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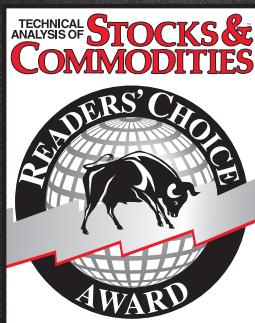
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by S&C staff

Andrea Unger is a full-time professional trader, president of Unger Academy, and author of *The Unger Method* (2021). 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 he speaks

TIPS

This article is the basis for Traders' Tips this month.



throughout Europe, America, Australia, and Asia. The Unger Academy works to help traders learn to implement a systematic way of trading and to improve their approach to trading. It offers education, research, trading strategies, and guidance.

STOCKS & COMMODITIES interviewed Andrea Unger to find out how he became interested in a quantitative trading approach, what portfolio diversification means to him, and what he considers a scientific approach to trading to be.

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Explore Your Options

GOT A QUESTION ABOUT OPTIONS?

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



Jay Kaeppel

COVERED CALL WRITING

I want to generate income by selling covered calls on my stocks. But I am not sure how best to go about it. Are there any useful guidelines?

The first thing to know is that there is no “one best approach.” In fact, there are many possible approaches, such as:

- If you have a target price in mind at which you intend to sell your stock shares anyway, it makes perfect sense to sell a covered call with a strike price at or near that level. If your target price is reached, you can sell your shares and collect an option premium.
- If you don't mind having your stock called away, selling at-the-money or in-the-money calls can make sense to receive more premium than selling an out-of-the-money call.
- If you want to sell calls to generate income but prefer not to sell your shares, then selling out-of-the-money calls makes the most sense. In addition, selling less than

If you want to sell calls to generate income but prefer not to sell your shares, then selling out-of-the-money calls makes the most sense.

the maximum potential number of calls can leave you with unlimited profit potential.

This article will pursue the last approach to covered call writing.

THE BASICS OF COVERED CALLS

If you hold 100 shares of an optionable stock, you can sell one covered call. If the option expires in-the-money, the call option will be exercised, and the 100 shares of stock will be called away from you at the option strike price. However, in any event, you do get to keep the option premium received.

If the option expires out-of-the-money, you keep the option premium and still retain your 100 shares of stock.

THE OUT-OF-THE-MONEY APPROACH

Let's set a couple of subjective guidelines. We want to sell covered calls to generate income from stock shares held. However, our hope is for the call options we sell to expire

worthless and to retain our stock shares. Likewise, we would like to have unlimited profit potential. As a result, we will set the following rules:

- We will sell call options with a delta below 30 (i.e., well out-of-the-money)
- We will sell call options with 7 to 45 days left until expiration
- We will sell less than the maximum number of possible call options (requires holding at least 200 shares of stock)

Let's spell out these guidelines in a little more detail. An at-the-money call option typically has a

Rank	Name	Stock	Latest Total Option Volume	Stock Close Price
1	WALT DISNEY	DIS	826463	110.54
2	Arm Holdings Plc Ads	ARM	774674	113.09
3	APPLE	AAPL	766648	188.32
4	AMAZON.COM	AMZN	623190	169.84
5	ADVANCED MICRO DEVICES	AMD	538086	169.35
6	Alibaba Group Holding Limited	BABA	422823	70.78
7	Affirm Holdings Inc Class A	AFRM	284589	49.22
8	Coinbase Global Inc Class A	COIN	247413	132.55
9	Alphabet Inc.	GOOGL	245308	145.91
10	FORD MOTOR	F	210990	12.83
11	BANK OF AMERICA	BAC	163767	33.12
12	ISHARES MSCI EMERGING MARKETS	EEM	157788	39.41
13	ISHARES FTSE CHINA 25 INDEX FU	FXI	153881	22.11
14	CAMECO	CCJ	136047	44.72
15	Alphabet Inc.	GOOG	132601	147.22
16	Corvax Co	CVNA	128607	52.39
17	Ark Innovation Elf	ARKK	108160	48.44
18	Cleantech Inc	CLSK	107095	10.50
19	CS.ai Inc	AI	106036	26.84
20	BOEING	BA	105588	209.22

FIGURE 1: OPTION TRADING VOLUME. Some stocks have options with good trading volume. This example list of stocks is sorted by option volume.

Explore Your Options

delta of about 50 (i.e., roughly 50% chance it will expire in the money). Therefore, a call with a delta of 30 or less has a higher probability of expiring worthless since it has only a 30% probability of expiring in the money.

Selling call options with 7 to 45 days left until expiration gives us the potential to have time decay work strongly in our favor, as options lose most of their time premium in the last 30 days before option expiration.

If we hold 400 shares of stock, we might sell two call options (we could sell anywhere from one to four calls). If the stock rallies above the strike price, we could have 200 shares called away. We would still have unlimited profit potential with the other 200 shares.

WHEN TO SELL COVERED CALLS ON STOCKS YOU HOLD

The reality is that there is no “one best time” or set of circumstances for deciding when to sell covered calls on stock shares you hold. But specific guidelines can make sense. Note that the items listed below are “food for thought” and not “one size fits all trading rules.”

For sake of example, let’s assume that on February 8, we happen to hold the 20 stocks with the highest option trading volume, as listed in Figure 1 (all screenshots courtesy of OptionsAnalysis.com).

Among optionable stocks we hold, we will consider selling covered calls when the 3-day RSI has been above 65% at least once in the last five trading days. The theory is that the stock may be “overbought”

FIGURE 2: STOCK SEARCH CRITERIA. Some example criteria are shown in a search for covered call candidates. In this example, which looks for stocks that could be considered overbought at this particular moment, we are considering selling covered calls when the 3-day RSI has been above 65% at least once in the last five trading days for the given stock.

Rank	Name	Stock	Stock Close	Latest RSI	Days Inside Range	Stock Volume
1	AMAZON.COM	AMZN	169.84	65.77	5	41857047
2	WALT DISNEY	DIS	110.54	97.20	3	60147972
3	Cleantech Inc.	CLSK	10.50	90.77	3	32650722
4	Affirm Holdings Inc. Class A	AFRM	49.22	94.36	3	25985337
5	Carvana Co.	CVNA	52.39	94.89	3	8102629
6	FORD MOTOR	F	12.83	82.48	2	68464221
7	Ark Innovation Etf	ARKK	48.44	79.51	2	14485743
8	Alphabet Inc.	GOOGL	145.91	68.52	1	21857920
9	Alphabet Inc.	GOOG	147.22	69.01	1	18049057
10	Coinbase Global Inc. Class A	COIN	132.55	77.45	1	11202808
11	C3.ai Inc.	AI	26.84	79.28	1	7537896

FIGURE 3: STOCK SEARCH RESULTS. Based on the search criteria used in Figure 2, these stock candidates resulted (at this point in time). We can see in this list that, of the 20 stocks with good option-trading volume from Figure 1, 11 of them saw a 3-day RSI of 70 or more at least once in the last five days.

FIGURE 4: OPTION SEARCH CRITERIA. This shows some example criteria when searching for covered call opportunities. Search criteria could be based on factors such as option liquidity, cost, strike price, and days till expiration.

Selling call options with 7 to 45 days left until expiration gives us the potential to have time decay work strongly in our favor.

and due for a short-term pullback. That short-term pullback may offer an opportunity to capture option premium. The input criteria appear in Figure 2. In Figure 3, we see that 11 of those stocks saw a three-day RSI of 70 or more at least once in the last five days. We will save these 11 stocks to a list.

Using OptionsAnalysis and the settings shown in Figure 4, we will look for covered call opportunities and sort results by *probability of profit*. The output appears in Figure 5.

The top-ranked trade is selling the February 16, 2024 60 strike price call @ \$2.27. For our example, we will assume that we hold 400 shares of AFRM stock and sell two call options (we could have sold up to four calls but want to retain unlimited profit potential and not risk having all of our shares called away if the stock rallies sharply).

The trade particulars appear in Figure 6, and the position risk curves appear in Figure 7.

WHAT HAPPENS FROM HERE

Ticker AFRM is trading at \$49.22 a share, so our 400 shares are worth \$19,688 at

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Smoothing Data With Less Lag

The Ultimate Smoother

First, we introduced you to a super smoother. Here, we introduce an ultimate smoother. It's an advancement you won't want to miss.



smoother is a low-pass filter that passes the low-frequency components of the input data spectrum essentially unchanged and rejects or attenuates the high-frequency components

in the data. This rejection of the high-frequency components produces an output waveform that is smoother than the input waveform. Early in my engineering career, I designed filters using real inductors and real capacitors. This experience enabled me to invent the SuperSmoother as well as the UltimateSmoother, which I will describe later in this article.

SUPERSMOOTHER

The SuperSmoother digital filter was translated from an analog filter having a maximally flat butterworth low-pass response with a reduced lag. The EasyLanguage code for the SuperSmoother is shown in the sidebar, “SuperSmoother Function, In EasyLanguage.” Here, it is written as a function so that it can be used in indicators and strategies as easily as a moving average.

The SuperSmoother is a second-order *infinite impulse response* (IIR) filter, meaning that it uses two previous calculations of the filter output in the current calculation of the filter response. The defining parameter of the SuperSmoother is the critical period. *Critical period* is the wavelength that divides the pass band and the reject band. Conceptually, think of it being the wavelength where all longer wavelengths are passed unaffected to the output and all shorter wavelengths are completely rejected at the output. Actually, there is a more gradual transition from the pass band to the stop band. The sharpness of this transition, to a greater degree, depends on the order of the IIR filter. For brevity, *critical period* is the input

“period” in the code listing in the “SuperSmoother Function” sidebar.

An exponential moving average (EMA) is a first-order IIR filter, using only one previous calculation. It is a smoother described by the equation:

$$\text{EMA} = \alpha * \text{Price} + (1 - \alpha) * \text{EMA}[1]$$

where EMA[1] is the value of EMA one bar ago.

The performance of an EMA can be compared to the performance of a SuperSmoother by letting alpha be equal to 3 divided by *period*. The code to plot the comparison of these two smoothers is given in the sidebar, “Plot SuperSmoother And EMA.” The comparison chart is shown in Figure 1.

It is obvious that the second-order SuperSmoother (in red) has superior smoothing than a first-order EMA having an equivalent critical period (in blue). It is also obvious that both filters have a lag compared to the input price data. Lag of smoothing filters is a major bane for technical traders. It doesn't help to get the right answer if it comes too late.

It is possible to design higher-order smoothing filters. Higher-order filters sharpen the transition from the pass band to the stop band. However, the penalty is that such filters incur even more lag. Therefore, these higher-order filters are seldom employed in trading. In addition, the calculation of higher-order filters causes floating point errors on many trading platforms. A reasonable approximation to the response of a fourth-order filter without getting a floating-point error is to first filter the data with a SuperSmoother and then filter that result with a SuperSmoother again.

HIGH-PASS FILTER

Low-pass filters are not the only kind of filters that can be employed. A second-order high-pass filter can be created by replacing the zeros in the filter transfer

by John F. Ehlers



FIGURE 1: SUPERSMOOTHER. The SuperSmoother has a better response than an EMA for equivalent lag.

SUPERSMOOTHER FUNCTION, IN EASYLANGUAGE

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

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

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

If CurrentBar >= 4 Then $SuperSmoother =
  c1*(Price + Price[1]) / 2 + c2*$SuperSmoother[1] +
  c3*$SuperSmoother[2];
If Currentbar < 4 Then $SuperSmoother = Price;
```

response at Nyquist (twice the sample period) with zeros at zero frequency. That is, the low-frequency components in the input data are rejected at the filter output and the high-frequency components are passed to the output unattenuated. The EasyLanguage code for a high-pass filter

PLOT SUPERSMOOTHER AND EMA

```
Inputs:
  Length(20);

Vars:
  SS(0),
  EMA(0),
  aa(0);

SS = $SuperSmoother(Close, Length);

aa = 3 / Length;
EMA = aa*Close + (1 - aa)*EMA[1];

Plot1(SS, "", red, 2, 2);
Plot2(EMA, "", blue, 2, 2);
```

function is given in the sidebar, “High-Pass Filter Function, In EasyLanguage.”

BAND-PASS FILTER

Another kind of filter that can be designed is a band-pass filter. With this type of filter, there is a band of periods that are passed basically unattenuated to the output, periods longer than the lower critical period are rejected, and periods above the upper critical period are also rejected. I have designed several second-order band-pass filters, but I discourage their use because there is a temptation to use a relatively narrow bandwidth with such filters to get an output that looks similar to a sine wave. The sine wave appearance results from the filter passing only a narrow



FIGURE 2: BAND-PASS FILTER. The band-pass filter gives an oscillator-style indicator output.

HIGH-PASS FILTER FUNCTION, IN EASYLANGUAGE

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

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

Vars:
  a1(0),
  b1(0),
  c1(0),
  c2(0),
  c3(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 $HighPass = c1*(Price - 2*Price[1] +
Price[2]) + c2*$HighPass[1] + c3*$HighPass[2];
If Currentbar < 4 Then $HighPass = 0;
```

portion of the data spectrum to the output. When the bandwidth is on the order of 25% of the center period or less, the phase shift across the pass band is nearly continuous. The phase response, including the transition bands, approaches 180 degrees. So using such a filter can give fantastic in-phase response for a while. But if the character

BAND-PASS FILTER, IN EASYLANGUAGE

```
{
  BandPass Filter
}

Inputs:
  LowerPeriod(30),
  UpperPeriod(15);

Vars:
  HP(0),
  BP(0);

HP = $HighPass(Close, LowerPeriod);
BP = $SuperSmoother(HP, UpperPeriod);

Plot1(BP, "", blue, 4, 4);
Plot2(0, "", black, 2, 2);
```

of the data shifts just a little, the output waveform can give a dead wrong trading signal due to the 180-degree phase shift. Recognizing the shift in the input data is nearly impossible in real time.

A better way to create a band-pass filter response is to use a SuperSmoother with the period set to the upper critical period of the pass band and a high-pass filter with the period set to the lower critical period of the pass band. The separation between the lower critical period and the upper critical period should be at least one octave. This way, the relative phase shift across the pass band is nearly consistent.

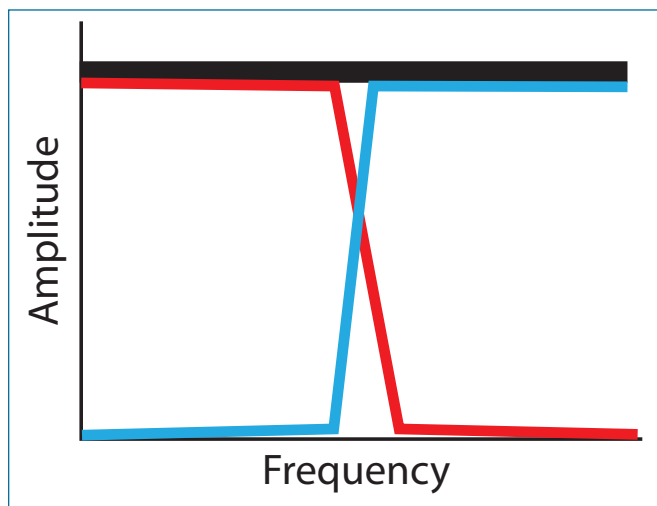


FIGURE 3: DERIVATION OF THE ULTIMATESMOOTHER. The UltimateSmoother is constructed by subtracting the high-pass filter response (blue) from the input data (black). The resulting filter response is shown in red.

The sidebar “Band-Pass Filter, In EasyLanguage” provides an example of such a band-pass filter. The pass band is set to be the octave between a 15-bar cycle period and a 30-bar cycle period. These inputs can be adjusted to obtain the best results for a given set of data. The band-pass filter output is an oscillator-style indicator and can be used directly as an indicator. An example of the filter response is shown in Figure 2.

This band-pass filter is superior to a second-order band-pass filter because it provides sharper transitions between the pass band and the stop bands. Think of it this way: The second-order band pass applies one order to the upper filter edge and one order to the lower filter edge, whereas this band-pass filter applies two orders to both the upper and lower band edges.

ULTIMATESMOOTHER

Like the band-pass filter, the UltimateSmoother is comprised of two component filters. Smoothing filters always involve lag in their output, and lag is to be avoided if possible. From my analog filter design experience, I know that lower-frequency filters require larger inductors and capacitors, and the lag results from the increased energy required to build up the electric and magnetic fields in

ULTIMATESMOOTHER FUNCTION, IN EASYLANGUAGE

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

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

Vars:
a1(0),
b1(0),
c1(0),
c2(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;
```

ULTIMATESMOOTHER EXAMPLE FILTER

```
{
  UltimateSmoother Filter
}
```

Inputs:
Period(20);

Vars:
US(0);

```
US = $UltimateSmoother(Close, Period);
```

```
Plot1(US, "", blue, 4, 4);
```

these components. Think in terms of big woofer speakers for low-frequency sound and tiny tweeters that produce high-frequency sound. That concept is lost with digital filters, where the filters are just code. But the principle is the same. You know a moving average becomes smoother the longer you make the average. That is the same thing as putting more energy into the filter. You also know that longer moving averages have more lag.

The UltimateSmoother conceptually has zero lag in the pass band and has minimum lag in the transition band because only a high-frequency filter is involved. The idea of the UltimateSmoother is described with reference to the

The UltimateSmoother can be applied to any input data, including other indicators.

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FIGURE 4: ULTIMATESMOOTHER. The UltimateSmoother has zero lag in the pass band.

schematic in Figure 3. The input data is mathematically described as an all-pass filter, shown in black. The response of a high-pass filter is shown in blue. The UltimateSmoother response is a result of subtracting the high-pass response from the all-pass response, and is shown in red. At the very low frequencies, the high-pass filter has virtually no amplitude, and so the result of the subtraction is that the UltimateSmoother output is the same as the input data in terms of both amplitude and lag. On the other hand, the response of the high-pass filter is almost the same as the input data and therefore the filtering is accomplished by cancellation.

For the mathematically inclined, the subtraction of the high-pass filter from the all-pass filter transfer function is described in terms of z transforms as:

$$\text{Transfer} = 1 - \frac{c1 \times (1 - 2 \times z^{-1} + z^{-2})}{1 - c2 \times z^{-1} - c3 \times z^{-2}}$$

Putting over a common denominator, the transfer function in closed form is:

$$\text{Transfer} = \frac{(1 - c1) + (2 \times c1 - c2) \times z^{-1} - (c1 + c3) \times z^{-2}}{1 - c2 \times z^{-1} - c3 \times z^{-2}}$$

This transfer function is translated to EasyLanguage code in the sidebar “UltimateSmoother Function, In EasyLanguage” which shows the UltimateSmoother written as a function.

Writing the EasyLanguage code for an UltimateSmoother filter is simple, as shown in the sidebar, “Ulti-

mateSmoother Example Filter.”

The UltimateSmoother example is plotted in Figure 4. The amazing feature of the UltimateSmoother is that it has zero lag in the pass band. The lack of lag in Figure 4 can be compared to the lag of a SuperSmoother and EMA in Figure 1. In all cases, the critical period was set to 20 bars. The UltimateSmoother can be applied to any input data, including other indicators.

CONCLUSIONS

1. The UltimateSmoother has zero lag in the pass-band.
2. The UltimateSmoother is created by subtracting the response of a high-pass filter from the input data.
3. The UltimateSmoother output is not quite as smooth as that of the SuperSmoother because filtering is accomplished by cancellation. Amplitude and phase response of the high-pass filter in its pass band is not exactly the same as that of the input data.
4. The SuperSmoother is recommended for use instead

This rejection of the high-frequency components produces an output waveform that is smoother than the input waveform.

of an EMA. In most cases, it can also be used instead of a simple moving average.

5. The best band-pass filter is created by the serial filtering of a high-pass filter and a SuperSmoother.
6. Band-pass filters should have a bandwidth exceeding an octave.
7. Code for the UltimateSmoother, SuperSmoother, and high-pass filter are provided as functions so they can be called as easily as a moving average.
8. The critical period is the defining parameter for filters. The critical period describes the period that separates the pass band from the stop band.

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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The amazing feature of the UltimateSmoother is that it has zero lag in the pass band.



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

*See our **Traders' Tips** coding section beginning on page 46 for implementation of John Ehlers' technique in various technical analysis programs and trading platforms. Code found in the Traders' Tips section is also posted at Traders.com.*

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DING/OVERNIGHT TRADING IN QQQ

Continued from page 38

the system maximum drawdown experienced a decline, reducing from -34.3% to -26.9%.

Figure 4 presents the equity curve spanning the period from 2000 to 2023. Without factoring in trading commissions, spreads, taxes, and other fees, a \$100,000 investment burgeoned to \$4.96 million, marking an appreciation of nearly 50 fold. The risk profile of the strategy, depicted in Figure 5, is generally moderate, although it exhibits an elevated tendency during market crises such as those in the years 2001, 2008, 2020, and 2022.

FINAL WORDS

In summary, the overnight strategy validates its profitability by delivering superior returns with relatively lower volatility and maximum drawdowns compared to the buy & hold approach over the testing period from 2000 to 2023. The incorporation of the January barometer significantly improves the strategy, resulting in a notable rise in the compounded annual return while concurrently reducing volatility. It is essential to emphasize that the results provided here are hypothetical and do not consider factors such as trading commissions, spreads, fees, taxes, and other variables. Further rigorous testing is required to validate these findings in real-world situations.

The research uncovered that overnight returns frequently outperform their intraday counterparts.



Peter (Haoting) Ding is a student with a keen interest in the application of big data in the financial market. He can be contacted at haotingding07@gmail.com.

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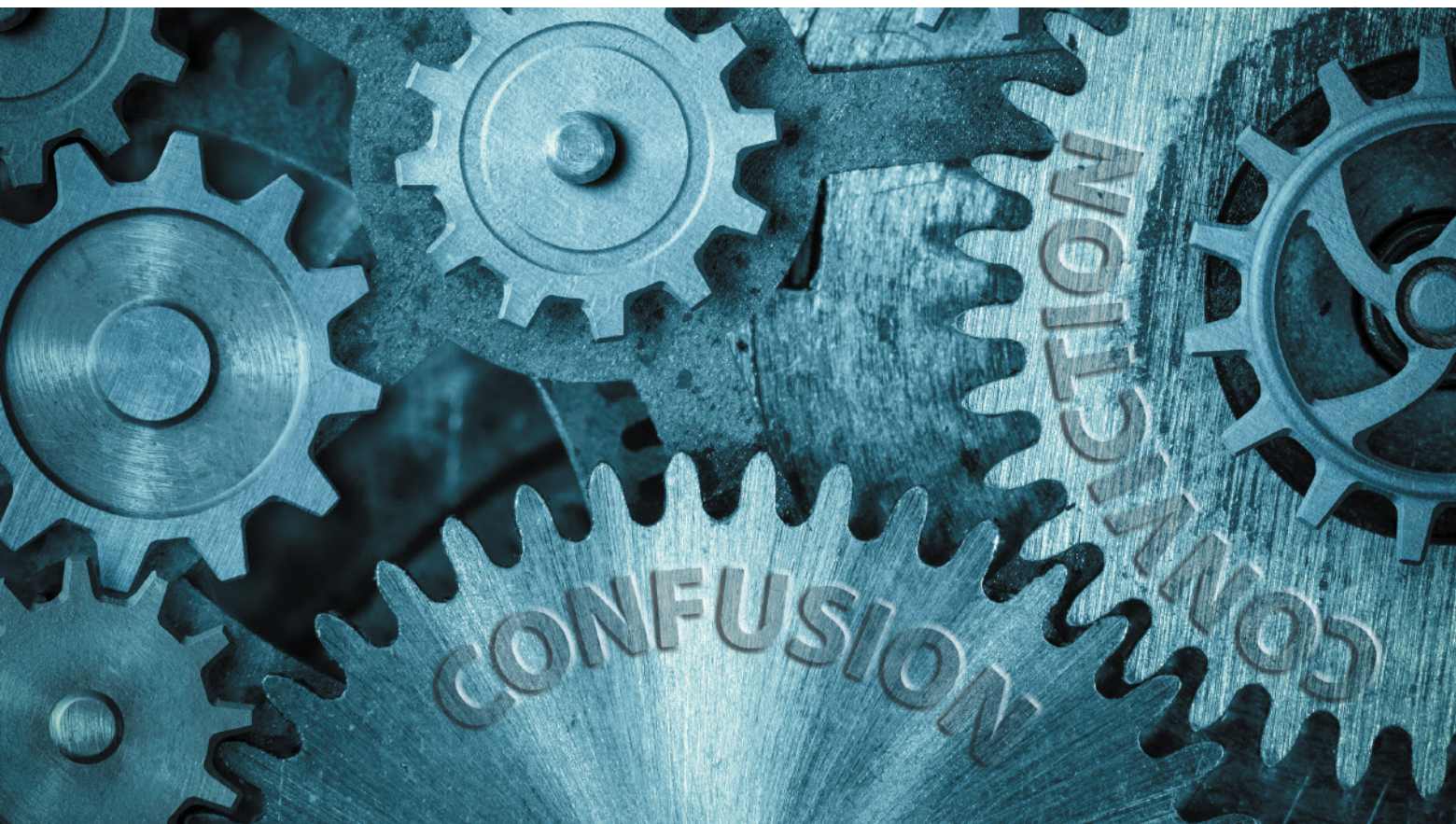
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Using The Put-Call Ratio

The Sentiment Flow Index: Confusion Or A Conviction Indicator?

Introducing a new indicator to filter the signal from the noise.

by Steve J. Godwin and Louisa C. Schneider

For decades, market technicians have used option put-call (P/C) ratios as sentiment and contrarian indicators. This article will take another look at the put/call ratio as a contrarian signal and demonstrates a new indicator we have developed to filter the signal from the noise.

Figure 1 shows the problem we are trying to solve. We are using the CBOE equity put/call ratio (\$CPCE) (as shown in the top graph in Figure 1) and it can be quite noisy, as highlighted in the red circles. The circled spikes occurred over two-month periods. The question is: Which ones were truly significant? Where should you

have played the contrarian trade? The S&P 500 index (lower graph in Figure 1) was in an uptrend in the first instance and in a downtrend for the second one.

And a final question here is: Where were the traders showing fear and where was the greed?

Look again at the red circles. In the first, the market had been rising off the October 2022 bottom for three months. Were the high P/C readings (indicating negativity) a contrarian play (that is, go long)? Indeed, the market continued its advance for another eight months. Look at the second set. Markets had been dropping for three months and the P/C ratio has been screeching higher for two of the three months. In the second case, the contrarian play was not in order. In short, we think the option traders in both areas were *not* telling us they thought the market was heading down; rather, they were telling us they were confused. Next, we'll show how we filtered confusion from conviction.

ANDREY KUZMIN/SHUTTERSTOCK

To begin, we ran some simple statistics for Figure 1. We defined the period from 1/4/2021 to 12/23/2021 as an uptrend, 1/4/2022 to 6/30/2022 as a downtrend, and finally, the period 6/1/2022 to 5/30/2023 as trendless. The trends are shown in Figure 1 and the raw statistics are shown in the table in Figure 2.

The uptrend data and downtrend data were as expected, showing a bias of calls (average P/C ratio < 0.5) and a bias of puts (average P/C ratio > 0.5), respectively. A higher standard deviation for the downtrend (0.11 versus 0.07) might be in agreement with more emotion manifesting on the downside. Surprisingly, the highest average P/C ratio and standard deviation occurred during the sideways move from June 2022 to May 2023. We believe, in a trendless market, traders are confused and lack conviction as to what the next trend may be. They react to the next news event with wide swings in P/C ratios. The net effect: *confusion can look like fear*. Our approach to sorting this out is next.

A MERGING OF THE OLD AND THE NEW

Joseph Granville developed the concept of volume-weighted price change (the on-balance volume) in the 1960s. J. Welles Wilder introduced the relative strength index in the late 1970s. Gene Quong and Avrum Soudack combined the two concepts here in this publication in 1989. We borrowed from each of them and created a volume-weighted relative strength index of the put/call ratio. We call it the *sentiment flow index* (SFI) after our favorite technical indicator, the money flow index (MFI). It is computed similarly to the MFI.

CALCULATION

Here are the formulas to arrive at the SFI:

Raw sentiment flow = Today's closing put / call ratio * today's option symbol total volume
 Sentiment flow ratio = (x-period positive sentiment flow) / (x-period negative sentiment flow)
 Sentiment flow index (SFI) = 100 - 100 / (1 + sentiment flow ratio)

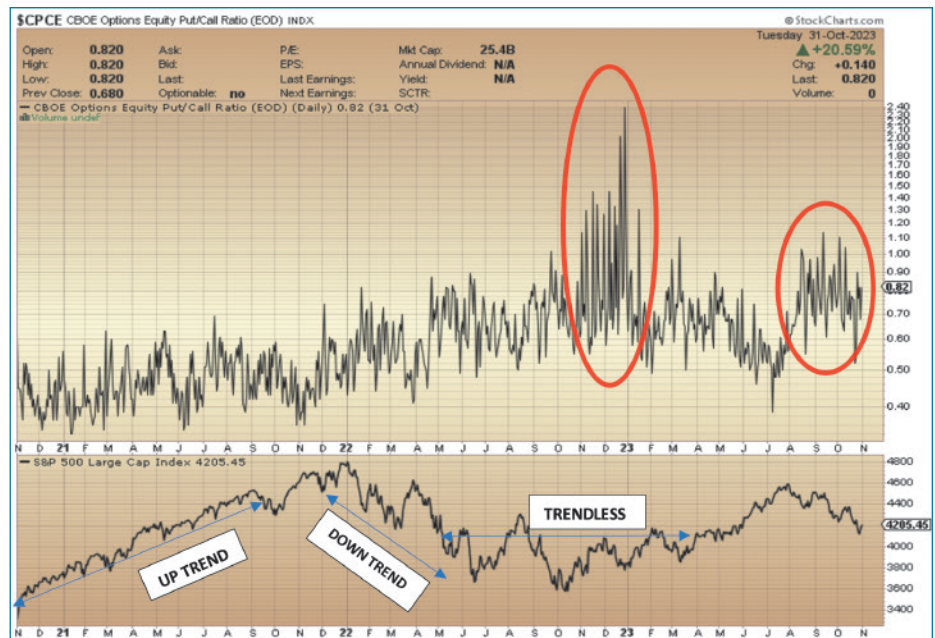


FIGURE 1: CBOE EQUITY PUT/CALL RATIO (\$CPCE). Here you see some recent put/call activity on the CBOE all-equities symbol CPCE. Some noisy periods are highlighted in red circles. Which are significant?

SPX	P/C RATIO (CPCE)	XBAR + 1 STD	XBAR - 1 STD	± 1 STD RANGE
UP TREND: 1/4/21 → 12/23/21				
XBAR:	0.47	0.54	0.40	0.94
STDEV:	0.07			
DOWN TREND: 1/4/22 → 6/30/22				
XBAR:	0.62	0.73	0.51	1.24
STDEV:	0.11			
FLAT TREND: 6/1/22 → 5/30/23				
XBAR:	0.72	0.89	0.55	1.54
STDEV:	0.17			

FIGURE 2: TREND STATISTICS. Statistics are shown for the CPCE plot from Figure 1, 1/4/2021–5/30/2023, where an uptrend, downtrend, and trendless period can be seen.

An Excel spreadsheet example for calculating the SFI is shown in Figure 3. The columns are typical volume-weighted RSI calculations. (These calculations have been reviewed many times in this publication and are also available in most technical software packages.) We need to point out one difference: We chose to measure the relative strength of the *negative* sentiment. As the put/

We believe that traders will trade in the direction of conviction until news or other events shake that conviction into confusion.

	A	B			A * B	Pessimism Sentiment flow INCREASE	Pessimism Sentiment flow DECREASE	C	D	=abs(C/D)	SENTIMENT FLOW INDEX
Date	CLOSING P/C RATIO	TOTAL P/C VOLUME	P/C RATIO CHANGE	DOWN=1 UP=(-1)	Raw Sentiment flow	one day gain	one day loss	avg gain 3 days	avg. loss 3 days	SFI-RATIO	SFI (3)
10/18/2023	0.68	1,982,666	-0.12	1	1,348,213	0	1,348,213	938,782	449,404	2.09	68
10/19/2023	0.78	2,334,156	0.10	-1	1,820,642	1,820,642	0	1,143,403	449,404	2.54	72
10/20/2023	0.76	2,762,225	-0.02	1	2,099,291	0	2,099,291	606,881	1,149,168	0.53	35
10/23/2023	0.52	2,239,377	-0.24	1	1,164,476	0	1,164,476	606,881	1,087,922	0.56	36
10/24/2023	0.55	2,093,361	0.03	-1	1,151,349	1,151,349	0	383,783	1,087,922	0.35	26
10/25/2023	0.90	2,728,411	0.35	-1	2,455,570	2,455,570	0	1,202,306	388,159	3.10	76
10/26/2023	0.77	2,465,471	-0.13	1	1,898,413	0	1,898,413	1,202,306	632,804	1.90	66
10/27/2023	0.82	2,382,784	0.05	-1	1,953,883	1,953,883	0	1,469,818	632,804	2.32	70
10/30/2023	0.68	2,001,094	-0.14	1	1,360,744	0	1,360,744	651,294	1,086,386	0.60	37
10/31/2023	0.82	1,676,943	0.14	-1	1,375,093	1,375,093	0	1,109,659	453,581	2.45	71
11/1/2023	0.70	1,663,716	-0.12	1	1,164,601	0	1,164,601	458,364	841,782	0.54	35

FIGURE 3: SPREADSHEET CALCULATIONS FOR SFI. Here is a look at the Excel spreadsheet build used to calculate and use the sentiment flow index. The spreadsheet calculates a three-day sentiment flow index, SFI(3), which is used in a short-term trading model.

call ratio increases, the strength of the pessimistic sentiment increases and vice versa. This is the reason for the comments above the one-day gain/loss columns. Our spreadsheet is calculating a three-day sentiment flow index, SFI(3). We use the SFI(3) in our short-term trading model. Our short-term trading model was described in our earlier S&C article, "A Unified Theory Of The Markets."

Previous investigators have smoothed the put/call ratio with moving averages. We do the same here for use in our trend model. We use a 10-day SFI of a 5-day smoothed put/call ratio, as shown in Figure 4. We will use it to demonstrate the application of the SFI. The top graph (green) is the daily closing price of the S&P 500 divided by 11 to fit it on the left axis. The middle graph (red) is the daily P/C ratio for the \$CPCE as reported by the CBOE. The final graph (purple) is the 10-day SFI of the 5-day smoothed P/C ratio. In our model, we use sentiment readings of >90

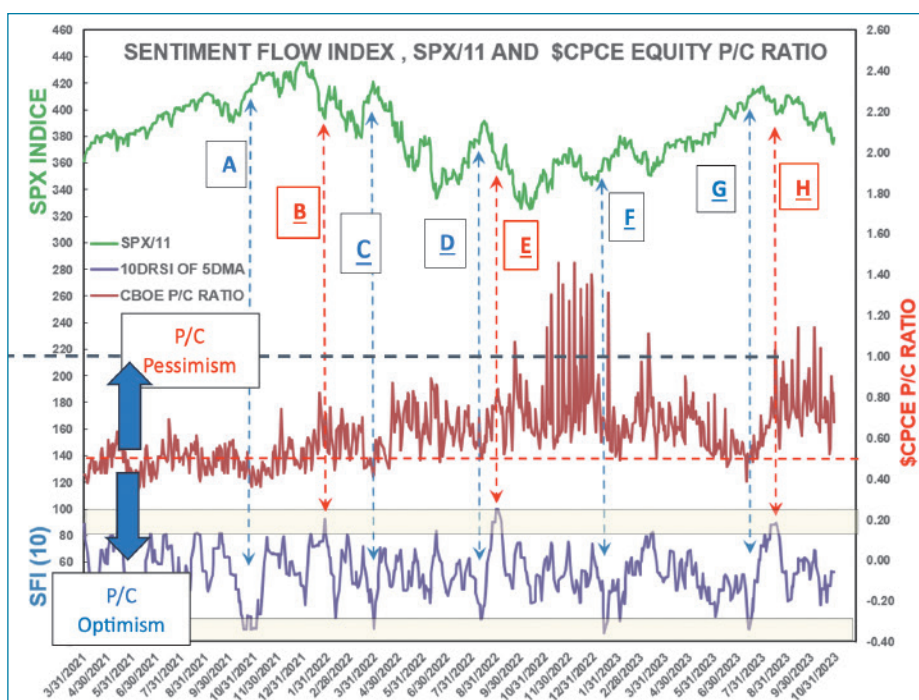


FIGURE 4: S&P 500 INDEX, DAILY PUT-CALL RATIO, AND SENTIMENT FLOW INDEX, 3/2021–11/2023. The top graph (green) is the daily closing price of the S&P 500 divided by 11 to fit it on the left axis. The middle graph (red) is the daily put-call ratio for \$CPCE. The lower graph (purple) is the 10-day SFI of the 5-day smoothed put-call ratio. In our model, we use sentiment readings of >90 and <10 for SFI to indicate extremes have been reached.

and <10 for SFI to indicate extremes have been reached. We are using a similar timeframe as in Figure 1.

The addition of volume to the SFI greatly filters the noisy P/C ratios to something more manageable in our models. The vertical red/blue dashed lines are pointing out extremes in sentiment. Red dashed lines identify strong areas of negative sentiment (high P/C ratios) and blue dashed lines point to high positive sentiment (low P/C ratios).

CONTRARIAN OR NOT?

Over the time period in the table in Figure 5, there are well over a dozen put/call ratios above 1.0. The red hori-

We created a volume-weighted relative strength index of the put/call ratio. We call it the sentiment flow index (SFI).

FIG. 2	DATE	SPX	SFI(10)	SFI	SPX 5	SPX 15	SPX 30
A	10/29/2021	4605	10	↑	4698 (UP)	4698 (UP)	4669 (UP)
B	1/27/2022	4327	92	↓	4477 (UP)	4380 (UP)	4204 (DN)
C	3/30/2022	4602	10	↑	4481 (DN)	4394 (DN)	3930 (DN)
D	8/11/2022	4207	17	↑	4284 (UP)	3967 (DN)	3693 (DN)
E	9/1/2022	3967	100	↓	4067 (UP)	3693 (UP)	3583 (DN)
F	1/13/2023	3999	7	↑	4020 (UP)	4018 (UP)	3997 (DN)
G	7/14/2023	4505	10	↑	4536 (DN)	4478 (UP)	4406 (DN)
H	8/17/2023	4370	90	↓	4376 (UP)	4457 (UP)	4288 (DN)
CORRECT CALLS :					3 out of 8	3 out of 8	4 out of 8
CONTRARIAN CORRECT CALLS :					5 out of 8	5 out of 8	4 out of 8

FIGURE 5: USING SENTIMENT PEAKS TO FORECAST SPX PRICES AT 5, 15, AND 30 DAYS. Here's a look at how well sentiment peaks forecasted up or down SPX price movement for five days out, 15 days, and 30 days into the future. From left to right, the table shows the date, the SPX price, and SFI-(10) value for each of the red/blue vertical lines in Figure 4, to help compare sentiment peaks with subsequent price movement. Results here indicate that the put/call forecast was a successful contrarian play in five out of eight forecasts (63%) at 5 and 15 days, and four out of eight (50%) at 30 days.

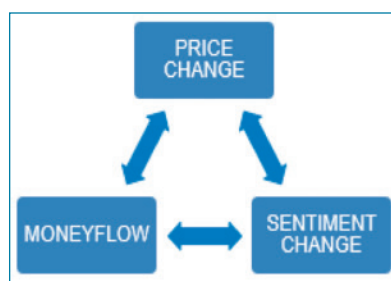


FIGURE 6A: MARKET BEHAVIOR MODEL. In our previous articles in this magazine, we defined our trading model as unifying the input force (money flow) with the output reaction (price and sentiment change) to identify short-term market extremes.

zontal dashed line is at 0.5 on the right scale. Let's call it the sentiment demarcation line. Above is pessimism, below is optimism. For almost the entire downturn from December, 2021 to October, 2022, option traders had negative sentiment (P/C ratio > 0.47). The SFI (10) shows that there were three points (B, E, and H) along the curve that had high negative strength (red lines) and five points (A, C, D, F, and G) of positive strength (blue lines).

We compare these sentiment peaks to SPX prices 5, 15, and 30 days later in the table in Figure 5.

From left to right, the table shows the date, SPX price, and SFI-(10) value for each of the red/blue vertical lines in Figure 4. The SFI-(10) is forecasting SPX price direction given by the put/call ratio. A value of <20 or >80 is forecasting an up/down market, respectively. Results indicate that the put/call forecast was a successful contrarian play in five of eight forecasts (63%) at 5 and 15 days, and four of eight forecasts (50%) at 30 days. Additional evaluation of the SFI-(3) on nonsmoothed put/call ratio data (not shown here) gives the successful contrarian play at 46% and 59% for 3 and 5 days, respectively.

CONCLUSION: THIS IS NOT YOUR PARENTS' OR YOUR GRANDPARENTS' OPTION MARKET

The stock market doesn't appear to be as driven by sentiment, as measured by the put/call ratio, as we learned growing up in the 1990s. Our data says that it is approaching 50-50 as to the put/call sentiment being a contrarian play. Here, we used the CBOE equity put/call ratio, but any symbol with daily reporting of volume

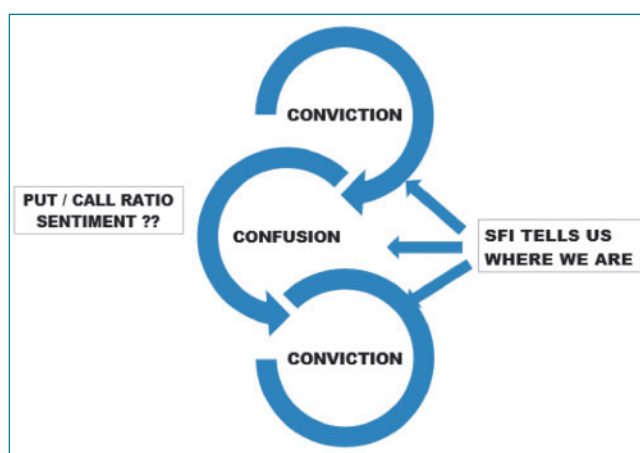


FIGURE 6B: MARKET BEHAVIOR MODEL. The sentiment flow index (SFI) can be used to filter market sentiment for confusion versus conviction. Using the SFI in a trading model can help to identify unsustainable market extremes.

will work. However, we have found some symbols so volatile, they became inconclusive even with the SFI. Perhaps these symbols were "algorithmical" rather than "sentimental."

Let's wrap it up with a short diagram. In our previous articles, we defined our trading model as unifying the input force (money flow) with the output reaction (price and sentiment change) to identify short-term market extremes, as illustrated in Figure 6a. Remember, we believe that extremes in the market are not sustainable. We use the SFI to further filter market sentiment for confusion and conviction, as shown in Figure 6b. We believe that

Continued on page 21

We use the SFI in our trading model to help us find extremes rather than to predict price.



THE WORLD OF RETAIL TRADING

Emilio Tomasini is an adjunct professor of corporate finance at the University of Bologna in Italy and is a professional trader. He has audited over 5,000 accounts of traders during 13 years of a real-money trading competition, giving him unique insights into what helps a retail trader to succeed. He has expertise in technical analysis and trading system design. In this column, he shares his sometimes “unserious” thoughts on serious topics in finance. In his writings, he hopes to help the retail trader better understand the leap from unprofitable to profitable trader, firmly believing that the right answers can come only if the right questions are asked. At his website at www.emiliotomasini.com, he offers some of his expertise in a free video course.



Emilio Tomasini

SYSTEM TRADERS AND DISCRETIONARY TRADERS, AND THE GULF IN BETWEEN

Recently, I was conversing with a trader who is an ardent adherent of the discretionary trading approach. He was speaking highly of an advisory service that issues Nasdaq stock buy recommendations. Out of curiosity, I probed this topic a bit with him. I asked whether the stock tips that the service publishes are based on algorithmic or discretionary selection. That is, are they picked by a machine or a human? The trader couldn't answer.

This trader may not have known the answer but I did. It's not possible for an advisory service like the one he described to issue recommendations on a completely discretionary basis. Tracking 6,000 Nasdaq stocks daily is only feasible with software; it's not possible for a human to do. The service he described is most assuredly not just passing along stock recommendations from one expert trader who is picking stocks and sharing his stock tips with his followers, as my conversation partner seemed to envision.

I think the reason my trader friend didn't realize this is because he himself is a highly experienced, successful discretionary trader, so it would seem plausible to him that someone could do this. In truth, discretionary traders do things that mere mortals can't. Spending some 16 hours a day

in front of a computer screen requires a level of attention, focus, and steely character possessed by only one in a thousand. Manually analyzing a universe of 6,000 stocks a day requires that same dogged discipline and time commitment. I think many discretionary traders don't realize that they are doing things that most people can't. They don't realize that what they are doing is nearly an impossible thing.

The discretionary trader with whom I was conversing also couldn't answer

The worlds of systematic and discretionary trading are separate and distinct.

another question I posed about his lauded advisory service: What type of trading system or trading approach were those trading tips based on? Was it trend following? Mean reverting? Rotational? Something else? Again, the trader couldn't answer.

Still intrigued by our conversation and proceeding logically, I divined that since signals arrive on Mondays, the system likely works on weekly bars. Further, since the signals are uncorrelated with index movements, it is likely a system working off of retracements in strong stocks, those with good relative strength against the index. And since the signals often

involve unheralded stocks, I deduced the system must select from a vast database. I further deduced that the signals are probably not based on fundamentals. Through a series of more questions, I understood that the system sells on stock strength with a tight trailing stop, resulting in trades that typically last a few weeks. My trader friend reported there were weeks without any signals at all and other weeks with up to 40 signals.

He expressed surprise at how there could be weeks with no signals and how at other times there could be such a high number of signals or potential buy candidates given in a single week. It is indeed hard to understand how a subscriber to the advisory service could manually enter and manage 40 signals in a week that may be issued by the service. Now, it's possible for a single user to design an algorithmic (that is, rules-based) system and automatically trade a system that produces 40 signals a week, given that traders can then do things with a single click. In an automated system, a large number of symbols can be screened, selected, and traded. But tracking, selecting, and managing some 40 signals a week manually or on a discretionary basis is extremely difficult indeed.

Granted, my trader friend, as I said, is himself a successful discretionary trader. I admire what he can do. As a discretionary trader, his mind subconsciously incorporates various

successful trading systems, and he has the rare ability to apply them all variously according to the circumstances and his mood. It could be rotational today, tomorrow nothing, the day after mean-reverting at the start of the day and ending the day with some nice trend-following to carry into the next day. Pretty nice, huh? And why these switches from one mode to another? Because the discretionary trader talks with angels and hears words we humans can't. As humans, we can at best use one, two, or three approaches at a time.

The worlds of systematic and discretionary trading are separate and distinct. Often, discretionary and quantitative traders are positioned at opposite poles, struggling to un-

derstand each other. To a successful discretionary trader, a quantitative trader is a failed trader hiding behind algorithms to avoid accepting his inability to trade. And meanwhile, the quantitative trader views the discretionary trader as someone playing the markets like a game, like a kid playing with a PlayStation.

As with many things, the truth probably lies in the middle. The successful discretionary trader possesses talents and abilities that are laudable. And if you're a quantitative trader who has the ability to understand statistics and you can program and design systems, that's equally impressive. It too deserves much respect and it too can bring trading success.

Really, discretionary trading and

Tracking, selecting, and managing some 40 signals a week manually or on a discretionary basis is extremely difficult indeed.

system trading are like trains on two different platforms, but headed in the same general direction. If these two worlds understood and respected the other side more, many traders still struggling on either side of the sky could perform better.

Word from a quantitative trader.

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GODWIN AND SCHNEIDER/SENTIMENT FLOW

Continued from page 19

traders will trade in the direction of conviction until news or other events shake that conviction into confusion. As market technicians we need all the clues we can get as to our opponents' next move.

We use the SFI in our trading model to help us find extremes rather than to predict price. A rising market reaching a short-term extreme is going to stop going up. It may go sideways or reverse. That's when properly placed vertical option spreads make the most money. We used the smoothed put/call ratio (5-DMA) combined with the SFI-(10) to confirm trend changes in our trend model. We urge you to experiment with the SFI to complement your trading style.

Good luck and keep up that volatility smile.

Steve Godwin teaches stock market classes at local community colleges and lectures at investment venues around the San Francisco Bay area. He is the author of the book Protecting Your Money In The Stock Market: It's A Herd Game. He can be reached at godwis@prodigy.net.

Louisa Schneider holds two masters degrees in electrical engineering, one from Technical University of Munich and one from University of Notre Dame. She currently works as a device engineer at Microchip Technology Inc. She is actively involved in two investment clubs and has

The addition of volume to the SFI greatly filters the noisy P/C ratios to something more manageable in our models.



been a market enthusiast for over five years. She can be reached at lschneider@alumni.nd.edu.

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‡[StockCharts.com](https://www.StockCharts.com)

‡See Editorial Resource Index

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The N-CAMA Trading Model: Backtesting and Live Testing

Testing And Validating A Trading Model

Stress tests? Scenario tests? Out-of-sample backtests? Monitoring? Paper trading? How can you decide a trading system is worthy of using? Last time, we presented the N-CAMA model, and tests were favorable. Has it generated profits on live data? Here's a look at backtesting and live-testing the N-CAMA trading model.

by Jacinta Chan, PhD

Trading models require sufficient testing to be validated prior to acceptance and adoption for use. The purpose of validating the model is to identify the risk that it could fail to perform well in live trading. Trading models can appear to work well in a backtest during the training period but then fail to perform as well in actual trading.

In this article, we'll explore the analysis of test results for an example trading system. We'll examine metrics including net profit, profit-to-loss ratio, number of profitable to unprofitable trades, and maximum consecutive

drawdown for the out-of-sample period and for the pilot trading period to find out what they can tell us.

THE TESTING STAGES

There are many types of tests for model validation, ranging from stress and scenario tests to risk monitoring to management exercises and programs. Paper trading uses actual market data but puts no money at risk, and is a simple and commonly used testing procedure that can be part of model validation.

Just to provide a rundown of some of the terms used and common steps in model validation (Figures 1A and 1B), the following is a list of stages for testing a trading model that are typically employed by technicians, analysts, or traders.

1. In-sample backtesting. During the in-sample testing period, machine learning takes place for the model to learn the best parameters and the optimal weights to assign through a process of error minimization (feed-forward backward propagation).

In Sample Backtest
(2013–2020)

Out Of Sample Validation
(2021–2022)

Pilot (paper) Trading Using Live Datafeed
(2023–current)

FIGURE 1A: TESTING STAGES FOR MODEL VALIDATION. The overall testing procedure for trading model validation can include in-sample testing on an earlier data set, out-of-sample testing on a subsequent data period, and then pilot trading on live (current) data.

Tests	Processes	Data Used
In-sample backtest (training period)	Machine learning error minimization feedforward backward propagation to obtain the best parameters to adopt and the optimal weightages to assign to the chosen parameters.	2013–2020 (8 years)
Out-of-sample backtest (validation)	Check and validate the optimal parameters and weights obtained from in-sample test for continuous performance.	2021–2022 (2 years)
Pilot trading test (live datafeed)	Pilot test is run for one or two quarters to see if real capital can be used to profit from the model.	2023 (or current data)

FIGURE 1B: PROCESSES IN EACH TESTING STAGE. This provides at a glance some details on what is involved in each stage of testing shown in Figure 1a. The data periods given here are the years used for the analysis in this article.

The historical data I am using for the in-sample backtesting for this analysis is the period from 2013 to 2020 (eight years of data).

2. Out-of-sample backtesting. Backtests then continue to the out-of-sample test period. The data used in the out-of-sample period has **never been used in the in-sample training period**. The out-of-sample test uses the parameters and optimal weights chosen during the earlier in-sample tests. The out-of-sample backtest helps to validate the optimized parameters for eventual real-life trading.

In the analysis in this article, I am using two years of data for out-of-sample testing (2021–2022).

3. Pilot trading. After backtesting is complete and the model is validated in the backtest, a pilot trading program can be undertaken. Unlike in a backtest, a pilot trading period uses live data. *Paper trading* is a relevant approach to a pilot trading period.

The pilot trading program (live data testing) continues to use the same parameters and optimal weights used in the out-of-sample backtest that were chosen during the earlier in-sample tests.

For the analysis in this article, the data period used is the first half of 2023.

How long should a pilot trading period be? Some projects

would perform paper trading on a live datafeed for a couple of months. Other companies might choose to deploy a small amount of real capital for a pilot run and live-trade the model for one or two quarters.

THE TESTS

The historical market data is segregated so that the data used during *training* is different from the data used in *out-of-sample validation*. That way, the results in the out-of-sample period have not been optimized in any way.

Training takes place in the *in-sample* backtest period. During the in-sample backtests, machine learning is used to help find the best parameters to adopt for the trading model. A neural network can train itself by making the comparison between the predicted output and the actual data of the time series. With the aid of machine learning during backtests and error minimization feedforward backward propagation, optimal weights can be assigned to the factors involved. The learned parameters are then used to test if the model would work in live trading.

Following the in-sample test, *out-of-sample backtesting* is conducted to validate the findings from the in-sample backtest. We are checking to see if the out-of-sample trading produces similar positive results to those obtained in the earlier in-sample backtest.

Pilot trading (paper trading) can then take place on a live datafeed, reflecting actual performance of the trading model or trading system.

In quantitative trading, the performance of the trading model is compared to a passive buy-and-hold strategy as well as to its own past performance during the training period.

Next, I'll review the trading model used in this analysis, which is a model I developed.

The purpose of validating the model is to identify the risk that it could fail to perform well in live trading.



THE N-CAMA TRADING MODEL

In my December 2023 article in this magazine, “N-CAMA: Combining Artificial Intelligence With A Time-Tested Technical Analysis Indicator,” I presented a trading model I developed and tested. The model, called N-CAMA, is based on an adjustable moving average strategy and the model is trained with a neural network. In the model, the next period’s close is predicted using the close and an adjustable moving average as inputs into a nonlinear autoregressive neural network with exogenous inputs (NARX). Thus, the model is used to predict the next period’s price.

There are some good reasons that I chose to use these two components, an adjustable technical indicator and the neural network, for my trading model.

First, the adjustable moving average (AMA) is unique, as its efficacy ratio can adjust the length used for the moving average according to the prevailing market conditions. It’s a tool that adapts to today’s dynamic markets.

And as for choosing to use a neural network in my work: A NARX-type neural network has the benefit of using the training process to predict a one-step-ahead value. Nonlinear autoregressive with exogeneous input neural networks are available in the Matlab platform. This type of neural network is used because it has the benefits of multilayered perceptrons and back-propagation neural networks.

(If you want to find out more about this type of neural network, I listed some reading at the end of my December 2023 article, plus you can check Matlab, and you can also refer to my December 2023 article that demonstrates the principles of this neural network. Basically, NARX is a kind of recurrent dynamic backpropagation neural network with feedback links connecting some layers of the network. The NARX model is built on the linear autoregressive exogenous (ARX) method, which is generally applied in time series modeling.)

Testing and pilot trading were done on Hang Seng Index futures (HSIF) (Figure 2), Korean Stock Index futures (KOSPIF) (Figure 3), and Singapore MSCI futures (SiMSCIF) (Figure 4). The out-of-sample results are reported in Figures 5A, 6A, and 7A for HSIF, KOSPIF, and SiMSCIF, respectively. N-CAMA outperformed the other benchmarks like the passive buy-and-hold, the standard 20-day moving average, as well as the AMA. This is further confirmed by the pilot trading (January 2023–June 2023) results as reported in Figures 5B, 6B, and 7B.

Is N-CAMA suitable for SiMSCIF? To find out, we can take a closer look at performance metrics for the trading model on the markets tested and focus on analyzing the

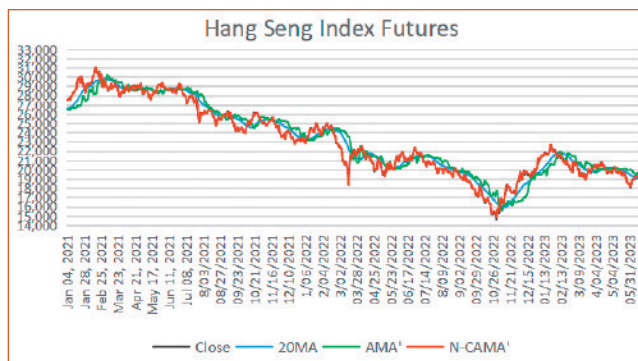


FIGURE 2: OUT-OF-SAMPLE TEST OF N-CAMA MODEL ON HANG SENG INDEX FUTURES (HSIF). The N-CAMA trading model outperformed the buy-and-hold strategy as well as the 20-day fixed moving average strategy and the adjustable moving average strategy in the out-of-sample period when tested on Hang Seng Index futures.

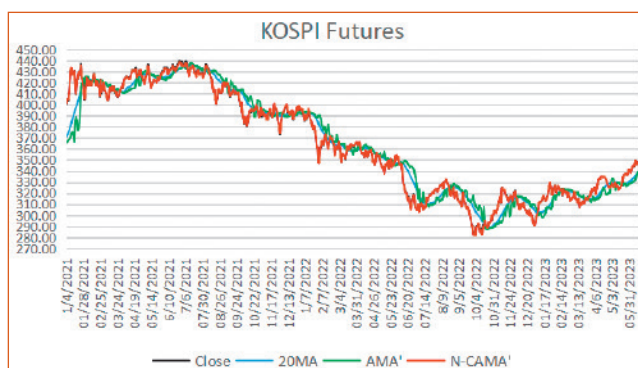


FIGURE 3: OUT-OF-SAMPLE TEST OF MODEL ON KOREAN STOCK INDEX FUTURES (KOSPIF). The N-CAMA trading model outperformed the buy-and-hold strategy as well as the 20-day fixed moving average strategy and the adjustable moving average strategy in the out-of-sample period when tested on Korean Stock Index futures.

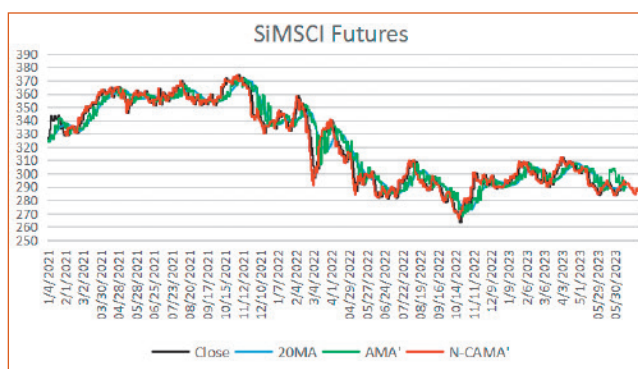


FIGURE 4: OUT-OF-SAMPLE TEST OF MODEL ON SINGAPORE MSCI FUTURES (SiMSCIF). The N-CAMA trading model, on average, did not perform better than the adjustable moving average strategy in the out-of-sample period for SiMSCIF.

performance of N-CAMA on SiMSCIF in the pilot trading period. The pilot trading period used for the analysis is the first half of 2023, from January to June 2023.

Hang Seng Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	-26.83%	4.32%	-21.80%	79.87%
Number of Profitable Trades to Unprofitable Trades		19:477	34:462	100:396
Average Profit to Average Loss		868:-32	754:-31	529:-79
Maximum Consecutive Losses		-2781	-5935	-2504
Number of Losses Consecutively		6	5	5

FIGURE 5A: PROFIT & LOSS ANALYSIS, HSIF, 2021–2022.

KOSPI Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	-24.60%	-5.72%	23.23%	271.36%
Number of Profitable Trades to Unprofitable Trades		18:475	20:473	130:359
Average Profit to Average Loss		12.98:-0.54	14.66:-0.43	8.50:-0.14
Maximum Consecutive Losses		-105.9	-72.6	-16.85
Number of Losses Consecutively		17	12	3

FIGURE 6A: PROFIT & LOSS ANALYSIS, KOSPIF, 2021–2022.

SiMSCI Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	-10.79%	12.37%	15.45%	76.92%
Number of Profitable Trades to Unprofitable Trades		17:520	31:506	34:503
Average Profit to Average Loss		10.61:-0.26	8.03:-0.39	8.73:-0.06
Maximum Consecutive Losses		-23	-58.53	-6.66
Number of Losses Consecutively		4	16	2

FIGURE 7A: PROFIT & LOSS ANALYSIS, SIMSCIF, 2021–2022.

VIEWING THE RESULTS

Figures 5–7 present tables showing the test results so we can analyze profit and evaluate performance of the trading model. The analysis checks for net profit after transaction costs, the number of profitable trades to unprofitable trades, the average profit to average loss, and finally, maximum consecutive losses, which ensures that the trading capital is sufficient to last through bad times.

Here's a closer look at each metric in the tables:

Profit. Net profit after transaction costs for the three tested markets using N-CAMA are positive for the pilot trading period, which is the first half of 2023. The

Hang Seng Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	-1.51%	29.60%	-38.44%	27.09%
Number of Profitable Trades to Unprofitable Trades		3:5	4:08	29:20
Average Profit to Average Loss		2587:-373	175:-1044	375:-274
Maximum Consecutive Losses		-1866	-2029	-1360
Number of Losses Consecutively		5	5	5

FIGURE 5B: PROFIT & LOSS ANALYSIS, HSIF, 2023.

KOSPI Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	18.08%	3.72%	7.28%	57.41%
Number of Profitable Trades to Unprofitable Trades		5:5	5:3	29:2
Average Profit to Average Loss		6.78:-4.44	7.62:-5.07	6.41:-2.65
Maximum Consecutive Losses		-4.6	-6.9	-2.4
Number of Losses Consecutively		5	4	1

FIGURE 6B: PROFIT & LOSS ANALYSIS, KOSPIF, 2023.

SiMSCI Futures	Buy & Hold	MA20	AMA	N-CAMA
Net cumulative profit after transaction costs per year	0.89%	3.91%	3.60%	14.13%
Number of Profitable Trades to Unprofitable Trades		4:7	8:8	8:3
Average Profit to Average Loss		8.46:3.16	5.17:-4.47	5.87:-1.56
Maximum Consecutive Losses		-6.44	-19.76	-1.73
Number of Losses Consecutively		2	4	1

FIGURE 7B: PROFIT & LOSS ANALYSIS, SIMSCIF, 2023.

profit for Hang Seng futures is 27%, KOSPIF is 57% and SiMSCIF is 14%. These results all represent abnormal returns, that is, returns above the passive buy-and-hold equivalent position.

Number of profitable trades to unprofitable trades. For the number of profitable trades to unprofitable trades in the pilot trading period, the N-CAMA trading model produces a ratio of around 29:20 for Hang Seng futures, 29:2 for Korean futures, and 8:3 for Singapore futures.

Average profit to average loss. The average profits were larger than the average losses using N-CAMA for the three futures markets during the pilot trading period.

N-CAMA produced an average profit to average loss of 375:–274 for Hang Seng futures, 6.41:–2.65 for Korean futures, and 5.87:–1.56 for Singapore futures during the pilot trading period.

Maximum consecutive losses. The maximum consecutive losses for HSIF were –1,360 index points; for KOSPIF, they were –2.4 index points; and for SiMSCIF, they were –1.73 index points in the study period. These maximum consecutive losses are relatively small because the study period is short.

ANALYSIS OF RESULTS

In the short period of time used for the test (six months), the N-CAMA trading model met the basic trading model acceptance criteria for the futures indexes tested.

The annual return for Hang Seng futures in the pilot trading period is acceptable with total profits almost two times larger than total loss. The ratio of winning trades to losing trade happens to be higher in this pilot trading period but was lower in the earlier out-of-sample period; however, the average profits were larger than the average losses. The maximum consecutive losses were smaller than they were in the other strategies tested, the fixed and adjustable MA systems. The profits were significantly higher for N-CAMA than they were for the buy-and-hold strategy and the fixed and adjustable moving average strategies. Therefore, in comparison, N-CAMA performed the best in the test.

The abnormal returns from N-CAMA for the Korean futures market were acceptable, with total profits many times larger than total losses. Winning trades outnumbered losing trades in the pilot trading period although that ratio was lower in the earlier out-of-sample period; however, the average profits were larger than the average losses. N-CAMA has the smallest maximum consecutive losses compared to the fixed or adjustable MA systems. The profits for N-CAMA were much higher than for the other tested trading strategies. The Korean futures appear to be the most attractive market to trade out of the three tested, because of the large returns and small losses for KOSPIF using N-CAMA.

The N-CAMA trading model gave a decent return for the Singapore futures (SiMSCIF) with a 2.67 times ratio of number of profitable trades to unprofitable ones. The total profits of 46.98 index points is 10 times higher than the total losses (4.68).

A POSITIVE OUTLOOK FOR THE MODEL

This study analyzed the performance of the N-CAMA trading model on three futures markets and compared the results to the passive buy-and-hold benchmark as well as to both the fixed moving average (20-day MA) and adjustable moving average (AMA) strategies.

The pilot test results were positive for the period used (first half of 2023). The maximum consecutive losses were smaller than for the other strategies tested. This metric is one of the most important considerations in model selection, because it helps to determine the amount of capital required to trade the model; it also determines the stop-loss to set, which is very important for risk management. In this study, the gains for the N-CAMA trading model were many times the losses.

N-CAMA is a dynamic trading model I developed based on an adjustable technical indicator, the AMA. In the model, the next period's close is predicted using the close and an adjustable moving average as inputs into a nonlinear autoregressive neural network with exogenous inputs. I chose to use a neural network in my model because research shows that this type of artificial intelligence can help a trading model to learn better in the training period and perform better in the out-of-sample validation period.

All traders seek to generate abnormal returns in their real-life trading. After initially choosing a trading system, validating the model is the next step. It's an important process to try to confirm that the system can perform as well in live trading as it appeared to perform when tested on historical data. Out-of-sample testing and pilot trading are important steps to confirm the validity of the model and its parameters. When modeling trading, we analyze the results from the different data periods so we can improve the trading model.

Based on the out-of-sample test and pilot trading results, N-CAMA is attractive as a trading model and can be put to further tests on other futures contracts.

Jacinta Chan has a PhD in financial statistics, lectures on investing topics at the university level, and spent most of her career as a futures and equities dealer. She is author of Algorithm Trading 101: Trading Made Simple For Everyone (<https://www.amazon.com/Algorithm-Trading-101-everyoneprofessional-ebook/dp/B08X3TIXWG>).



All traders seek to generate abnormal returns in their real-life trading.

She is currently researching neural network trading systems.
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FURTHER READING

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N-CAMA is attractive as a trading model and can be put to further tests on other futures contracts.



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Gauging The Unknown

Determining Risk Before It Happens

Assessing the risk of being in the markets is a topic that always looms large with investors. What are some ways to calculate and assess it, and what place should each method have in your work? Here's a look at the most important and commonly used measures of risk, and considerations for how you might use each.

by Perry J. Kaufman

Risk is a trader's dilemma. Not the risk we see when we look at a chart, or the risk of loss when we review our system or trading performance—but the risk we cannot see. The risk that has not yet happened.

It's what can we lose tomorrow or in the next 30 days or the next year that is important. If we can figure that out, we can adjust our leverage and be sure that we can survive the downturns. Is that even possible?

Let's look at the most likely candidates:

- the standard deviation
- semi-variance
- extreme volatility
- Monte Carlo
- value-at-risk

One thing is common to all these measurements: the shorter the data used, the less reliable the results. The data must include drawdowns in order to have a chance of being accurate. But how far back is reasonable? If we look at the drawdowns in the Nasdaq ETF QQQ in Figure 1, we can see the problems.

Had we only looked at the past 10 years, we would have seen one occurrence of a 35% drawdown and everything else much smaller. However, the dot.com decline that began in 2000 caused a drawdown of more than 85%. How do we account for that? How likely is that to happen again?

We will look at those two scenarios at play here. One

is from 2015 and the other from 2000. We'll look at both and see what the numbers show.

USING THE STANDARD DEVIATION AND SEMI-VARIANCE

Starting with the period from 2015 through 2023, Figure 2 shows both the standard deviation of the daily returns (on the left), and the standard deviation of the daily drawdowns (the “semi-variance”) on the right. In Figure 3 the same table is shown, this time beginning with 2000, for comparison.

What can we see for the standard deviation of returns (on the left)? Data from 2015 is a bit more volatile, showing an average of 7.4 basis points each day compared to 5.1 basis points from 2000. It tells us that we can expect an average move of about $\pm 2.8\%$ on 95% of the days using data from 2015, and $\pm 3.5\%$ going back to 2000. That would include the dot-com drawdown and the financial crisis of 2008.

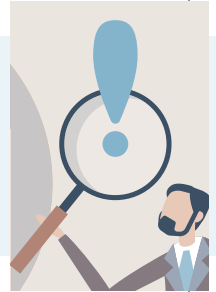
Those numbers can help when deciding whether the market is “normal” or extreme.

On the right side of Figures 2 and 3 are the standard deviation of the daily drawdowns. We are only interested in the “min” values, which show the amount of loss. Using values from 2015, we see that there is only a 2.5% chance of losing 23% (1/2 the probability taken from 100). That would be a manageable loss if we did not look at the table showing losses from 2000. Using two standard deviations, the loss would have been 92%, similar to the actual loss in 2002.

More importantly, the loss at one standard deviation is 64%. That's likely to occur. That makes Nasdaq a very risky investment. As an investor, you need to decide if the Nasdaq index can really decline as it did in 2000 to 2002. Are the drawdowns from 2000 realistic or are the last eight years more likely to be true?

The problem with technology is that new innovations push out old leaders. We had Kodak who refused to go digital, Blockbuster replaced by streaming, and Borders Books replaced by Amazon. But there are bigger issues, such as power replaced by sun or hydrogen and food replaced by lab-grown substitutes. Innovations that replace whole industries. And there are always banking problems, too much credit card debt, and cryptocurrencies that could implode. It's not hard to picture another nasty decline.

Volatility will tell you when the risk is too high to trade, but not exactly how much you can lose.



EXTREME VOLATILITY

Volatility can tell you the times when risk is high or low. An equity index will have lower volatility than an individual stock because of diversification. Figure 4 shows the 20-day annualized volatility for QQQ back to the mid-1990s. To calculate that, use the standard deviation of the 20-day daily returns multiplied by the square root of 252.

How can this predict risk? Volatility is the same

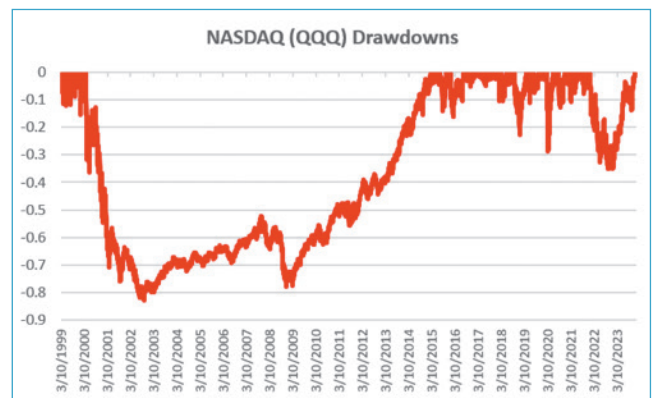


FIGURE 1: DRAWDOWNS (QQQ). Here you can see the drawdowns in the QQQ since the inception of the ETF in 1999. The dot.com decline that began in 2000 caused a drawdown of more than 85%. It's important to use a long-enough span of data to accurately gauge and measure risk over time.

From 2015	Standard deviation of returns				Standard deviation of drawdowns			
Range	Average	0.074%	Min	Max	Average	-6.70%	Min	Max
67%	1 Stdev	1.40%	-1.32%	1.47%	1 Stdev	8.54%	-15.24%	1.84%
95%	2 stdev	2.80%	-2.72%	2.87%	2 stdev	17.08%	-23.78%	10.38%
99%	3 stdev	4.20%	-4.12%	4.27%	3 stdev	25.62%	-32.32%	18.92%

FIGURE 2: DAILY RETURNS VS. DRAWDOWNS, SINCE 2015. On the left you see the standard deviation of daily returns for the QQQ, and on the right you see the standard deviation of drawdowns (the “semi-variance”), from 2015. Compare to Figure 3, which analyzes a shorter span of time.

From 2000	Standard deviation of returns				Standard deviation of drawdowns			
Range	Average	0.051%	Min	Max	Average	-35.62%	Min	Max
67%	1 Stdev	1.73%	-1.68%	1.78%	1 Stdev	28.47%	-64.08%	-7.15%
95%	2 stdev	3.46%	-3.41%	3.51%	2 stdev	56.93%	-92.55%	21.32%
99%	3 stdev	5.19%	-5.14%	5.24%	3 stdev	85.40%	-121.02%	49.79%

FIGURE 3: DAILY RETURNS VS. DRAWDOWNS, SINCE 2000. On the left is the standard deviation of daily returns for the QQQ and on the right is the standard deviation of drawdowns (the “semi-variance”), this time from the year 2000. The longer span of data used in Figure 2 reveals more volatility (an average of 7.4 basis points each day versus an average of 5.1 basis points each day since 2000).



Both the standard deviation and Monte Carlo are good for assessing which system has the least risk.

as risk. When volatility is at an extreme, so is risk. It may be that the volatility is producing profits as prices climb, but when it reverses, it can be devastating. My own calculation for extreme volatility in equity index markets is 32%. Anything above that should be carefully watched for an exit opportunity. Exiting sooner is safer than waiting.

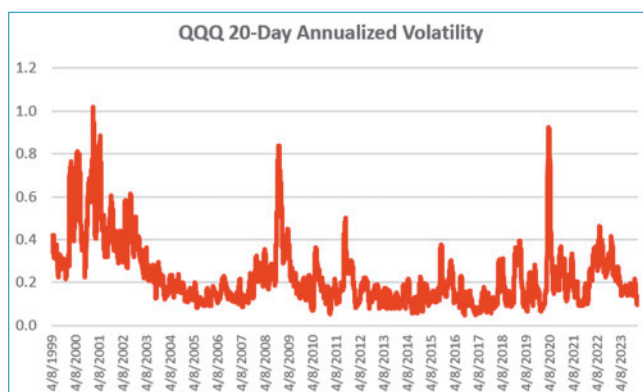


FIGURE 4: ANNUALIZED VOLATILITY. Here you see the 20-day annualized volatility for QQQ back to the mid-1990s. When volatility is at an extreme, so is risk.

	A	C	D	E	F	G	H
1	Date	AMZN	GOOGL	META	MSFT	NVDA	TSLA
6398	1/3/2024	148.47	138.92	344.47	370.6	475.69	238.45
6399	Position	67.354	71.984	29.030	26.983	21.022	41.938

FIGURE 5: “MAGNIFICENT 7” STOCKS, HYPOTHETICAL POSITION SIZES. In the example analysis, position sizes are based on a \$10,000 allocation in each stock, divided by yesterday’s close (in this example, as of January 3, 2024).

	A	I	J	K	L	M	N	O	P	Q
1	Date	AAPL	AMZN	GOOGL	META	MSFT	NVDA	TSLA	Paste	Returns
6389	12/19/2023	0.2909	-0.1224	0.4506	0.4835	0.0442	-0.1986	0.8551	0.233449	0.180839
6390	12/20/2023	-0.5815	-0.7314	0.8903	-0.0895	-0.1908	-0.6327	-1.6435	0.233915	0.188714
6391	12/21/2023	-0.0418	0.7616	1.0823	0.3998	0.2126	0.3841	1.2489	0.243718	0.189314
6392	12/22/2023	-0.3011	-0.1839	0.5485	-0.0574	0.0751	-0.0687	-0.3230	0.256471	0.191096
6393	12/26/2023	-0.1542	-0.0044	0.0153	0.1183	0.0058	0.1933	0.6759	0.273537	0.225991
6394	12/27/2023	0.0281	-0.0307	-0.5849	0.2454	-0.0425	0.0589	0.7894	0.274073	0.233449
6395	12/28/2023	0.1208	0.0176	-0.0718	0.0398	0.0873	0.0447	-1.3250	0.29227	0.243718
6396	12/29/2023	-0.2944	-0.6323	-0.2772	-0.3532	0.0546	0.0000	-0.7785	0.297966	0.256471
6397	1/2/2024	-1.9423	-0.8910	-0.7833	-0.6291	-0.3710	-0.5748	-0.0101	0.340332	0.273537

FIGURE 6: RETURNS. Using the example stocks in Figure 5, you can calculate the returns for January 3 based on the position sizes and the returns of each price. Calculations are based on the position sizes applied to each older day’s prices.

Then volatility will tell you when the risk is too high to trade, but not exactly how much you can lose.

Monte Carlo

Monte Carlo is a way of randomizing risk given a performance history. The idea is to move the data around to see if different sequences of profits and losses will show a better measure of risk.

The problem is that a large loss is likely to follow a large gain but not likely to follow a small gain. Of course, if a news event occurred, a large loss could happen anytime. The process does not break the data into equal intervals but tries to find some “trigger” that makes separating the data more realistic. For example, you could simply break the data whenever there was a trade based on your favorite strategy.

Most analysts discard the top and bottom 5% of the combinations as being unrealistic. The results are then treated in the same way as the standard deviation. Find the value of $2 \times \text{standard deviation}$ of the returns on the left side of the chart as a better measure of how much risk you may see. Both the standard deviation and Monte Carlo are good for assessing which system has the least risk.

Value-at-Risk

I saved this for last. *Given your current positions, what is the chance that you will have a 5% loss tomorrow?* It does involve more work and is best done on a computer. But a simple spreadsheet can show you the process.

Let’s use the so-called “Magnificent 7” stocks (which are seven popular tech stocks) for this example, all long positions, with today’s position sizes based on a \$10,000 allocation in each, divided by yesterday’s close.

Based on the price, we get the current position sizes as of January 3, 2024, shown in Figure 5.

We can now calculate the returns for January 3 based on the position sizes (row 6399) and the returns of each

price (for example, GOOGL is KI6397/K6396 – 1). The returns are shown in Figure 6 under each symbol. The sum of the “portfolio” (columns I through O) is shown in column P. I copied and pasted the values so they could be sorted. Part of those sorted results

are shown in column Q (the largest returns).

When column P is sorted and put into column Q, we get the distribution shown in Figure 7.

How do we read this? If we look at the average return (the center value) we get 0.57%, a slightly positive value. In order to get the risk of a 5% loss, we start at the lowest value (the top of the sort when selecting “lowest”) and count 5% of the data. It gives us -15.5%. Then it is likely that we have a 5% chance of losing 15.5% tomorrow, even though the average is positive. In professional funds, we would reduce all those positions by 1/3, so the chances of loss are only 5%.

PREDICTING TOMORROW

The standard deviation, the semi-variance, and even Monte Carlo are good ways to compare the risk profiles of two systems but do not attempt to tell you today’s risk.

Volatility is more immediate. With high volatility you know that the risk is current. You can exit or reduce your position.

Value-at-risk attempts to be predictive. It can tell you the likelihood of a loss of 5% or 10% tomorrow. That will allow you to reduce (or even increase) your position to hold risk to a level you can manage. But, like all measures, it depends on the amount of data used. The more data, the more realistic the result.

As VaR shows, there is a large amount of risk in trading the “Magnificent 7.”

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.

INTERVIEW

Continued from page 35

sue it, or for those who have already gotten started in trading and want to take it further, we offer a lot of material dedicated to systematic trading. You will find trading systems, ideas, and analyses of the markets. I like to post things that I think are really interesting.

Paid members are the ones who enroll in our academy. They receive support, our guidance, and all of our services, as well as a community of other traders. There is a lot of stuff there to be discovered.

FURTHER READING

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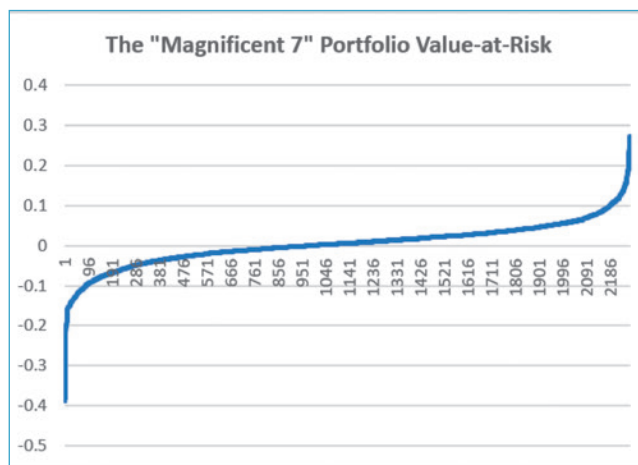


FIGURE 7: VALUE-AT-RISK DISTRIBUTION. You can use a spreadsheet to sort the returns data and plot a distribution graph. Shown here is a distribution of returns for the Magnificent 7 stocks based on positions as of January 3, 2024 applied to all data back through 2015. This type of graph can help show you the percent chance of losing a given percentage tomorrow.

The spreadsheet discussed in this article is available in the S&C Article Code section of Traders.com.

FURTHER READING

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

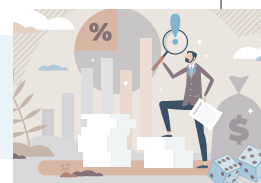
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Kaufman, Perry J., and Alberto Vivanti [1997]. *Global Equity Investing*, Wiley.

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Value-at-risk attempts to be predictive.



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A Conversation With Andrea Unger

Andrea Unger is a full-time professional trader, president of Unger Academy, and author of The Unger Method (2021). 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 he speaks throughout Europe, America, Australia, and Asia. He may be reached at Andrea@UngerAcademy.com.

The Unger Academy works to help traders learn to implement a systematic way of trading and to improve their approach to trading. It offers a package of trading support to members that includes education, research, trading strategies, and guidance.

STOCKS & COMMODITIES interviewed Andrea Unger in early 2024 via email to find out how he became interested in a quantitative trading approach, what portfolio diversification means to him, and what he considers a scientific approach to trading to be.



How did you first become interested in trading? How were your first experiences?

Well, I was looking for something to make money from and I found trading. I got into it because some friends suggested I invest in the stock market. Then they suggested I buy shares of the company I worked for, which was listed on the stock market. I made money from that purchase, so I thought that was the way to go.

Then we got excited about the potential for this way of investing and started acting on tips from friends, friends of friends, rumors, and so on, and we invested more money. Then we discovered a type of option, although it was not a true option contract, called covered warrants. We bought into these because of the leverage they offered. And then we lost money. A lot of money.

All of this made me quite curious. I started looking for information on the internet and I started learning. I also found out that some people had

made a lot of money in a trading contest and thought, *if they could do it, why couldn't I?* I kept on learning more about investing. In the first phase of the contest, I lost. But then I won. And with more and more experience, I slowly got to where I am today.

What in your educational background or experience (if anything) led you to approach the markets in a quantitative and systematic way?

I am a mechanical engineer. I have an MS degree in engineering, a mathematical mind, and a scientific mindset. So everything told me to be systematic in my approach.

The truth is that I am terrible at discretionary trading. I am not able to deal with my emotions, or rather, I cannot make the right decisions at the right moment. At first, I tried to ride the waves of the markets based on my gut reactions and it was a disaster. Whenever you look at a chart in hindsight, you feel pretty smart because you imagine that you would



Being able to rely on data and numbers is a big help in my opinion, and that is extremely important not just for me, but for everyone.

have been able to ride all the ups and downs of the chart. But in reality, it is really tough when you're sitting there watching the market as it's happening and you don't know what will happen next. That is a challenge. So it was clear to me that I wasn't going to be a discretionary trader. It was simply not going to work for me to trade based on impulsive decision-making.

Next, I learned about chart-reading and considered approaching trading this way. You know, there is something good about trading with charts. This approach had many advantages over making trades based on impulsive reactions to news, tips, and rumors. However, it turned out

to be too exhausting to sit in front of the screen for hours during the trading day. It was too stressful for me to have to watch the market action all the time and make decisions.

So, when I discovered the systematic way of trading, I decided to go for it. It turned out to be easy for me, because with this approach, everything is schematic.

The core idea in systematic trading is that you set up a few trading rules and get the results accordingly.

So you take a rules-based approach to trading. Why is a scientific approach to trading important to you?

It's important because I want to *measure* things. In life I am a good decision maker, and in trading I also want to be able to rely on my decisions, which are all contained in my trading systems. I always test my systems and the results tell me if my systems can make money, or at least whether they would have made money by yesterday. This gives me confidence because it shows me whether an idea is good and if it could work. So all I need is statistical proof that an idea will also make money in the future. And then, of course, I also set up rules to stop the systems that don't work.

So having a plan is part of the scientific approach, because the "scientific approach" means that you measure everything with numbers. And being able to rely on data and numbers is a big help in my opinion, and it's extremely important not just for me, but for everyone.

In some of your articles in this magazine, you show readers how to improve a trading strategy by making selected changes and then measuring the effect of each change. You generally have used the EasyLanguage or PowerLanguage

programming languages to accomplish these tasks. How much coding experience or background does a trader need to use this type of approach?

With a scientific mindset, you will have the right skills in your head to understand programming.

I am not a programmer but I have learned a little about programming. Mostly only basic knowledge such as "if-then-else," "for" loops, and constructs like that; nothing special, and none of it is essential to approach the market with MultiCharts, which uses PowerLanguage, a close relative of EasyLanguage (the language used by the TradeStation platform). After all, the name "EasyLanguage" tells you that it is designed to be a simple, straightforward language. It is a programming language specifically designed for traders. Many of the words in this language relate exclusively to trading itself, so I think it is natural for a trader to grasp.

Of course, if you start from scratch and write down code on a blank sheet of paper, it isn't the easiest thing in the world. But if you start from existing codes, basic scripts and so on, you can change and modify them, edit them, extend them, and improve them, just with pretty basic knowledge.

I've also used trading platforms that use the C# programming language, which was difficult for me. I had trouble with that because that is a serious programming language, and you need to know something about programming, and that isn't my forte or specialty.

So programming isn't the real obstacle; designing systems isn't just about programming. And while you can't just stubbornly decide that you don't want to have to learn anything new, most traders will find that they are able to work with EasyLanguage,

Having a plan is part of the scientific approach, because the "scientific approach" means that you measure everything with numbers.

even without any programming background, since the language was designed to be accessible to traders.

Can you tell us about what you call the Unger Method and what it entails?

I call it the Unger Method because it is my way of developing trading systems. When we talk about trading systems, people can get intimidated and they often ask, "How can I implement an idea for a trading system? How do I actually develop a trading system?"

I started offering the Unger Method as the answer. The Unger Method can be used to analyze the markets and then measure the resulting data in useful ways. The trader can then work from those metrics to improve their results. This is the type of approach I typically demonstrate in the articles I have contributed to STOCKS & COMMODITIES magazine.

So it's really quite simple. If you read my articles in this magazine, you'll find a very practical approach to trading the market. The articles demonstrate how I study the markets, how I start with a simple idea, and how I then build a trading system based on that idea.

If an idea proves to be good or promising, with positive results, then I work to improve and refine it. If my initial idea produces a terrible backtest, then I drop it so that I don't waste time on something that is destined to fail. I want to spend my time working to improve only



In trading I want to be able to rely on my decisions, which are all contained in my trading systems.

the good ideas.

So the Unger Method is a step-by-step process that takes you from an initial model to a complete and working trading system.

What was your experience like when you took part in the World Trading Championships? What kind of trading approach did you use, and did your experience at the competition help you develop the method you use today?

It was a great experience. Mainly because I won four times...I am just kidding, of course. When I first entered, I wasn't convinced I could trade efficiently using a systematic approach with only \$15,000, which was the entry minimum back then. (Today, it is \$10,000.) So I started with discretionary trading. And I made money in the first month of the competition. I made about a 40% return.

However, it was killing me. It was too much stress—way too much pressure. So I decided to use my systems in the competition. And that's what I did. You know the rest.

These days, it's easier because today we have micro futures so you can trade in smaller sizes, even with 10k or 15k. (That is why the entry minimum is less today than it was then.)

The experience was beneficial. After all, you have a year to maximize your profits and ensure you don't get pushed out of the competition due to losing too much.

That one year of the competition

can feel like a long time. But in reality, it doesn't give you much time to recover if you fall behind. So if something goes wrong in your trading during the competition, you drag your feet on making changes to what you are doing. You

must change your approach and adapt to the new scenarios you find yourself in.

And for me, that's the essence of what I gained from participating in the trading competitions. I learned to react to what the market is showing me. I learned to always be in the present, to focus on the results, and to read the results to take the next step. This way of reading the markets and reacting is helpful in trading as well as in life.

As a professional trader, how much time would you say you spend on actual trading each day or each week? And approximately how much time might you spend each day on other activities that support your trading, such as research, testing, and strategy development?

I don't spend too much time each day on trading itself—apart from staring at the screen, which I can't ever seem to tear myself away from. I spend a lot of time in front of the monitor because I love trading. I love what the markets do. I love watching how the day unfolds. But in actuality, with a systematic approach to trading in place, I don't have to watch the markets all day. There is no need.

I'd say my interaction with the markets on a daily basis is close to zero. I spend 4–5 hours a month on trading itself. And by that, I mean actual trading activity.

On weekends, I update my cloud server with the workspaces I trade on. And once a month, I reshuffle my strategy portfolio. I do pay attention

to the net asset value of my account to see how I'm doing.

As for time spent on system development: When I am working on developing a new system—because I always want to be building new systems—then I may spend a few hours (maybe 4–5 hours a month) developing systems if I get a new idea for a strategy, or just because I enjoy doing it. I may have seen something that gave me a new idea, and then I'll want to go and test it.

But that's really all. Or, at least, that would be all the time I spend on it if I were a sane person, but I'm crazy and spend too much time in front of my trading software.

As for research: At Unger Academy, we do a lot of research, so on average, I spend at least an hour a day researching and thinking about things, mostly because I love doing it. There is no real need to spend that much time on it, but because I love trading and finding out what might come next, I always keep at it. I enjoy looking into things and trying to understand new things.

You say that it is essential to use a well-diversified portfolio. What does a well-diversified portfolio look like to you, and what aspects of a portfolio are important to have in your approach?

A well-diversified portfolio is something that spans many sectors. I am not just talking about stocks of companies that produce products in different areas. I'm talking about instruments. I am talking about grains, bonds, currencies, index futures, commodities (and by commodities, I mean energy, gold, metals, meats... all those things). I am putting in all sorts of things just to be sure, or at least confident, that I have something that is not correlated with the rest of the world. And that *something* is sometimes what contributes to better

performance.

If you only work with stocks, the risk is that everything will move in one direction, and heavily so, and in that case, you will be exposed before such an event. If you are on the right side, you are happy, but if you're on the wrong side, it could seriously affect you.

But if I am working in, say, natural gas and 30-year bonds and euro-USD currencies, maybe lean hogs...then I get real diversification. For me, it is imperative to diversify as much as possible. And that means across the futures markets.

Do you have any thoughts on how the current generation of artificial intelligence or generative AI could come into play for technical traders or for the trading world?

I have been wondering the same thing. I have looked at ChatGPT, which doesn't necessarily represent all that artificial intelligence has to offer, but it is a good example. ChatGPT has absolutely no idea. I mean, it's not artificial intelligence; it seems more like artificial stupidity when it comes to trading, coding, and so on. There is no real engagement with what you are doing, with what the human is doing. It is just a mechanical process that the machine goes through.

For instance, it doesn't recognize errors that end up being incorporated instead of being rooted out. And it completely disregards the human experience. You could argue that it is learning, that it will learn, but I have been testing it for a while now and over the last few months, I haven't seen any improvement. I haven't seen any real progress. What I get is extreme politeness and friendliness when the chat provides answers, but I don't see that it's becoming a beneficial tool yet.

So at this point in time, it hasn't been a helpful tool. If you ask the ma-

chine to create some code, you can end up spending more time correcting the code than you would have spent coding it yourself to begin with. The technology could become more helpful once it learns the essential dynamics of decision-making. Maybe it will learn to put together the critical aspects of each market. Then it could become something really useful.

But despite the speed at which technology moves, I don't think that will be very soon. I mean, it isn't a matter of months; maybe it is a matter of years. But I'm not so optimistic that artificial intelligence will do the work for us. Neither am I so pessimistic that I think it will take over our jobs. I think it will work peripherally and can be a help from time to time. At least, that's what I think right now given what I've seen so far.

At Unger Academy, you offer services to help professional and private traders refine their approach to trading. What kind of services do you offer? How can you help traders?

Anyone who comes to Unger Academy is someone who wants to learn what I do. And I teach precisely what my approach to trading is. I show how I develop systems, mix them, use them live in the markets, and so on.

That is what I teach. But I have always understood that people need guidance on the whole process. So, Unger Academy has improved the entire package. When you come to Unger Academy, you get the knowledge because that is what I teach, but you also get the tools.

We also try to free up traders from worrying about things that are related to trading but aren't directly about trading itself. For example, you may not want to worry about how to set up your trading infrastructure. You may

Of course, I also set up rules to stop the systems that don't work.

not want to have to learn to program. You may not want to have to worry about choosing the best VPS or whatever. So we try to provide a complete package of trading support. In this way, we become not only mentors but, in some cases, also consultants and buddies for our students.

Tell us about some of the resources available on your website. Are there both free resources as well as resources for paying members?

Yes, we have lots of free resources. There is a blog and a YouTube channel that we update several times weekly. We post a lot of interesting ideas and useful insights there, so even those who don't want to start training with us can still learn from our experience and research.

It's also possible that by looking through all these resources, someone might decide that trading isn't for them. That can be helpful for someone to find out before they start spending money to get into trading or before they lose money in the markets if they aren't well-suited to trading activities. That is something I always try to get across to people: no one *has* to become a trader. Trading well requires discipline, patience, commitment, and an understanding of money management. Someone may think it's what they want to do and they may want to explore the possibilities, but for some, it may be too dangerous an activity and it may be best to limit it.

But for those who do want to pur-

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The Market After Hours

Overnight Trading In QQQ

They say the early bird gets the worm, but in the case of some trading opportunities, does the night owl reap the rewards? Here's a study to test the hypothetical profitability of trading one market's overnight session.

by Peter (Haoting) Ding

Overnight trading is an approach that involves buying right before the market closes with the intention of selling at the market open the next day. Overnight trading has patterns and characteristics that differ from daytime trading. Can traders capitalize on this?

After reading about some research in this area, I set out to test the idea. I performed some data mining on historical data to recognize any evident overnight trading patterns, and then I sought to evaluate the associated risks and seasonality of the pattern. In this article, I'll describe the study I undertook.

OVERNIGHT TRADING

In a 2018 *New York Times* article by Jeff Sommer, Sommer discussed the results of overnight trading using the

exchange-traded fund (ETF) SPY, which mirrors the Standard & Poor's 500 stock index. From the inception of the ETF in 1993 to 2017, the overnight trading strategy yielded a cumulative return of 541%. In contrast, the daytime strategy—buying SPY at the opening second of the market at 9:30 am EST and selling it at the 4 pm close—would have experienced a decline of 4.4% over the same period. In a 2023 article in *Review Of Financial Economics*, M.E. Lachance delved into the enduring biases in overnight returns and assessed the viability of exclusively trading overnight investments. The research uncovered that overnight returns frequently outperform their intraday counterparts. A model was introduced to address systematic biases, identifying around one-fifth of stocks exhibiting positive and statistically significant overnight biases. Investing in these stocks overnight resulted in a twofold return compared to the market, with only a third of the market beta.

THE APPROACH

The study I present here utilizes QQQ as a key investment instrument to examine its overnight trading patterns. QQQ, an ETF closely mirrors the Nasdaq-100 index,

comprising 100 prominent nonfinancial companies listed on the Nasdaq stock exchange. These listed companies, including Apple, Microsoft, Amazon, and others, primarily operate in the technology, health care, consumer discretionary, and communication services sectors. Recognized as pivotal contributors to the U.S. economy, these companies offer long-term growth opportunities, rendering QQQ an attractive investment vehicle from a trading standpoint. The heightened volatility stemming from its concentration in these sectors also serves as a robust test case to evaluate the effectiveness of the overnight strategy.

The study employed intraday and daily data sourced from reputable platforms including FirstRate.com, Pittrading.com, and Yahoo Finance data. All calculations were executed utilizing the AmiBroker software suite. Our methodology established specific entry and exit points, stipulating buying at the close (4 pm EST) and selling the position at 9:35 am EST.

Recognizing that the accuracy of computer modeling hinges on data quality, we meticulously conducted our calculations using datasets obtained from two distinct vendors: pittrading.com and FirstRate data. The calculated average annual returns, coupled with their standard deviation, revealed a notable consistency between these datasets. This observation instills confidence in the robustness of our study's findings.

OVERNIGHT TRADING VS. BUY & HOLD

Figure 1 illustrates the annual returns of QQQ, presenting the outcomes achieved through both overnight and buy & hold strategies. The overnight strategy consistently outperformed buy & hold in terms of annual returns throughout the entire period (2000–2023). The compounded annualized return (CAR) for the overnight strategy stands at 11.4%, accompanied by a standard deviation of 16.5%, outshining the buy & hold strategy's 6.3% CAR with nearly double the volatility (29.8%) over the same period.

Furthermore, the maximum system drawdown is –34.3% for the overnight strategy, significantly less than the –83% experienced in the buy & hold strategy. Notably, in years when the overnight strategy records a decline, the buy & hold strategy often incurs more substantial losses. Additionally, buy & hold displays three consecutive years of loss, a trend not observed in the overnight strategy.

While the overnight strategy demonstrates significant outperformance compared to buy & hold, it is worth noting that it still experiences double-digit losses in the years 2001, 2008, and 2022. This prompts the question:

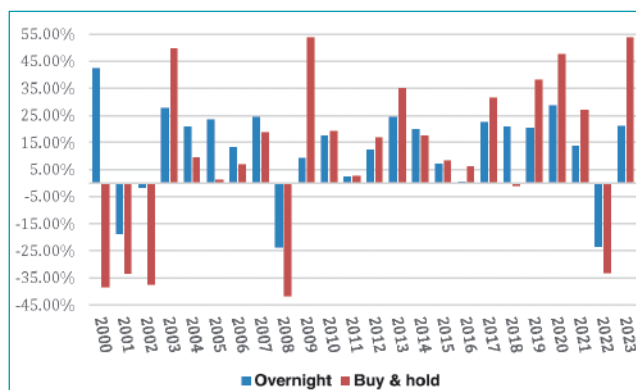


FIGURE 1: OVERNIGHT TRADING STRATEGY VS. BUY & HOLD. Here you see annual returns of QQQ from both the overnight and buy & hold strategies. The overnight strategy consistently outperformed buy & hold in terms of annual returns throughout the entire period (2000–2023).

Year	Jan	Feb	May-Oct	Annual%
2000	5.1%	7.5%	24.0%	42.3%
2001	-4.9%	-7.1%	-24.4%	-18.9%
2002	8.2%	3.0%	-6.4%	-1.7%
2003	-0.6%	2.4%	16.8%	27.6%
2004	3.1%	3.3%	2.0%	20.8%
2005	4.5%	-1.5%	4.6%	23.5%
2006	1.7%	-2.2%	7.6%	13.3%
2007	0.7%	0.4%	12.5%	24.5%
2008	-8.3%	0.2%	-18.9%	-23.8%
2009	-3.0%	-6.8%	10.4%	9.2%
2010	1.5%	-0.4%	6.0%	17.3%
2011	1.1%	-0.9%	-2.9%	2.2%
2012	4.5%	1.4%	3.1%	12.4%
2013	1.6%	2.1%	13.4%	24.4%
2014	0.0%	3.0%	6.7%	19.7%
2015	3.0%	0.7%	1.5%	7.2%
2016	-2.0%	-2.1%	5.1%	0.4%
2017	2.4%	0.4%	10.5%	22.6%
2018	3.7%	3.6%	3.3%	20.8%
2019	-0.1%	0.9%	10.2%	20.3%
2020	1.6%	-3.6%	21.1%	28.7%
2021	1.6%	-1.2%	3.0%	13.5%
2022	-2.6%	-5.4%	-20.5%	-23.5%
2023	0.6%	-3.1%	11.6%	21.0%

FIGURE 2: JANUARY BAROMETER. This looks at whether the seasonal pattern known as the January effect tends to appear in the monthly and yearly performance of the overnight strategy.

Is there a way to enhance the strategy? Exploring avenues to refine the overnight strategy may involve considering adjustments in response to historical downturns. Wall Street wisdom, which encompasses a wealth of market knowledge and strategies, could potentially offer in-

sights to fortify the overnight approach against periods of heightened market volatility. One common wisdom is the so-called January barometer. The idea is that the direction of the market in January sets the tone for the rest of the year. If the market performs well in January, it is believed to bode well for the entire year, and if it performs poorly, it may signal a challenging year.

Examining the monthly performance of the overnight strategy in Figure 2 reveals a noteworthy correlation between January's performance and the strategy's overall annual performance. For instance, in 2001, the overnight strategy experienced a -4.9% loss in January, corresponding to its -18.9% loss for the entire year. Similarly, in 2008, with an -8.3% decline in January, the strategy recorded a -23.8% loss for the entire year. This pattern is evident again in 2022.

Upon closer examination, it becomes evident that January's performance often serves as an indicator of February's trends. Noteworthy is the substantial impact of January's results on the subsequent performance observed from May to October. This alignment coincides with the Wall Street adage of "sell in May and go away." This market saying advises investors to divest their stocks in May and stay out of the market until November. The rationale behind this adage lies in the historical tendency of stock markets to display weaker performance during the summer months, notably from May to October.

THE OVERNIGHT STRATEGY UTILIZING THE JANUARY BAROMETER

Based on the aforementioned observations, a modified overnight strategy was devised. In this adjusted approach, rather than executing a long buy position at each day's close from January to December, a conditional short sell is introduced for the months of February and May to October. Specifically, if January's performance registers a decline exceeding 2%, the subsequent trading strategy involves a short sell position for QQQ during both February and the May to October period.

Upon incorporating short selling based on the January barometer, the overnight strategy transformed the loss years of 2001, 2008, and 2022 into positive returns, as il-

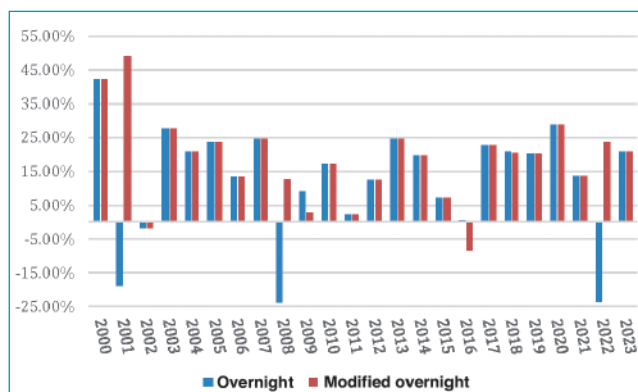


FIGURE 3: ANNUAL RETURNS FOR OVERNIGHT STRATEGY VS. MODIFIED OVERNIGHT STRATEGY. After incorporating short selling into the strategy based on the January barometer, the overnight strategy transformed the loss years of 2001, 2008, and 2022 into positive returns.

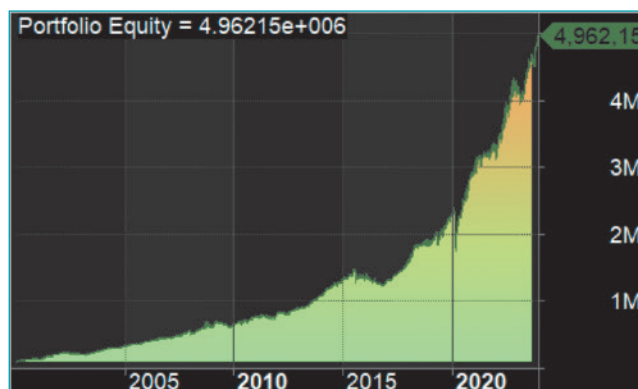


FIGURE 4: EQUITY CURVE FOR MODIFIED OVERNIGHT STRATEGY, 2000-2023. Modifying the overnight strategy to incorporate short selling based on the January barometer made a marked improvement in the equity curve, an increase of nearly 50 fold (not including any commissions, fees, or slippage).

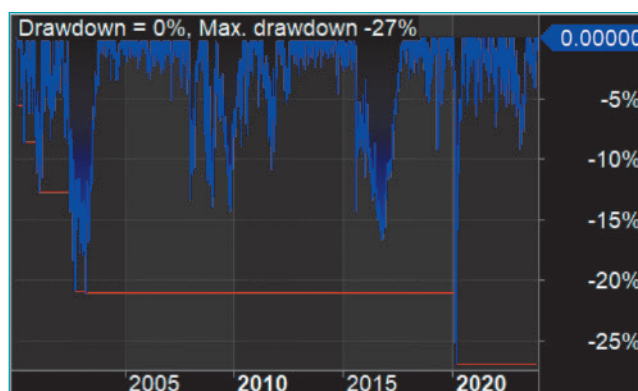


FIGURE 5: RISK PROFILE FOR THE MODIFIED OVERNIGHT STRATEGY, 2000-2023. The risk profile of the modified strategy is generally moderate. It exhibits elevated riskiness during market crises such as those in 2001, 2008, 2020, and 2022.

lustrated in Figure 3. The compounded annualized return saw a notable improvement from 11.4% to 17.6%, while volatility decreased from 16.6% to 12.8%. Importantly,

Investing in these stocks overnight resulted in a twofold return compared to the market, with only a third of the market beta.

Continued on page 15

S&C DIGITAL EDITION

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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

SPECULATORS

Some commodity producers blame speculators for their problems. Is this a valid perspective?

All perspectives, when based on experience, are valid. However, humans often perceive the world through tainted glasses. We naturally assume that the world, or the market itself, is causing us pain; we often fail to recognize that the decisions made or ignored allowed the circumstances to be detrimental. The same can be said of speculators. Anyone who has participated in financial or commodity markets as an investor or speculator knows the feelings of despair that come with being on the wrong side of a trend. It is easy to blame the market for our hardships, but we made a series of decisions or became complacent to open the door when misery knocked on it. Nothing market participants do can change the outcome of an event, but every market participant has at least some control over their destiny.

Being a commodity producer is a challenging endeavor. I grew up in an “oil” family; my dad and his brother owned a contracting company that worked for large operators such as Unocal 76 and Encana to keep oil and gas rigs running through treacherous weather and to clean up the inevitable human error and its toll on efficiency (and that sometimes even threatened the lives of oil field workers). Our

household prospered and struggled with the price of oil, which caused my parents a lot of stress.

The feast-and-famine nature of commodity markets can't be controlled, but it should be embraced. Without fail, we know that brutal bear markets will eventually meet commodity rallies and vice versa. We've yet to see a commodity hold a massive rally or remain in a trough forever. With this habitual pattern in mind, those with exposure to com-

Nothing market participants do can change the outcome of an event, but every market participant has at least some control over their destiny.

modity prices or those looking to gain exposure to such via speculative activities should behave accordingly. This is obviously easier said than done, but recognizing and embracing reality is the first step toward beating the odds.

I will admit that speculators can profoundly impact prices in the short run, but the math has to make sense for producers and consumers in the long run. Otherwise, one side of the equation will adjust its behavior to accommodate the new

pricing until the market normalizes. Speculators can sometimes enable price exaggeration in otherwise civilized and logical markets. These exaggerations can, and do, occur in both directions. Thus, the added volatility has the ability to create both misery and opportunity.

On the other hand, removing speculators from the equation entirely isn't as attractive as it might sound. Without speculators, producers and end users will have fewer opportunities to hedge their price risk; further, those price hedges will be far less efficient. A good example of this playing out in real time was the lumber market from 2020 to 2022. Government-mandated COVID shutdowns collapsed most asset prices, including lumber; the subsequent reopening of economies around the world triggered volatility from pent-up demand and stressed supply chains. As a result of fundamental chaos and a lack of market liquidity, lumber futures ping-ponged between about \$500 and \$1700 for almost two years. Of course, the volatility brought would-be hedgers out of the “woodwork” (pun intended), but we often had to let them know the reality of lumber futures and options. There isn't enough trading in the contracts to make them a viable hedging option, particularly after

Continued on page 44

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

DON'T IGNORE EXTREMES

While browsing YouTube, I heard a lot about optimizing years of market data and I don't understand why it takes years if the dot-com bubble or Covid won't happen again. No extreme event happens twice. What's the point of optimizing a strategy for something that happened 10 years ago and won't happen again?

Yes, you are definitely right—many events happen once, only to never happen again (at least let's hope not with things like Covid). And every event is different anyhow. So that would lend credence to your argument: "why test during that event, if it will not happen again?"

Taking that logic a bit further, this line of thinking implies that whatever happened yesterday, last week, last month—or whatever time period—also will never happen again exactly as it did.

So if you are saying that system testing on data from any given market crisis is not worthwhile because that particular crisis will never happen again, I'd argue that along those same lines, testing over the last month would not be worthwhile either, because the last month will never be repeated exactly the same way either.

And then that means no backtesting at all would take place! Given how most people incorrectly

backtest anyhow, it may not be that bad of an idea for some amateur algo traders to forgo backtesting... but I digress.

Let's put it all together:

1. Special events of the past will never be repeated exactly
2. Normal and typical events of the past will never be repeated exactly.

With that in mind, why backtest at all?

Future events will be different than the past events, but might sort of mimic those past events (normal or abnormal).

It turns out that points 1 and 2 are definitely true, and identical events will likely not happen, but these events will have brothers, sisters and cousins. Meaning, future

events will be different than the past events, but might sort of mimic those past events (normal or abnormal). They'll resemble the past, just like siblings might resemble you, but are not exactly the same. Backtesting then gives us a chance to see how our strategy holds up against these non-repeating events. If the trading strategy is flexible enough to handle those past events, it might be robust enough to handle future unpredictable events.

I'll give you an example. For 10 to 15 years, until January 2022, US interest rates went down. That means the US bond/note market was in an unprecedented bull market. So if you decided to build a strategy for US bond/note futures, you might say, "hey, the market has only gone up these past 10–15 years, so I will only take long trades." That worked until 2022, when you would have gotten slaughtered with a long-only model.

I took a different approach, thinking "sooner or later interest rates will go up, so my model should take short bonds/notes trades, too." I built my model with that in mind, making it flexible enough to work well both long and short. I tested up until 2022 with events I knew happened (the bull market) and events



FIGURE 1: INTEREST RATE STRATEGY JANUARY 2022 UNTIL PRESENT

Continued on page 44

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

THE PUT/CALL RATIO FOR MARKET BREADTH AND SENTIMENT

In my recent article in this magazine, I discussed using the bullish percent index as a way to look under the hood of the market and determine bearish or bullish sentiment. Because that indicator uses point & figure charts to derive signals, some people may find it less accessible.

Here, I'll look at using another sentiment indicator: the Cboe put/call ratio. This ratio measures the number of puts versus the number of calls trading on the Cboe. The ratio is derived and read easily. When the ratio is above 1, it means more puts are being traded than call options, indicating that sentiment has turned bearish. Conversely, when the ratio is below 1, it means more call options are trading relative to put options and sentiment is more bullish.

The Cboe Options Exchange is the largest options exchange in the U.S., which is why using trading data derived from it has been found useful in gauging market sentiment. Options are derivative products that track the performance of an underlying security. Puts are often bought to provide insurance against the decline of the underlying security. With large open positions, institutional traders will often buy puts to provide some near time protection against the likelihood of a market correction or crash. Puts are also bought for pure speculation; traders will buy them simply to gain

on reactions and reversals. Calls are bought by traders to bet on price increases. It is the number of traders willing to buy calls as opposed to puts that make this sentiment indicator so useful.

There is another layer we must consider to truly understand how valuable this indicator can be. The Cboe indicators break down options into three groups; index, equity, and

the two combined.

Index options (which are used for the Cboe index put/call ratio) track the performance of indexes like the S&P 500, the Dow Jones Industrial Average, the Russell 2000, NASDAQ, and others. Index options are often associated with institutional traders who are making directional bets or hedging their positions.

Equity options (which are used for the Cboe equity put/call ratio) track the performance of an individual stock. These options are usually bought by retail traders to hedge or more often to make directional bets.

It is the number of traders willing to buy calls as opposed to puts that make this sentiment indicator so useful.

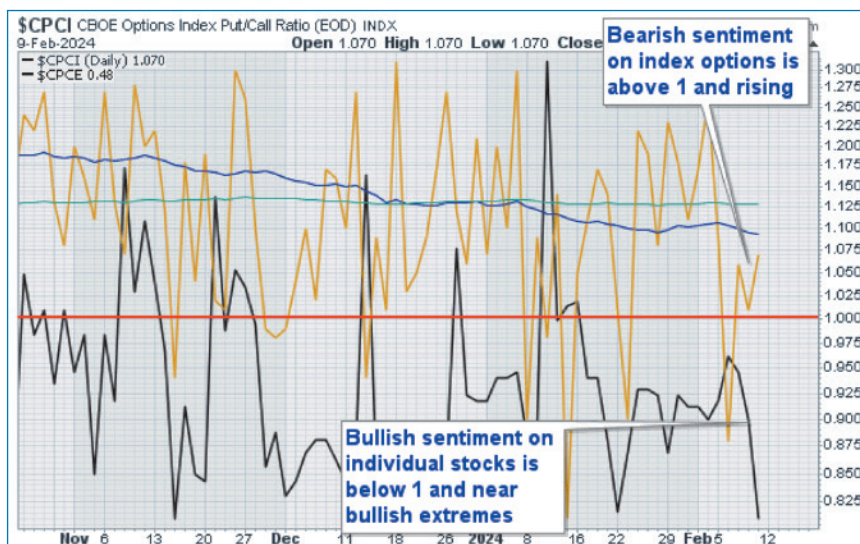


FIGURE 1: INDEX & EQUITY OPTIONS RATIOS. Here, the Cboe index put/call ratio is plotted as the gold line, while the Cboe equity put/call ratio is plotted as the black line. The plots are very different, suggesting that index options are used differently in the markets than equity options are.

Cboe also offers an indicator that combines both index and equity option numbers to create a put/call ratio: the *Cboe total put/call ratio*. This ratio offers an overall assessment of market sentiment.

INTERPRETATION

Figure 1 superimposes the index option ratio and equity option ratio on a single chart for easy comparison. The gold plot line represents index options while the black plot line represents equity options. A quick glance at the chart will show that the ratios are performing very differently, which is why it is so useful to split the numbers. At market extremes, professional traders will often act differently than retail traders.

To interpret the readings on the chart, remember that the important number is 1. Everything happens above or below 1. When the reading is above 1, it means that put volume has exceeded call volume. More traders are buying puts than calls. Since puts are often used to hedge positions as well as make directional bets, this can be read as a bearish sign. The sentiment is that traders are anticipating a market decline. The reverse is true with a reading under 1. Fewer puts relative to calls are being bought when the reading drops below 1. Market participants are expecting further price rises, which means sentiment is bullish.

With an understanding of how to interpret the numbers, now take a look at Figure 1 again. The gold line, which measures Cboe index options, is above 1 at 1.070. Professional traders are becoming bearish. Though the reading is not at extremes, anything above 1 is still concerning. It should at least give you pause. What is it that these professionals know? Why are they becoming bearish as the indexes notch new all-time highs?

Now look at the black plot line in

Figure 1. What is it telling us? Recall that the black plot line depicts the Cboe equity put/call options. Equity options are often associated with retail or nonprofessional traders. The black plot line shows that the ratio is below 1, in fact, it is at 0.814, or as you can see on the chart, it is at extremes. The interpretation here is that retail traders are excessively bullish, possibly encouraged by news of the market making new all-time highs. Retail traders are expecting continuing price rises and are excessively optimistic. This stands in direct opposition to the expectation of the professionals.

As with other sentiment indicators, the Cboe put/call ratio is a contrarian indicator. When there is excessive pessimism or bearishness, it is wise to position yourself for a bullish reversal. And vice versa, when there is excessive optimism or bullishness, it is wise to position yourself for a market decline.

Then there is the *Cboe total put/call ratio*, shown in Figure 2. This combined indicator looks at *both* the equity and index options traded

At market extremes, professional traders will often act differently than retail traders.

on the Cboe. You can see in Figure 2 that this ratio seems to confirm what the professional traders are thinking—that there is too much bullish sentiment, which makes the market ripe for a bearish reversal. The red horizontal line is drawn to highlight the all-important number 1. The red arrows on the chart mark previous bullish extremes. At the far right side of this chart, we are at the level of the last extreme and look set to exceed it.

What does this mean for us as traders? It means it is wise to proceed with caution. It may not be a good time to open up new long positions. It means we should watch carefully what happens next to determine what the market does going forward. Sentiment indicators like these are not there to scare or terrify you into

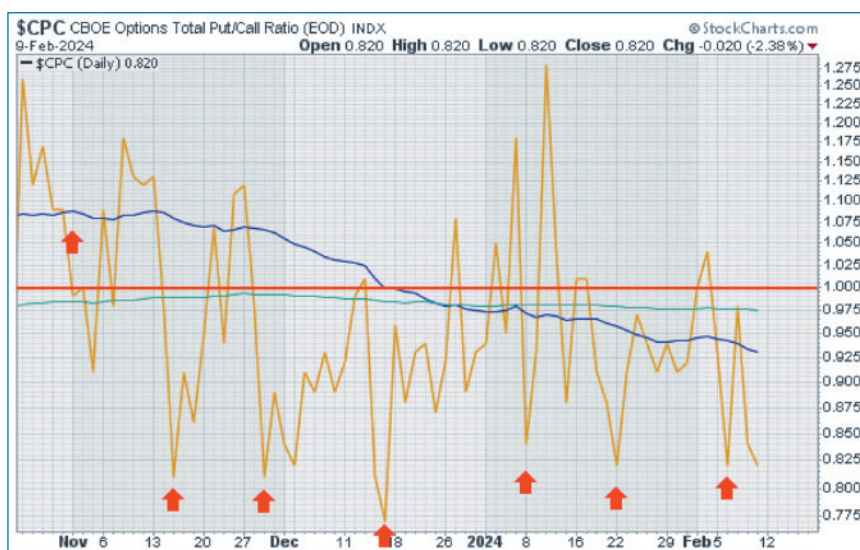


FIGURE 2: TOTAL PUT/CALL RATIO. Unlike Figure 1, which plots the index option and equity option ratios separately, this chart plots the Cboe total put/call ratio, which combines equity and index options information into a single number. The red horizontal line highlights the level of 1, which is considered an important level for the ratio. Red arrows mark previous bullish extremes. At the far right of the chart, we are at the level of the last extreme—will that last extreme level be exceeded? Traders will watch this level carefully.

Sentiment indicators like these are not there to scare or terrify you into selling everything and going to cash.

selling everything and going to cash. They are simply there to alert you to pull back from excessive optimism if applicable and to allow you to make more cautious decisions going forward. One such decision might be to not buy at market extremes.

Figure 3 is the same chart as Figure 2 but this time with the S&P 500 index superimposed on the Cboe total put/call ratio. The S&P 500 index is the green line rising to the right. We can see from the low Cboe total put/call

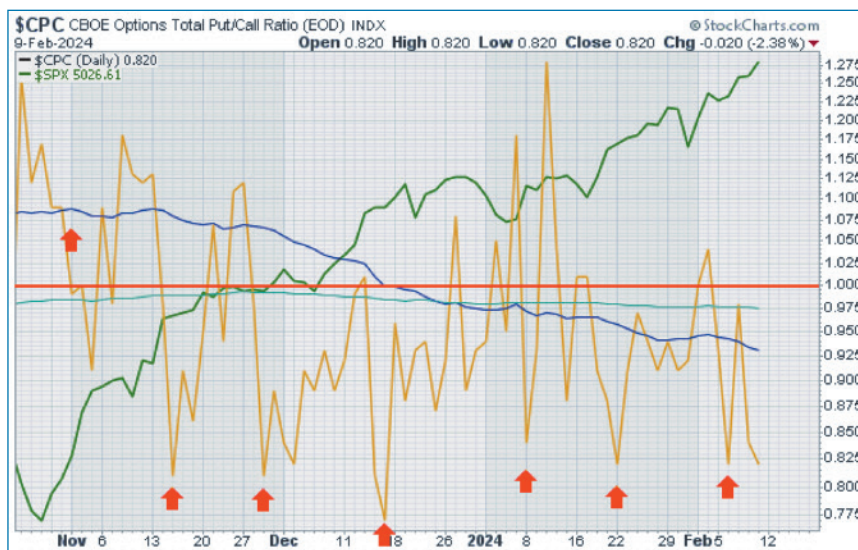


FIGURE 3: TOTAL PUT/CALL RATIO WITH S&P 500. The Cboe total put/call ratio is plotted with the S&P 500 index (green line). The S&P 500 index rose to new all-time highs of over 5,000 on February 9, 2024. Low Cboe put/call ratio readings suggest excessive bullish sentiment in the market at that point.

ratio readings that there is excessive bullish sentiment in the market as the index itself rises to new all-time highs,

surpassing 5,000 on February 9, 2024 for the first time in its history.

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Futures For You

GARNER

Continued from page 40

the fact. Unfortunately, producers and end-users attempting to protect themselves from price volatility after it had arrived might have discovered that hedging their price risk would cause more harm than not hedging at all (cash market speculating).

In summary, we all know the nature of commodity markets. As consumers, producers, or speculators, we must try to buck human nature and attempt to use volatility to our advantage. Of course, this is easier said than done, but the goal should be to keep greed and complacency at bay when prices are favorable so we can be aggressive rather than play defense

The feast-and-famine nature of commodity markets can't be controlled, but it should be embraced.

when prices are unfavorable.

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Algo Q&A

DAVEY

Continued from page 41

that did not happen (prolonged bear market), precisely because I knew the future was going to be different than the past.

Looking at January 2022 until today, Figure 1 shows what one of my interest rate strategies did after development—pretty nice!

My strategy was robust enough to perform well—long and short—even though it was developed on a decidedly bull market.

The lesson here is that a good strategy can handle past history without being destroyed, and when built correctly, the results should give you confidence that the strategy can handle future unknown events.

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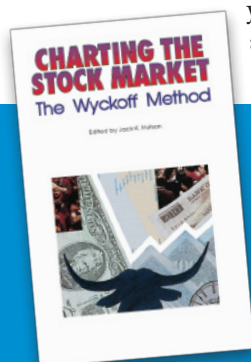
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The focus of Traders' Tips this month is John Ehlers' article in this issue, "The Ultimate Smoother." Here, we present the April 2024 Traders' Tips code with possible implementations in various software.

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

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

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



◆ TRADESTATION: APRIL 2024 TRADERS' TIPS CODE

In his article in this issue, "The Ultimate Smoother," John Ehlers introduces an enhanced smoother, termed the UltimateSmoother, as an evolution of his previously developed SuperSmoother. The UltimateSmoother is not limited to price data and can be applied to other indicators.

The \$UltimateSmoother function and accompanying indicator are provided here. The UltimateSmoother example filter from Ehlers' article has been slightly modified here to accept a user-defined price as an input.

Function: \$UltimateSmoother

```
{
  TASC APR 2024
  UltimateSmoother Function
  (C) 2004-2024 John F. Ehlers
}
```

inputs:

```
Price( numericseries ),
Period( numericinteger );
```

variables:

```
a1( 0 ),
b1( 0 ),
c1( 0 ),
c2( 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;

Indicator: Ultimate Smoother

```
{
  TASC APR 2024
  UltimateSmoother
  (C) 2004-2024 John F. Ehlers
}
```

inputs:

```
Period( 20 ),
Price( Close );
```

variables:

```
US( 0 );
```

```
US = $UltimateSmoother(Price, Period);
Plot1(US, "US");
```

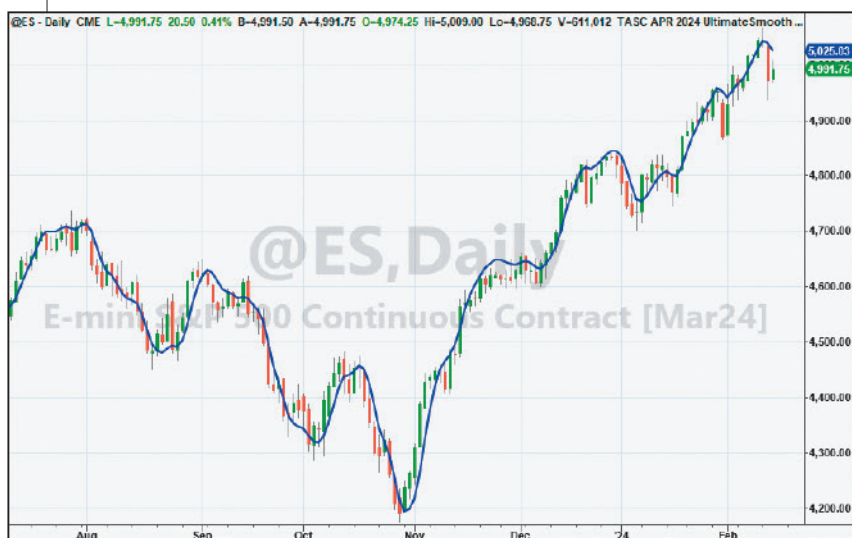


FIGURE 1: TRADESTATION. This TradeStation daily chart of the continuous emini S&P 500 futures contract displays a segment from 2023 and 2024 with the UltimateSmoother applied.

A sample chart is shown in Figure 1.

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

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



To demonstrate how easy it is to verify whether a concept of a trading idea works or not, we can construct a quick-and-dirty system using Wealth-Lab's Building Blocks. Knowing that the UltimateSmoother runs circles around its same-period counterpart, we'll take their bullish and bearish crossovers as entry points for trades. Drag and drop two crossover rules onto the design surface and we're ready:

- **Entry.** UltimateSmoother (Close,20) crosses above the 20-period EMA
- **Exit.** UltimateSmoother (Close,20) crosses under the 20-period EMA

Freeing our time for something more creative than coding, we sketched a trading system in a few clicks of the mouse. Figure 3 shows characteristic trades in recent uptrends and market corrections. As always, any trading idea should be scrutinized with out-of-sample backtesting and walk-forward optimization.

—Gene Geren (Eugene)
Wealth-Lab team
www.wealth-lab.com



◆ **NINJATRADER: APRIL 2024 TRADERS' TIPS CODE**

NinjaTrader 8: www.ninjatrader.com/SC/APRIL2024SCNT8.zip

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 chart displaying the indicator is shown in Figure 4.

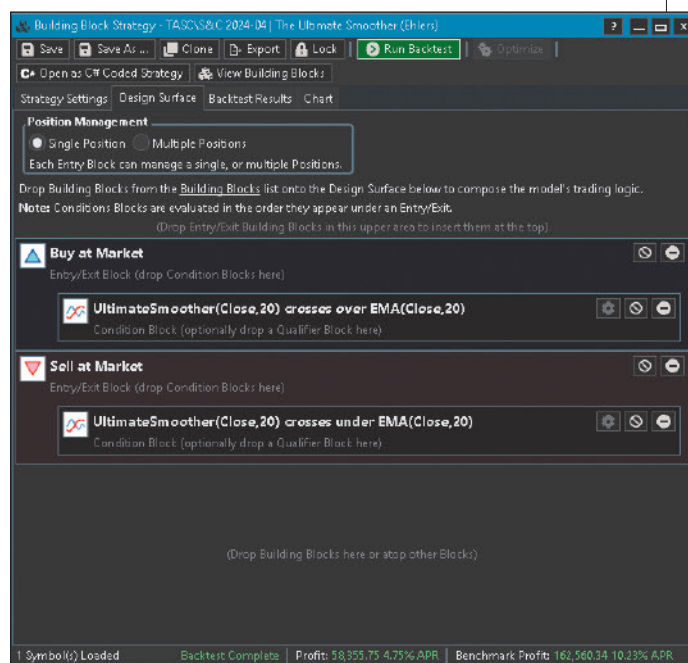


FIGURE 2: WEALTH-LAB. This demonstrates prototyping a trading system in Wealth-Lab 8 using its Building Blocks feature.



FIGURE 3: WEALTH-LAB. Trade signals given by the example trading system based on the UltimateSmoother are applied here to a daily chart of ES=F (emini S&P 500 continuous futures contract). Data provided by Yahoo! Finance.



FIGURE 4: NINJATRADER. This chart demonstrates the UltimateSmoother on a chart of the continuous emini S&P 500 futures contract.



FIGURE 12: EXCEL. When the high-pass and band-pass are plotted on the same chart, the chart gets hard to read. As a solution, a “tall chart” option has been custom-added to the spreadsheet as an easy-to-use button you can click to spread out the chart vertically. Alternatively, you can use the button on the right to select to show *only* the band-pass filter in order to zero in on the band-pass.



FIGURE 13: EXCEL. Here, the SuperSmoother (red line) and UltimateSmoother (blue line) are both plotted on a daily chart of Antero Resources Corp. (AR) for comparison. You can see the improved lag and signal fidelity of the UltimateSmoother compared with the SuperSmoother.

dard alpha value calculation of 3 over length.

That led me make the *alpha numerator* into a user control value (cell F17) that we can play with. (It can be quite interesting to see what changing the numerator of *alpha* does to the EMA plot...) See Figure 10, which compares the Ehlers SuperSmoother with an EMA using a custom alpha defined as “3 / length.”

Next, Ehlers walks us through the lag problem inherent in low-pass filters and offers the alternative of subtracting high-pass filters, with their inherent minimal lag, from our input, thus leaving as a residue our low-pass signal with the same minimal lag as the high-pass filter.

First, I’ll show the high-pass output (Figure 11), which tends to reflect our frequent stepwise close differences without the longer trending implications.

Ehlers refines the output of the high-pass filter with his SuperSmoother to create his band-pass result.

When high-pass and band-pass are plotted on the same chart, as in Figure 12, things get a little messy. To spread things out a bit vertically, I added the “tall chart” option button. Or you may zero in on the band-pass by way of the “band-pass-only” button to the right of the charts.

In Figure 13, we can see the improved lag and signal fidelity of the UltimateSmoother compared with the Super-

—Ron McAllister
Excel and VBA programmer
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FIGURE 7: RISK CURVES FOR THE EXAMPLE COVERED CALL TRADE. Here you see the risk curves for the trade from Figure 6. The risk curves show the expected profit/loss (P/L) for the option position based on the price of the underlying shares as of four different dates leading up to option expiration.



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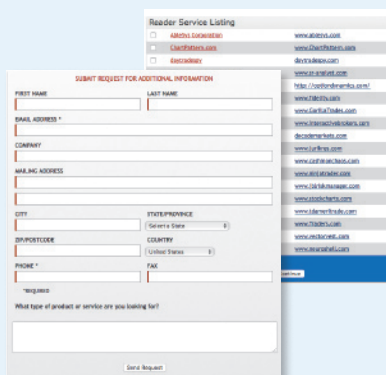
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FUTURES LIQUIDITY

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

COMMODITY FUTURES

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

This liquidity ranking is produced by multiplying contract point value times the maximum conceivable price motion (based on the past three years' historical data) times the contract's open interest times a factor (usually 1 to 4) for low or

very high volumes. The greatest number of dots indicates the greatest activity; futures with one or no dots show little activity and are therefore less desirable for speculators.

Courtesy of CBOT



All futures listed are weighted equally under "contracts to trade for equal dollar profit." This is done by multiplying contract value times the maximum possible change in price observed in the last

three-year period. Thus, all numbers in this column have an equal dollar value.

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

STOCKS

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

Trading Liquidity: Futures

Commodity Futures	Exchange	% Margin	Effective % Margin	Contracts to Trade for Equal Dollar Profit	Relative Contract Liquidity
S&P 500 E-Mini (Mar '24)	CME	5.1	16.3	3	>>>
10-Year T-Note (Mar '24)	CBOT	2.1	9	9	>>>
5-Year T-Note (Mar '24)	CBOT	1.4	8.2	13	>>>
Ultra T-Bond (Mar '24)	CBOT	5.7	8.6	3	>>>
Ultra 10-Year T-Note (Mar '24)	CBOT	2.9	8.6	6	>>>
2-Year T-Note (Mar '24)	CBOT	0.6	7.3	14	>>>
30-Year T-Bond (Mar '24)	CBOT	3.9	9.4	5	>>>
Soybean Meal (May '24)	CBOT	1.1	1.7	2	>>>
Nasdaq 100 E-Mini (Mar '24)	CME	5.4	12.9	2	>>>
Soybean (May '24)	CBOT	2.3	4.2	4	>>>
Corn (May '24)	CBOT	6.8	7	12	>>>
Natural Gas (Apr '24)	NYMEX	33.4	7.4	3	>>>
Russell 2000 E-Mini (Mar '24)	CME	3.5	16	5	>>>
Crude Oil WTI (Apr '24)	NYMEX	9.3	13.9	5	>>>
Gold (Apr '24)	COMEX	4.5	21.7	6	>>>
30-Day Fed Funds (Feb '24)	CBOT	0.1	1.3	11	>>>
3-Month SOFR (Dec '24)	CME	0.1	2.9	21	>>>
Euro FX (Mar '24)	CME	1.7	12.8	13	>>>
Wheat (May '24)	CBOT	8.9	6.1	6	>>>
ULSD NY Harbor (Apr '24)	NYMEX	8.4	8.9	2	>>>
Gasoline RBOB (Apr '24)	NYMEX	8.1	11.7	3	>>>
Cocoa (May '24)	ICE/US	8.2	13	7	>>>
Cotton #2 (May '24)	ICE/US	7	10.4	8	>>>
Dow Futures Mini (Mar '24)	CBOT	4.7	17.7	5	>>>
Hard Red Wheat (May '24)	KCBT	8.5	6	6	>>>
Live Cattle (Apr '24)	CME	3.6	9	8	>>>
Sugar #11 (May '24)	ICE/US	8.9	26.4	29	>>>
Canola (May '24)	ICE/CA	6.2	5.6	19	>>>
Coffee (May '24)	ICE/US	9.6	22.8	8	>>>
Nasdaq 100 Micro (Mar '24)	CME	5.4	12.9	16	>>>
S&P 500 VIX (Mar '24)	CFE	45.3	31.4	11	>>>
Australian Dollar (Mar '24)	CME	2.4	12	18	>>>
British Pound (Mar '24)	CME	2.6	14.8	17	>>>
Palladium (Mar '24)	NYMEX	16.5	6.6	1	>>>
S&P Midcap E-Mini (Mar '24)	CME	5.8	24.7	4	>>>
Canadian Dollar (Mar '24)	CME	1.5	12	26	>>>
High Grade Copper (Mar '24)	COMEX	4.5	15.7	9	>>>
Lean Hogs (Apr '24)	CME	4.7	11.6	17	>>>
Mexican Peso (Mar '24)	CME	4.9	21.6	36	>>>
Platinum (Apr '24)	NYMEX	6.8	16.4	13	>>>
S&P 500 Micro (Mar '24)	CME	5.1	16.3	30	>>>
Silver (Mar '24)	COMEX	8.7	33.2	8	>>>

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).

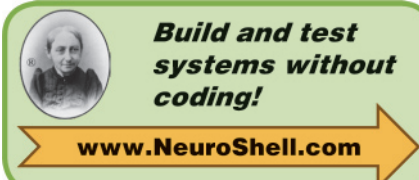
"Relative Contract Liquidity" places commodities in descending order according to how easily all of their contracts can be traded. Commodities at the top of the list are easiest to buy and sell; commodities at the bottom of the list are the most difficult. "Relative Contract Liquidity" is the number 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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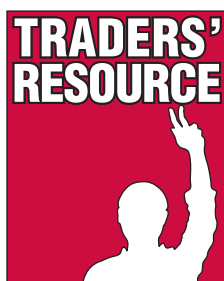
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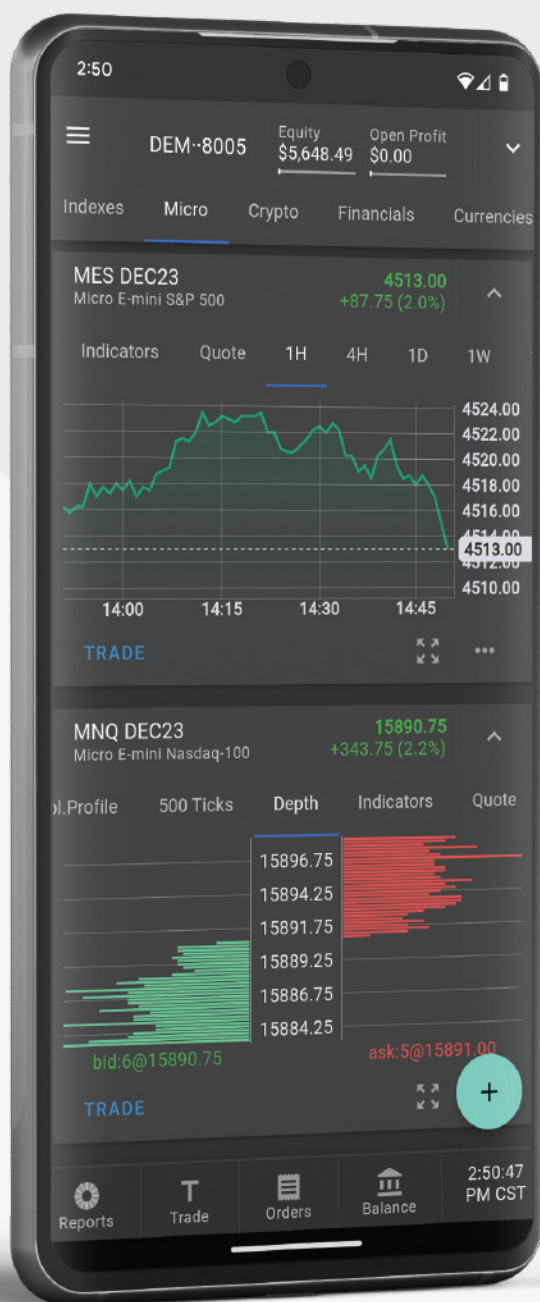
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