 142.000 level, we waited for the price to rebound from the 138.000 level before entering a bullish trading position at 142.000. With a risk/reward ratio (RRR) of 1:3, the take-profit was set at 145.000 while the stop-loss was set at 141.000. Eventually, the market hit the target and made a profit on August 11, 2023.

Strategy snapshot

- Instrument: USD/JPY
- Order: Buy
- Entry date: August 7, 2023
- Entry price: 142.000
- Stop-loss: 141.000
- Take profit: 145.000
- Exit date: August 11, 2023
- Profit: 300 pips

CONCLUSION

Traders should pay attention to how the market behaves after the golden cross as it nears major price levels. They should watch for increased volatility and wait for the market to move strongly in the expected direction before entering a trading position. To gauge volatility accurately, traders can use the Bollinger Bands indicator. This step is important because tension often builds up around

It offers a strategic framework for capturing profitable opportunities in the forex market.



major price levels or psychological levels. However, once the market starts moving according to the indication of the golden cross or the death cross, traders could enter positions to potentially profit from it.

Another thing to watch closely is the behavior of the two moving averages, the 50-day SMA and the 200-day SMA. Look for a widening gap between these two curves to confirm the strength of the current trend. Even during market retracements or pullbacks from upward movement, traders can anticipate a bounce as long as the 50-day SMA remains on course and doesn't start slowing down toward the 200-day SMA.

The strategy presented in this article is intended to encourage traders to look for potential position trading opportunities, all while maintaining responsible trading practices, recognizing the significant impact of every decision along the way in their trading career.

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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DAVEY

Continued from page 37

contract performed proportionately to the full-sized contract. Many times this is the case, at least before slippage and commission are taken into account.

In my experience, in probably 90% of the cases, the 2 datastream solution or the simple switch solution

will yield acceptable results that are comparable to the full-sized results. But sometimes, getting a micro contract to perform proportionally to the full-size contract is just not possible. Don't be surprised if this happens to you!

The micro futures are a nice addition to the futures landscape. I suspect their small margin requirements will lead to more volume from small traders in the future. Eventually, traders

The micro futures are a nice addition to the futures landscape.

will likely develop strategies from scratch just for the micros, but in the meantime, conversion to micros from full-sized contracts is usually possible.

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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.



Carley Garner

BROKER CHOICE

Does it matter which futures and options broker I choose?

The answer is YES (capital letters are appropriate). For full disclosure, I myself am a commodity broker; I run a boutique futures and options trading shop servicing clients of all sizes and experience levels. Thus, my opinion is clearly biased in this arena. Nevertheless, too many traders either choose a brokerage nonchalantly or pick the one offering the lowest commission rate without thoroughly evaluating what the consequences might be to their trading experiences and, more importantly, their performance.

Although I wish it weren't the case, our brokerage thrives on market chaos. This is because when feces hits the fan, it reveals which market participants are swimming naked and which brokerages are cutting corners at the expense of their clients. Unfortunately, the traders swimming naked and the brokers cutting corners are often paired with each other, exacerbating the chaos. For this reason, we generally receive a large influx of new clients on the heels of such occurrences. For instance, the three-day stock market wipeout in early August caught quite a few stock index traders—specifically put option sellers—off-guard, and ill-prepared brokerages showed their hands.

When the brokerage industry shifted to a discounted commission

model, it felt like a win for consumers, but I believe the opposite is true. Lower transaction costs came at the detriment of experienced and competent service; in this business, you will always get exactly what you pay for. For instance, brokerages generally look to keep a less experienced and/or smaller staff to keep expenses low enough to accommodate next-to-nothing commissions. Further, such discount commission brokers also

When the brokerage industry shifted to a discounted commission model, it felt like a win for consumers, but I believe the opposite is true.

charge higher margin requirements than the exchange minimum rates because they can't afford to absorb their clients' risk if something like the early August equity market implosion happens.

Perhaps the most cataclysmal aspect of discount brokerages is their avoidance of margin calls or even risk stress posed by their client's positions. This comes in the form of a heavy-handed liquidation policy. Many brokerages automatically liquidate their clients' futures positions systematically via computerized

software. Such mass liquidation can trigger mini-flash crashes. For whatever reason, traders tend to run out of money simultaneously; imagine what happens when dozens of brokerages liquidate tens of thousands of contracts nearly simultaneously. The massive price spike leaves traders sidelined with significant losses while the market moves favorably without them.

Options traders are often worse off due to the spike in volatility and lack of liquidity that occurs in such an event, causing the spread between the bid and ask to balloon. On the Thursday before the early August stock market wipeout that ended the following Monday, I priced out a September 4800 put for a client; the option was worth about \$500. On Monday morning, that same option was worth \$9,500! The buyer of that option was doing very well, but the seller was down \$9,000 on a position with a maximum profit potential of \$500. That qualifies as a bad day in anyone's book. Had the trader been short the September 4800 put without any protection, depending on their account size, they could have easily been force-liquidated by a heavy-handed margin clerk at catastrophic prices. Just two weeks later, the September 4800 put was back beneath the original price of \$500, making the trade profitable for anyone who could hold on. However,

Futures For You

it was wildly painful for those forced out due to forced liquidation by their brokerage.

On the morning of Monday, August 6th, rather than mindlessly liquidating our clients' trades to reduce the risk exposure of our brokerage book, we were working with clients to sell futures contracts against their option positions to reduce risk and margin. A single event like this can be the difference between blowing out an account and surviving.

In some cases, it can be a six-figure difference. Imagine a trading account holding ten short September S&P 4800 puts going into the drop; an account forced out at the worst possible time would have locked in a loss of \$90,000 that could have been recovered in a handful of days. A trader with the same position but plenty of excess margin available to cushion the blow would be looking at a profitable trade within a few weeks of what seemed like a total disaster. Further, a trader who is short on capital but working with the right brokerage might have had the opportunity to hedge price risk with short futures contracts. To hedge

ten short puts, selling two futures contracts against them would have been appropriate to slow the bleeding. In such a scenario, the trader might have avoided a \$90,000 loss on the options but incurred a large loss on the futures of \$10,000 to \$20,000; not perfect, but \$70,000 better off than the worst-case scenario.

So next time you are tempted to choose the lowest-cost brokerage, particularly as an option seller or option spread trader, it is important to account for the cost of being with the wrong broker at the wrong time. Sometimes, being cheap is extremely expensive.

Are there better ways to trade than mindlessly selling put options in the stock indexes? I believe there are, but it is a strategy that has historically worked more than it hasn't, so traders are attracted to it. The key, however, is to survive the occasional shocks to allow the strategy to work. If you are an option seller trading at a discount brokerage, you will likely learn that the brokerage you choose does matter. If caught in a locked-limit commodity market, futures traders might find themselves in a similar

In this business, you will always get exactly what you pay for.

learning lesson. A good broker could help mitigate the pain and chaos via option hedges, but a discount broker likely wouldn't have the manpower or experience to assist.

Lastly, even if you are day trading highly liquid futures contracts and you believe you are broker agnostic, you might find yourself in a situation in which you lose power or internet access and need quick and efficient service to offset your trades; this might not be available if you opted for the lowest transaction cost brokerage. A trader can easily *lose* more in the market than they can *save* in commissions.

If you are wondering why anyone would sell puts in the S&P for limited profit potential and unlimited risk, it is because, over time, the strategy almost always works. Surviving the low percentage of losers is the name of the game.

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Explore Your Options

KAEPPEL

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are trading above that price, the position will show a gain, and vice versa.

COMPARING THE TWO POSITIONS

Figure 5 displays the comparative numbers for each trade, and Figure 6 overlays the risk curves for the positions. There are a few key things to consider:

- The 22-strike price has a breakeven price of \$28.03 versus \$32.77 for the 30-strike price.
- The 22-strike price starts moving point-for-point with SLV shares above the breakeven price of \$28.03.
- If SLV does manage to move significantly higher, the 30-strike price enjoys significantly greater profit potential than the 22-strike price.
- Time decay will have a much greater negative effect on the 30-strike price.

Ideally, we want to buy LEAPs when IV is relatively low.

A trader considering these two positions must weigh these factors and decide whether to play for maximum profit with a greater risk of loss (the 30 calls) or employ a more stock replacement strategy (via the 22 calls).

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THE WORLD OF RETAIL TRADING

Emilio Tomasini is a professional trader and was an adjunct professor of corporate finance at the University of Bologna in Italy for almost 20 years. In this column, he shares his sometimes “unserious” thoughts on serious topics in finance. Through his writings, he aims to help retail traders better understand the leap from unprofitable to profitable trading, firmly believing that the right answers can only come if the right questions are asked. Since 1996, he has published a weekly newsletter on Nasdaq stocks on his website, www.emiliotomasini.com, using a trend-following strategy based on the principles he has learned during his 30-year career in the financial markets.



Emilio Tomasini

THE SMELL OF BOOT GREASE, GUN-POWDER, AND LOTS OF DUST: WHAT DO THEY HAVE TO DO WITH A FAMOUS TECHNICAL ANALYSIS BOOK?

For those who have served in the military, it doesn't take long to recognize the universal experience of infantry life. Infantrymen speak the same language worldwide—a universal tongue. When I think of John Murphy's 1992 *Technical Analysis Of The Financial Markets* (originally published in 1986 as *Technical Analysis Of The Futures Markets*), I am reminded of those distant days at the Infantry School in Rome, where I trained as an aspiring officer cadet. Guided by the rare psychological mechanisms that influence human actions, I decided before donning the uniform that I would not waste those five months and would use my limited free time for something productive. That productive endeavor was John Murphy's book, one of the most renowned books on the subject worldwide. (Other notable and impactful books published in those earlier days of the technical analysis field include Martin Pring's *Technical Analysis Explained*, published in 2002, and Jack Schwager's *A Complete Guide To The Futures Markets*, first published in 1984.)

We know that sometimes the heart must be separated from the brain, and my heart remains with Murphy's book. It is for me tied to the rhythmic march of an infantry platoon, the dim light of the barracks, and the weight

of a backpack carrying the glorious book. Of course, the 1992 edition of Murphy's book is vastly different from the one available today, which is much more comprehensive and detailed. Back then, the content was much more concise and concentrated. Martin Pring's book offered and still offers exhaustive and updated coverage of the various main topics of technical analysis, and it is highly recommended for anyone looking to delve into this fascinating discipline.

This statement has haunted me for 30 years: Why can the head-and-shoulders pattern be a reversal pattern today and a continuation pattern tomorrow?

From my reading of Murphy's book at that time, I have a vivid memory of reversal patterns: head-and-shoulders, double bottoms, and double tops, among others. What astonished me in that edition was the explanation of reversal patterns primarily as obvious situations of trend reversals. In today's classic technical analysis, the most well-known reversal pattern is perhaps the head-and-shoulders. Yet, I discovered in Murphy's book that the head-and-shoulders pattern could also be a continuation pattern.

This statement has haunted me for 30 years: Why can the head-and-shoulders pattern be a reversal pattern today and a continuation pattern tomorrow?

The nightmare ended several years later when I realized that reversal patterns in technical analysis do not exist in the sense that the market has only two states: trending (upward or downward) and congestion or horizontal movement. When and if the trend ends and congestion begins is more divinatory art than technical science, and relying on head-and-shoulders patterns that invert today and continue the trend tomorrow is of little value. The same applies to triangles, flags, and wedges. It's all nice in theory, but when the market moves, you must focus on the two states mentioned above to survive. It's like defining a symmetrical triangle as bullish or bearish. We all know the theory: If the trendline ascends, the triangle is bullish; if the trendline descends, the triangle is bearish. But who has ever statistically tested this? No one, because triangles exist only in the mind of the beholder, not in reality.

Nowadays, as an older and perhaps wiser trader, I've realized that in the end, what matters is *trend* and *congestion*; everything else is an embellishment of reality that serves to name graphic representations that repeat themselves in the markets.

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Once the file is downloaded, you can import the file 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 displaying the indicator is shown in Figure 3.

—NinjaTrader, LLC
www.ninjatrader.com



FIGURE 4: NINJATRADER. John Ehlers' trend analysis technique is demonstrated here on a daily chart of ES.



◆ NINJATRADER: SEPTEMBER 2024 TRADERS' TIPS CODE

The September 2024 issue contained an article by John Ehlers titled "Precision Trend Analysis," which described a method for trend detection and confirmation. Code for NinjaTrader based on the coding included in Ehlers' September 2024 article is available for download at the following link for NinjaTrader 8:

NinjaTrader 8: ninjatrader.com/SC/September2024SCNT8.zip

Once the file is downloaded, you can import the file 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 displaying the indicator is shown in Figure 4.

NinjaScript uses compiled DLLs that run native, not interpreted, to provide you with the highest performance possible.

—NinjaTrader, LLC
www.ninjatrader.com



◆ METASTOCK: NOVEMBER 2024 TRADERS' TIPS CODE

John Ehlers' article in this issue, "Ultimate Strength Index (USI)," introduces his latest modification to the RSI indicator. Here is the formula to add that indicator to MetaStock.

Ultimate Strength Index (USI)

len:= Input("Length", 4, 150, 14);

a1:= exp(-1.414*3.14159 / len);
 b1:= 2*a1*cos(1.414*180 / len);
 c1:= -a1*a1;
 x:= (1 + b1 - c1) / 4;

SU:= if(C > Ref(C, -1), C - Ref(C, -1), 0);
 avSU:= Mov(SU, 4, S);
 SD:= if(C < Ref(C, -1), Ref(C, -1) - C, 0);
 avSD:= Mov(SD, 4, S);

{calculate ultimate smoother values of SU and SD}
 USU:= if(cum(1) < 8, avSU,
 (1-x)*avSU + (2*x - b1)*Ref(avSU, -1) - (x + c1)*Ref(avSU, -2) +
 b1*Prev + c1*Ref(Prev, -1));

USD:= if(cum(1) < 8, avSD,
 (1-x)*avSD + (2*x - b1)*Ref(avSD, -1) - (x + c1)*Ref(avSD, -2) +
 b1*Prev + c1*Ref(Prev, -1));

denom:= if((USU + USD <> 0), USU + USD, -1);
 if(denom = -1, 0, (USU-USD) / denom)

—William Golson
 MetaStock Technical Support
MetaStock.com



◆ WEALTH-LAB: NOVEMBER 2024 TRADERS' TIPS CODE

We have added John Ehlers' ultimate strength index (USI) as a built-in indicator in WealthLab 8. We then proceeded to create a simple, example drag-and-drop trading strategy with the following rules:



- Buy next bar at open after USI crosses above -1
- Sell next bar at open after USI crosses above 1

This quick proof of concept highlights the value of this indicator, as the strategy achieved an impressive 77% profitable trade rate. The sample chart in Figure 5 shows a representative trade.

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

◆ **TRADINGVIEW: NOVEMBER
2024 TRADERS' TIPS CODE**

The TradingView Pine Script code presented here implements the ultimate strength index (USI) introduced by John Ehlers in his article in this issue.

```
// TASC Issue: November 2024
// Article: Ultimate Strength
// Index (USI)
// Article By: John F. Ehlers
// Language: TradingView's
// Pine Script™ v5
// Provided By: PineCoders, for
// tradingview.com
```

```
//@version=5
title='TASC 2024.11 Ultimate
Strength Index'
stitle='USI'
indicator(title, stitle, false)
```

```
int length1 = input.int(28, 'USI
Length:', minval = 1)
float src = input.source(close,
"Source")
```

```
// --- Functions ---
// @function
// The UltimateSmoother is a
// filter created
// by subtracting the response of a high-pass
// filter from that of an all-pass filter.
// @param src Source series.
// @param period Critical period.
// @returns Smoothed series.
UltimateSmoother(float src, int period) =>
float a1 = math.exp(-1.414 * math.pi / period)
float c2 = 2.0 * a1 * math.cos(1.414 * math.pi / period)
float c3 = -a1 * a1
float c1 = (1.0 + c2 - c3) / 4.0
float us = src
```



FIGURE 5: WEALTH-LAB. This chart plots the ultimate strength index (USI) and shows an example trade in SPY.



FIGURE 6: TRADINGVIEW. Here you an example of the ultimate strength index (USI) applied to a daily chart of the emini S&P 500 futures contract (ES) using 28 bars (bottom subgraph) and 112 bars (top subgraph) of data.

```
if bar_index >= 4
    us := (1.0 - c1) * src +
        (2.0 * c1 - c2) * src[1] -
        (c1 + c3) * src[2] +
        c2 * nz(us[1]) + c3 * nz(us[2])
us
```

```
// @function Ultimate Strength Index is a new version of
// the RSI calculation that has a small ammount of lag.
// @param src Source Series.
// @param l1 Length of Ultimate smoother function.
// @param l2 Length of the short period smoothing.
// @returns IJSI value.
```


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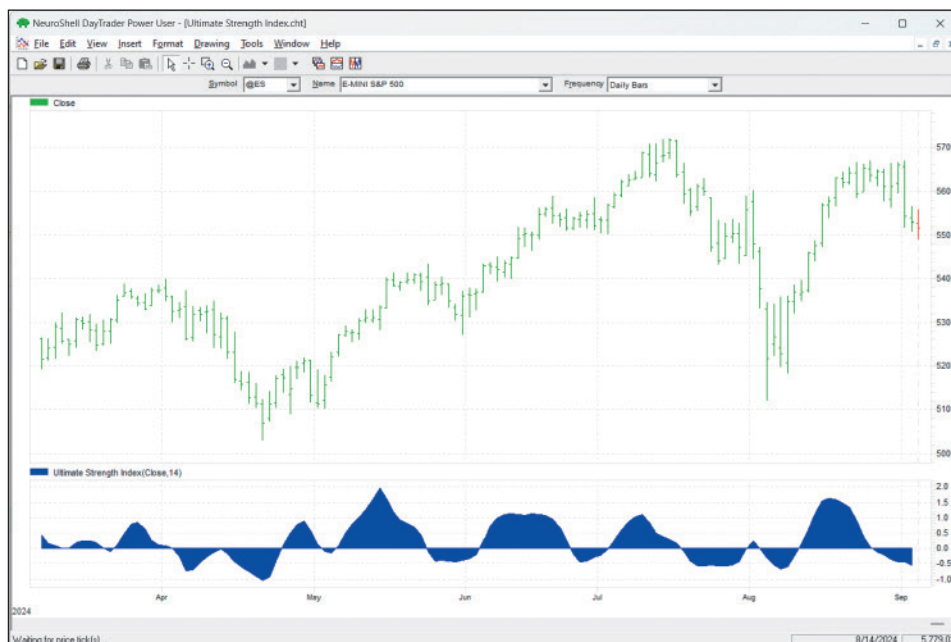


FIGURE 8: NEUROSHELL TRADER. This NeuroShell Trader chart demonstrates the ultimate strength index (USI) applied to the emini S&P 500 futures contract (ES).

USU: UltimateSmoother(Avg(IfThenElse(A>B(Close,Lag(Close,1)),Sub(Close,Lag(Close,1)),0),4),14)
 USD: UltimateSmoother(Avg(IfThenElse(A<B(Close,Lag(Close,1)),Sub(Lag(Close,1),Close),0),4),14)
 USI: Divide (Subtract(USU, USD), Add2(USU, USD))

Note that the UltimateSmoother indicator is from the April 2024 issue and April 2024 Traders' Tips. 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.

A sample chart is shown in Figure 8.

—Ward Systems Group, Inc.
 sales@wardsystems.com
 www.neuroshell.com



ZORRO:
NOVEMBER 2024
TRADERS' TIPS
CODE

In his article in this issue, John Ehlers proposes a replacement for the popular RSI indicator. His ultimate strength index (USI) has the advantage of symmetry—the range is -1 to 1—and less lag. Like the RSI, it enhances cycles and trends in the data, and thus, the author proposes it

is well suited for different types of trading systems. Let's look how to realize it in code.

The USI is based on another indicator developed by John Ehlers, the UltimateSmoother, which was described in an article in the April 2024 issue. Here again is that code in C:

```
var UltimateSmoother (var
    *Data, int Length)
{
    var f = (1.414*PI) / Length;
    var a1 = exp(-f);
    var c2 = 2*a1*cos(f);
    var c3 = -a1*a1;
    var c1 = (1+c2-c3)/4;
    var US = series(*Data,4);
    return US[0] = (1-c1)*Data[0]
    + (2*c1-c2)*Data[1] -
    (c1+c3)*Data[2]
    + c2*US[1] + c3*US[2];
}
```

Similar to the RSI, the ultimate strength index calculates the normalized differences of the ups and downs in the price curve, after no-lag smoothing. Here is the EasyLanguage code given in Ehlers' article in this issue converted to C:

```
var UltimateStrength (int Length)
{
    var SU = series(max(0,priceC(0) - priceC(1)));
    var USU = UltimateSmoother(series(SMA(SU,4),Length);
    var SD = series(max(0,priceC(1) - priceC(0)));
```

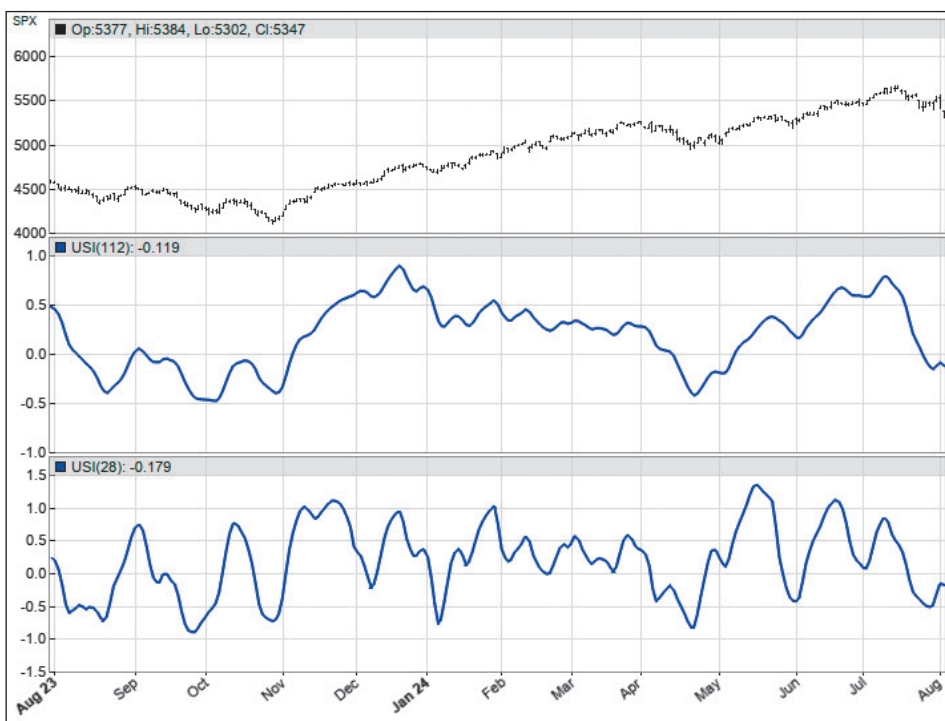


FIGURE 9: ZORRO. Here is an example of the ultimate strength index plotted on a chart of SPX.



```
var USD = UltimateSmooth(series(SMA(SD,4)),Length);
return (USU-USD)/fix0(USU+USD);
}
```

For checking the correctness of our conversion, we will plot the USI with two different time periods on a chart of SPX. Here is the code to plot it:

```
void run()
{
    BarPeriod = 1440;
    StartDate = 20230801;
    EndDate = 20240801;
    assetAdd("SPX","STOOQ:SPX");
    asset("SPX");
    plot("USI(112)",UltimateStrength(112),NEW|LINE,BLUE);
    plot("USI(28)",UltimateStrength(28),NEW|LINE,BLUE);
}
```

The resulting chart (Figure 9) replicates the chart in Ehlers' article in this issue.

We can see that the long timeframe USI enhances the beginning and end of trends, and the short timeframe USI makes the cycles visible.

The code can be downloaded from the 2024 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>

◆ EXCEL: NOVEMBER 2024 TRADERS' TIPS CODE

In John Ehlers' article in this issue, "Ultimate Strength Index (USI)" Ehlers shows an incremental lag and jitter-reduction effort applied to the widely used RSI. In it, he simply applies his UltimateSmoother to a 4-bar average of each of the up and down components prior to substituting each smoothed result for the corresponding bits of the standard RSI formula to arrive at his ultimate strength index (USI).

In Figure 10, you can see longer- and shorter-period USI plots. The longer-period USI plot stays above zero for much of the longer uptrend. The shorter-period USI plot is more sensitive to short swings.

Ehlers notes in his article that crossovers created by adding a two-bar delay plot can assist in identifying swing trade opportunities.

To download this spreadsheet: The spreadsheet file for this Traders' Tip can be downloaded from www.traders.com in the Traders' Tips area. To successfully download it, follow these steps:

- Right-click on the link to the Excel file, then
- Select "save target as" to place a copy of the spreadsheet file on your hard drive.

Problem fix notice:

Early Saturday on the morning of September 7, 2024, recent Traders' Tips spreadsheets began displaying the following message:

Status(4) - Get Prices Error: Symbol (A) "401 - Unauthorized"

The changes necessary to make the spreadsheet provided here (that is, for the November 2024 issue) functional were extensive.

Therefore, I have provided a "REPAIRS!" tab in this month's spreadsheet that will allow you to select a problem spreadsheet and then automatically apply a cumulative set of repairs that should make your problem Traders' Tip spreadsheet functional once again.

Details and necessary setup steps are described in the "REPAIRS!" tab.

—Ron McAllister

Excel and VBA programmer
rpmac_xlft@sprynet.com

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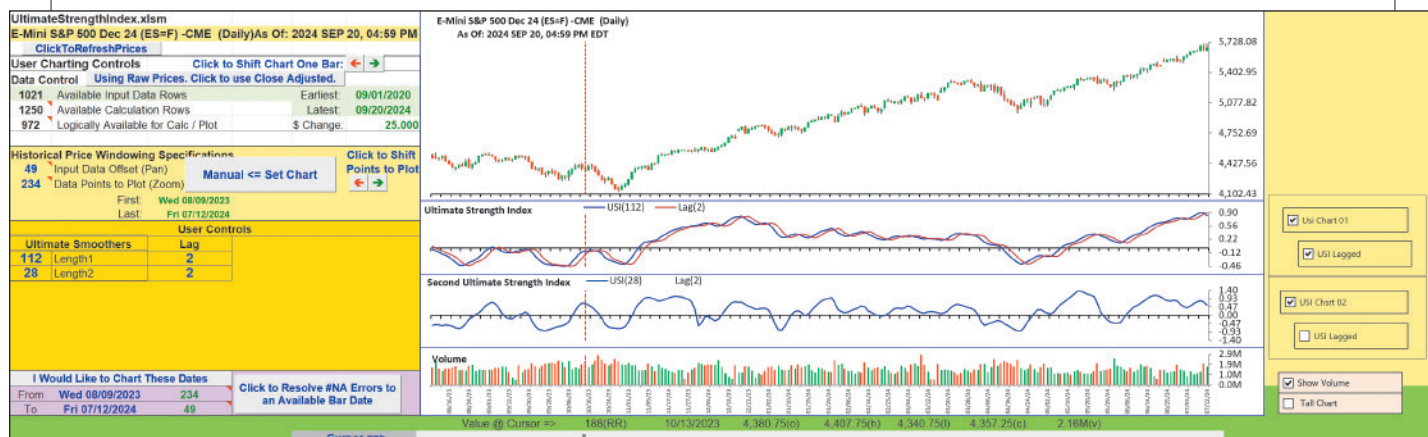


FIGURE 10: MICROSOFT EXCEL. Comparing USI at different lengths.

THE MATH IS SIMPLE. THE BENEFITS ARE CLEAR.



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Looking For Retests And Retracements

Concentric Containment Moving Averages

By using a series of moving averages, we can study price action within the timeframe and look for clues to the direction ahead.

by Howard J. Herman

price action within the timeframe.

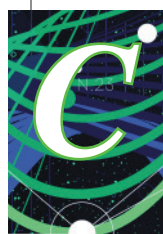
In my experience, the period for each MA is not important, nor is the relationship between the MA periods in the series. It is the series of shorter- and shorter-period MAs containing price action that is the condition of importance.

Let's look at some examples.

PRICE ACTION IN SPY & GLD

As I write this in late September 2024, I can see several cases of this in the current market, and this sets up some possible significant retracements for these markets. SPY and GLD are two markets where I currently see examples of concentric containment MAs occurring.

See Figure 1, a chart of SPY. On the chart, you can see five concurrent containment MAs. Drawn on the chart are 2,025-day, 1,100-day, 279-day, 166-day, and 4-day



Concentric containment moving averages are what I call a series of moving averages (MAs), each with a shorter period than the next. Each MA contains a series of price action without being violated by the price action—that is, the shortest-period moving average contains the price action without being crossed by price action. There might be, say, 20 periods within a 10-period MA, or six periods within the 10-period MA. In any case, concentric MAs are a series of MAs where the period is shorter for each until it only contains the



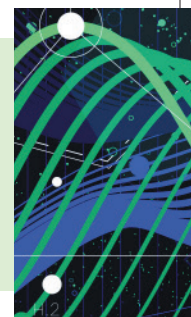
FIGURE 1: CONCENTRIC CONTAINMENT MOVING AVERAGES, SPY. Five concurrent containment MAs are shown: 2,025-day, 1,100-day, 279-day, 166-day, and 4-day containment MAs of lows. Each time the shorter-period MA is broken by price, it could retest the next-larger-period MA and so on. In that scenario, it could be setting up for a retracement or downside price move.



FIGURE 2: CONCENTRIC CONTAINMENT MOVING AVERAGES, GLD. Five concurrent containment MAs are shown: 1160-day, 101-day, 77-day, 19-day, and 7-day containment MAs of lows. Once the 7-day is broken, the market could have a tendency to return to the 19-day and retest it, and so on. A significant amount of potential is built up in each of these containments.

containment MAs of lows. My assessment of this is that once the 4-day MA is broken, the tendency for that market will be to retest the 166-day MA. If that fails, it will have a tendency to retest the 279-day and so on. Thus, after, say, 13 years of general uptrend, I believe this market is due for a significant (possibly very significant) retracement or bear market. All of these MAs have ratios of 1 or more. There is a potential built up in each of these that can be released for a significant downward move.

Concentric MAs are a series of MAs where the period is shorter for each until it only contains the price action within the timeframe.



See Figure 2, a chart of GLD. On this chart, you can see 1160-day, 101-day, 77-day, 19-day, and 7-day containment MAs of lows. As with the SPY, I believe that once the 7-day is broken, the market will have a tendency to return to the 19-day and retest it. As with SPY, there is a significant amount of potential built up in each of these containments.

After a break in the 4-day MA in SPY, could SPY just go ahead and proceed to new highs? Sure, that's possible. My simple statement is that, at least for traders, the opportunity to the downside outweighs that to the upside and in a really significant way. Perhaps the buy-and-hold type of investor might also wish to hedge or rebalance against the reversion that appears likely to come soon.

GLD? Same thinking. Could GLD eventually go on the fresh all-time highs? Of course. But the real juice—in my opinion, and at least given the way this indicator is setting up—is to the downside.

I can see several cases of this in the current market and this sets up some possible significant retracements for these markets.



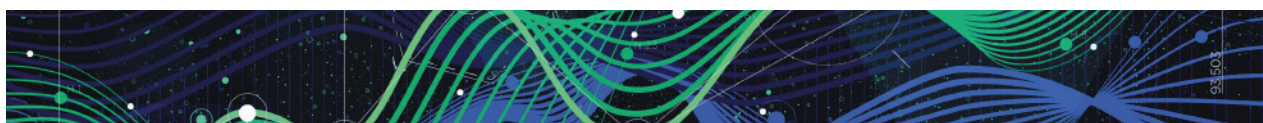
Do you have any thoughts on this? I welcome your feedback! I'm open to ideas and suggestions as I continue to explore this or similar concepts.

Howard J. Herman can be reached at h@z3l.com.

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‡See Editorial Resource Index

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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 '24)	ESZ24	CME	5.3	13.3	2	>>>
10-Year T-Note (Dec '24)	ZNZ24	CBOT	1.9	12.6	14	>
Ultra T-Bond (Dec '24)	UDZ24	CBOT	4.5	8.5	3	>
5-Year T-Note (Dec '24)	ZFZ24	CBOT	1.3	10.9	18	>
30-Year T-Bond (Dec '24)	ZBZ24	CBOT	3.3	10	6	>
Ultra 10-Year T-Note (Dec '24)	TNZ24	CBOT	2.4	9.8	8	.....
2-Year T-Note (Dec '24)	ZTZ24	CBOT	0.6	10.7	20	.....
Nasdaq 100 E-Mini (Dec '24)	NQZ24	CME	5.8	12	1	.....
Gold (Dec '24)	GCZ24	COMEX	4.4	11.1	2	.....
Soybean (Nov '24)	ZSX24	CBOT	2.3	3.2	3	.....
Crude Oil WTI (Nov '24)	CLX24	NYMEX	9.4	11	4	.....
Natural Gas (Nov '24)	NGX24	NYMEX	10.7	4.2	3	.....
Russell 2000 E-Mini (Dec '24)	QRZ24	CME	3.5	13.1	4	.....
Soybean Meal (Dec '24)	ZMZ24	CBOT	1.1	1.8	2	.....
Corn (Dec '24)	ZCZ24	CBOT	6.4	6.4	12	.....
3-Month SOFR (Dec '24)	SQZ24	CME	0.1	2.5	25	.....
Euro FX (Dec '24)	E6Z24	CME	1.7	11.5	12	.....
30-Day Fed Funds (Oct '24)	ZQV24	CBOT	0.1	1.2	12	.....
ULSD NY Harbor (Nov '24)	HOX24	NYMEX	8.2	5.8	2	.....
Gasoline RBOB (Nov '24)	RBX24	NYMEX	8.4	7	2	.....
Wheat (Dec '24)	ZWZ24	CBOT	7.2	5	6	.....
Silver (Dec '24)	SIZ24	COMEX	7.4	16.8	4	.....
Dow Futures Mini (Dec '24)	YMZ24	CBOT	5.1	15.5	3	.....
British Pound (Dec '24)	B6Z24	CME	2.5	11.3	13	....
Cotton #2 (Dec '24)	CTZ24	ICE/US	6.3	5.4	6	....
Hard Red Wheat (Dec '24)	KEZ24	KCBT	7.2	5.2	6	....
Coffee (Dec '24)	KCZ24	ICE/US	7.4	16	5	...
High Grade Copper (Dec '24)	HGZ24	COMEX	5.6	20.2	8	...
Bitcoin Futures (Sep '24)	BTU24	CME	26.4	34.6	1	..
Canola (Nov '24)	RSX24	ICE/CA	6.1	5.6	19	..
Cocoa (Dec '24)	CCZ24	ICE/US	16.8	23.4	4	..
Crude Oil Brent (F) (Dec '24)	QAZ24	NYMEX	8.3	9.5	4	.. CBOT Chicago Board of Trade, Division of CME
Live Cattle (Dec '24)	LEZ24	CME	3.7	10.6	10	.. CFE CBOE Futures Exchange
Palladium (Dec '24)	PAZ24	NYMEX	11.1	4.9	1	.. CME Chicago Mercantile Exchange
S&P 500 Micro (Dec '24)	ETZ24	CME	5.3	13.3	21	.. COMEX Commodity Exchange, Inc. CME Group
S&P 500 VIX (Oct '24)	VIV24	CFE	41.1	38.8	13	.. ICE-EU Intercontinental Exchange-Futures—Europe
S&P Midcap E-Mini (Dec '24)	EWZ24	CME	6.1	19.9	3	.. ICE-US Intercontinental Exchange-Futures—US
Sugar #11 (Mar '25)	SBH25	ICE/US	6.1	24.9	39	.. KCBT Kansas City Board of Trade
Australian Dollar (Dec '24)	A6Z24	CME	2.3	19.7	30	.. MGEX Minneapolis Grain Exchange
Canadian Dollar (Dec '24)	D6Z24	CME	1.5	15.4	34	.. NYMEX New York Mercantile Exchange
Lean Hogs (Dec '24)	HEZ24	CME	5.5	8.7	13	..
Nasdaq 100 Micro (Dec '24)	NMZ24	CME	5.8	12	13	..

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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:

$$1 \text{ or } \exp \left(\frac{\ln(\text{volume})}{\ln(5000)} \right) - 2$$

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TOP 10 VIEWED BOOKS FOR TRADERS



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well, available in more formats than ever before. With so many to choose from, including classic texts published long ago and the most recent arrivals on the scene, you can find numerous books that will teach you what you need to know about trading and the techniques to trade better.

This month's Traders Resource is the tip of the iceberg when it comes to all the available books out there for traders and investors. Websites such as TraderPlanet (traderplanet.com) and Traders' Library (traderslibrary.net) can help you locate nearly any trading or investing book. In addition, Amazon.com and BarnesandNoble.com, among other websites, can help you home in on a subject and suggest other related and popular material.

Beginning traders should be sure to read the writings of Robert Edwards and John Magee, Jack Schwager, J. Welles Wilder, Martin Pring, Perry Kaufman, and Edwin LeFèvre to start your education down the right path. And traders of every level and

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Explore Your Options

GOT A QUESTION ABOUT OPTIONS?

Jay Kaepfel 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 Kaepfel at jay@sentimentrader.com. Selected questions will appear in a future issue of S&C.



Jay Kaepfel

TAKE THE LEAP

I sometimes come across an idea that appears to hold significant long-term potential, but don't want to commit a lot of capital for a long time on a more speculative position. Any suggestions?

Options on LEAPs (long-term equity anticipation securities) offer investors and traders the potential to gain longer-term exposure to a security without making a significant capital commitment. The approach we will discuss here is what I refer

to as the “why not?” approach. The scenario: You do some research, read something, or hear something that interests you. Your gut tells you that there might be some excellent long-term potential. However, simultaneously, the cynic in you isn't sure if it's a real opportunity or just wishful thinking. Either way, you are loathe to make a significant dollar investment and wonder if it might be best to forget the whole thing.

This is an excellent scenario for using a LEAP option. For this discussion, we will look strictly at buying a LEAP call option, although a trader can consider any number of spread strategies.

HOPING FOR BIG THINGS IN SILVER

Silver is one of those markets that is always touted as “poised to explode.” As shown in Figure 1, ticker SLV (iShares Silver Trust ETF) has been in an uptrend for almost two years. In our example scenario, let's assume a trader is convinced that SLV will continue to rally and could explode to its 2011 high near \$48 a share. The most straightforward approach would be to buy 100 shares of SLV at \$26.12 for a cost of \$2,612. But let's also say that the trader does not want to commit that much capital to a purely speculative bet. He might consider January 2026 LEAP options.

One crucial consideration is implied volatility. Figure 2 displays SLV

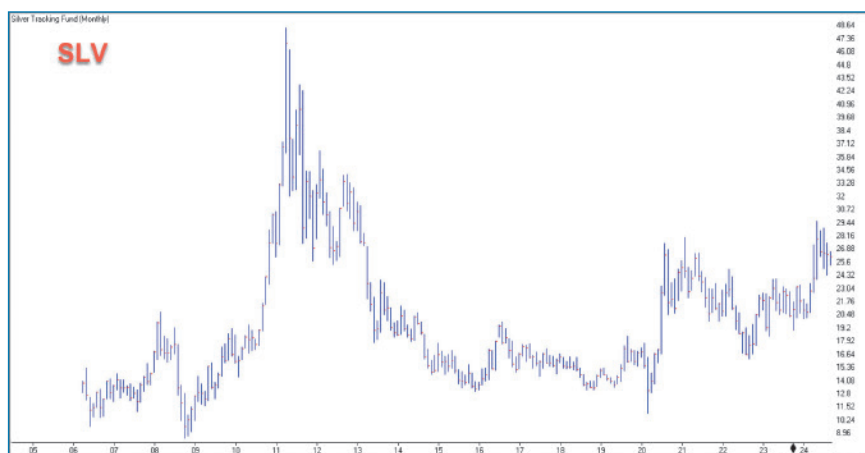


FIGURE 1: SLV. The ETF has been in an uptrend for almost two years.



FIGURE 2: IMPLIED VOLATILITY, SLV. Buying LEAPs when IV (black line) is relatively low is usually preferable.

Explore Your Options

price action and implied volatility (IV) for SLV options with more than 90 days before expiration. The level of IV tells us if the amount of time premium built into the options is relatively high or low. Ideally, we want to buy LEAPs when IV is relatively low. Doing so allows us to:

- Pay less for the option than we would if the IV was high, and
- Benefit if IV increases during the life of the trade since an increase in implied volatility would mean an increase in the amount of time premium built into the price of the option we hold.

In Figure 2 we see that IV is towards the low end of the historical range.

For this example, we want to give SLV as much time as possible to make a significant price move, so we will look at January 2026 LEAP options, which have 497 days left until expiration.

SELECTING A STRIKE PRICE

One big decision is which strike price to trade. The thing to remember is that there are no right or wrong answers here, only your own preferences. In short, the tradeoff can be explained most succinctly as follows:

A deep-in-the-money call option can amount to a stock replacement strategy, that is, you start getting point-for-point movement with the underlying stock sooner than you would if you bought a higher strike price. The tradeoff is that you also pay more to purchase the option.

At the other end of the spectrum, you can buy a far-out-of-the-money call for an extremely low cost and obtain considerable leverage *if* the underlying security makes the big move you hope for. The tradeoff is a much lower probability of profit. In other words, an in-the-money call can start making money with a more minor movement

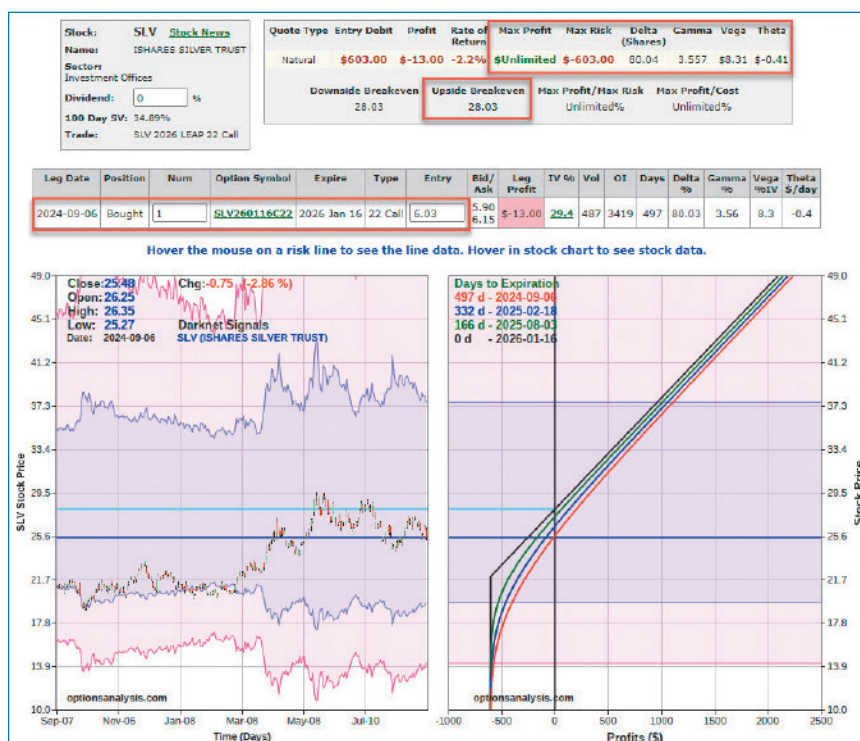


FIGURE 3: TRADE DETAILS AND RISK CURVES, IN-THE-MONEY LEAP (SLV)



FIGURE 4: TRADE DETAILS AND RISK CURVES, OUT-OF-THE-MONEY LEAP (SLV)

by the underlying, whereas a far out-of-the-money call *must* see a more significant movement by the underlying security to generate a meaningful profit. As always, some examples are the best way to illustrate.

Silver is one of those markets that is always touted as "poised to explode."

Explore Your Options

Left Trade									
Quote Type	Entry (Cost)	Profit	Rate of Return	Max Profit	Max Risk	Delta (Shares)	Gamma	Vega	Theta
Natural	\$603.00	\$-13.00	-2.2%	\$Unlimited	\$-603.00	80.03	3.557	\$8.31	\$-0.41
Right Trade									
Quote Type	Entry (Cost)	Profit	Rate of Return	Max Profit	Max Risk	Delta (Shares)	Gamma	Vega	Theta
Natural	\$554.00Debit	\$-14.00	-2.5%	\$Unlimited	\$-554.00	93.13	8.566	\$23.63	\$-0.98
Natural 1/2	\$277.00	\$-7.00	-2.5%	\$Unlimited	\$-277.00	46.57	4.28	\$11.82	\$-0.49

Left Trade												
Leg Date	Position	Num	Option Symbol	Expire	Strike	Type	Entry	Bid/Ask	IV %	Vol	OI	Days
2024-09-06	Bought	1	SLV250116C22	2025 Jan 16	22.000	Call	6.03	5.9/6.15	29.4	487	3419	497
Right Trade												
Leg Date	Position	Num	Option Symbol	Expire	Strike	Type	Entry	Bid/Ask	IV %	Vol	OI	Days
2024-09-06	Bought	2	SLV260116C30	2026 Jan 16	30.000	Call	2.77	2.7/2.83	32.3	228	15642	497

Trade	Downside Breakeven	Upside Breakeven	Max Profit/Max Risk	Max Profit/Cost
Left	28.03	28.03	0.00	Unlimited
Right	32.77	32.77	0.00	Unlimited

FIGURE 5: COMPARING BOTH POSITIONS. Comparing the trade particulars for both the in-the-money LEAP versus the out-of-the-money LEAP example trades helps the trader to weigh the factors of each, such as the breakeven price, the profit potential for both strike prices, and the time decay factor.

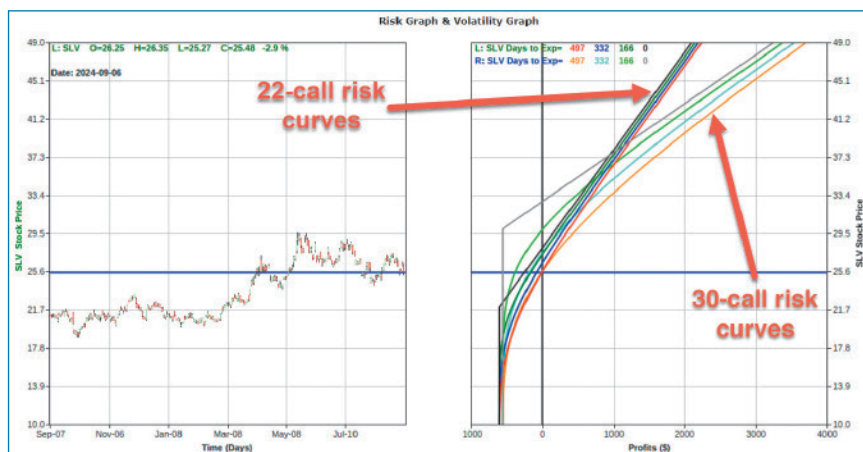


FIGURE 6: RISK CURVES FOR BOTH POSITIONS OVERLAID. Comparing the risk curves for both the in-the-money and out-of-the-money LEAP helps the trader consider risk versus reward.

BUYING AN IN-THE-MONEY LEAP

Our first example involves buying one SLV January 2026 22 strike price call option at \$6.03. Figure 3 displays the particulars for this position and the risk curves (that is, the expected \$ gain or loss at a given price for SLV shares as of four different dates leading up to expiration).

Things to note:

- The cost to enter this trade is \$603—this is also the maximum loss.
- The delta of 80.03 suggests that

for each \$1 point move in SLV shares, the position will gain or lose \$80.03.

- The gamma of 3.557 indicates that for each \$1 point move in SLV share, the position will gain or lose 3.557 deltas.
- The vega of \$8.31 suggests that the position will gain or lose \$8.31 in value for each one-point increase or decrease in implied volatility.
- The theta of -0.4 suggests that the position will lose \$0.40 a day due solely to time decay.
- The breakeven price for this trade is \$28.03 at the time of op-

tion expiration—if SLV shares are trading above that price, the position will show a gain, and vice versa.

Now let's look at buying an out-of-the-money LEAP option.

BUYING AN OUT-OF-THE-MONEY LEAP

Our second example involves buying two SLV January 2026 30 strike price calls at \$2.77. Figure 4 displays the particulars for this position and the risk curves (the expected \$ gain or loss at a given price for SLV shares as of four different dates leading up to expiration).

Things to note:

- The cost to enter this trade is \$554—this is also the maximum loss.
- The delta of 93.14 suggests that for each \$1 point move in SLV shares, the position will gain or lose \$93.14.
- The gamma of 8.567 indicates that for each \$1 point move in SLV share, the position will gain or lose 8.567 deltas.
- The vega of \$23.64 suggests that the position will gain or lose \$23.64 in value for each one-point increase or decrease in implied volatility.
- The theta of -0.98 suggests that the position will lose \$0.98 a day due solely to time decay.
- The breakeven price for this trade is \$32.77 at the time of option expiration—if SLV shares

Continued on page 43

There are no right or wrong answers here, only your own preferences.

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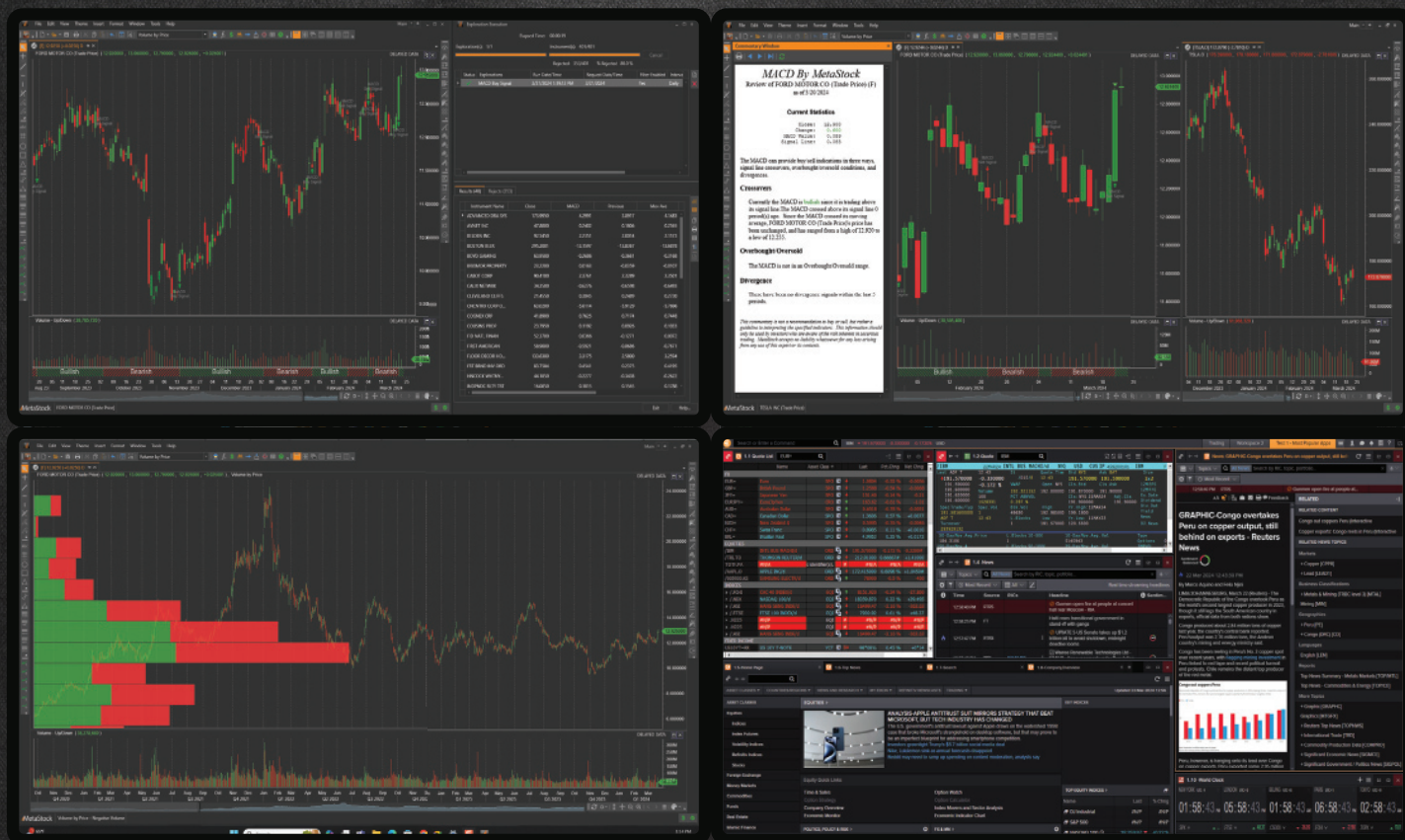
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