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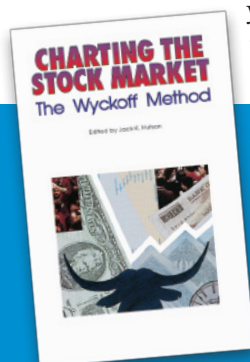


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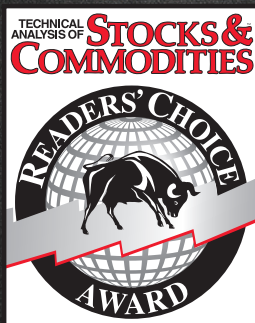


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editor@traders.com

Editor in Chief Jack K. Hutson

Production Manager Karen E. Wasserman

Graphic Designer Wayne Shaw

Webmaster Han J. Kim

Contributing Editors John Ehlers,
Anthony W. Warren, PhD.

Contributing Writers Thomas Bulkowski, Martin
Pring, Barbara Star, Markos Katsanos, Leslie N.
Masonson

OFFICE OF THE PUBLISHER

Publisher Jack K. Hutson

Industrial Engineer Jason K. Hutson

Project Engineer Sean M. Moore

ADVERTISING SALES

4757 California Ave. S.W.

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National Sales Manager Edward W. Schramm
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CIRCULATION

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1 206 938-0570 Fax 1 206 938-1307

circ@traders.com

Subscription Manager Sean M. Moore

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http://www.traders.com

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The Savvy Technician

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

REVERSAL OR REACTION: WHICH IS IT?

Why is chart reading so difficult? Because try as we might, we simply can't predict the future. We can anticipate it and react to it, but we cannot predict it. Our tools are useful in helping us manage risk but they are the map and not the territory. Being

able to allow the markets to make their moves without feeling the need to force our will on it and also being able to respond to market moves in an intelligent manner is the best that we can aim for.

When markets are clearly trending, especially upwards and when most stocks are carried along with it,

it's easy to become complacent, to imagine that we possess powers that are unique to us. And that our power of chart reading or anticipating the future direction of the market is equal to none. It is when the trend changes, when the market becomes choppy and is no longer predictable that we need to understand that our earlier beliefs in imaginary skills were just that.

With that in mind, let's discuss some recent price action in the S&P 500 (SPX, see Figure 1). The several months from 2023 shown in the chart were not the easiest to trade. From the high on July 27, 2023 of 4,607.07, price retreated and made a series of lower highs and lower lows. At the close on Friday, October 20, 2023 the index was at 4,224.16 after completing the bearish three black crows candlestick pattern (bearish candles with long bodies with closes on three consecutive days at or near the low). That brings total losses from the July 27th high to 384, or 8.3% of the index.

So is this the beginning of a reversal, or simply a reaction?



FIGURE 1: BEARISH PRICE ACTION IN THE S&P 500 (SPX). The type of price action seen here is not easy to trade. From the high on July 27, 2023, price retreated and made a series of lower highs and lower lows. In October 2023 you can see a bearish three black crows candlestick pattern.

Our tools are useful in helping us manage risk but they are the map and not the territory.

The best way to approach the markets is to allow the patterns to complete their formations before reacting to them.

REVERSAL UNDERWAY, OR SIMPLY A REACTION?

The answer to this question is important because it tells us how to position trades going forward. Should we buy the dips and position ourselves to stay long in the market in anticipation of the market breaking out to new highs once the correction is over? To attempt to answer this question, it is best that we step back and look at price action over a longer period of time.

Figure 2 shows two years of price action. On December 29, 2021, the SPX closed at 4,793.54, which was near its high. It then proceeded to fall over the next six months. In mid-June 2023, price found support and formed what would be the first “V” in a W-shaped reversal. The next reaction took the SPX up to a high of 4,325 on August 16, 2023. Price touched the 200-day moving average, found resistance, and proceeded to fall again, forming the second “V” of the W-shaped reversal.

The reversal was completed when price formed the W-shaped pattern and price proceeded to make a series of higher highs and higher lows interspersed with normal reactions. Staying long made sense. Then we get to July 27, 2023. We can see from Figure 1 that price met resistance and proceeded to make a series of lower lows and lower highs. Stepping back from the short-term price chart in Figure 1 to the longer-term chart in Figure 2, we can see the reaction



FIGURE 2: REVERSALS AND REACTIONS. It is best to allow patterns to complete their formations before reacting to them. This two-year chart of the SPX steps back and takes a longer-term view than Figure 1.

was steep and closed below the 200-day moving average, which may no longer act as support. At the right of the chart, price is bounded between the two green lines to form a flag (Figure 2). As we know, flags are continuation patterns. So the price action that preceded the formation of the pattern should continue when price leaves the pattern. Will that happen in this instance? Maybe. If that happens, then we are looking at a reaction instead of a reversal, as ugly as it has been.

HINDSIGHT IS 2020

All chart patterns can fail. All chart patterns can resolve in unexpected ways. The best way to approach the markets is to allow the patterns to complete their formations before reacting to them. In the example il-

lustrated here, we should wait for the breakout of the flag formation. If it breaks out to the downside, then the pattern has failed. If it breaks out to the upside, then it is possible that it will return to test the upper trendline of the channel. There is then another opportunity for the flag to fail or to enter the channel and then reverse to the upside. But if price breaks out of the flag to the upside and only returns to test the upper channel line before making higher highs and higher lows, then those who recognized the flag might congratulate themselves on their brilliance in predicting the future. But that is dangerous because it is a failure to recognize that the charts we are reading are not the markets but the map. It shows the territory but it does not create it.

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A Machine-Learning Model

Artificial Intelligence Applied To Technical Trading

Artificial intelligence tools can be used to classify trading sessions into patterns. The Python programming environment can be used to carry it out. Here, we'll lay out the concept.



Have you ever thought of a trading session as... a flower?"

The first time I proposed such a subject to my hedge fund managers, I saw them become confused. I'm sure some of them started mumbling and wondering if I had smoked or eaten some unusual flowers! Nonetheless, I was serious, and let me explain why.

Let's rewind to 1936 when a British scientist named Ronald Fisher developed an "algorithm" to recognize iris species based on a few numerical data features. The iris dataset is the "Hello world" of data science, meaning it is commonly used to practice basic machine learning (ML) algorithms. It comprises five columns: petal length, petal width, sepal length, sepal width, and species type. Researchers measured various features of different iris flowers and recorded them digitally. Fisher used four features, sepal length, sepal width, petal length, and petal width, to classify three iris species (named setosa, versicolor, and virginica).

So, my point was: What if we follow a similar research path and classify trading sessions into four species (or patterns), as shown in the example in Figure 1. Instead of petals and sepals, we could use technical indicator readings from previous sessions.

When experienced traders look at charts, unlike novices, they don't aim to predict the future. Instead, they try to recognize patterns they've observed in their experience. In more detail, they look for incomplete patterns so they can place a trade before

the pattern's completion.

Let's draw a comparison between the two worlds, flowers and trading. In Figure 2, you can compare the iris dataset to the trading dataset I am proposing. If you structure the trading dataset this way, the classification problem is exactly the same. It doesn't matter if you have to recognize a flower or a trading session. Moreover, it doesn't matter if the last column of the trading dataset is related to the future, as this

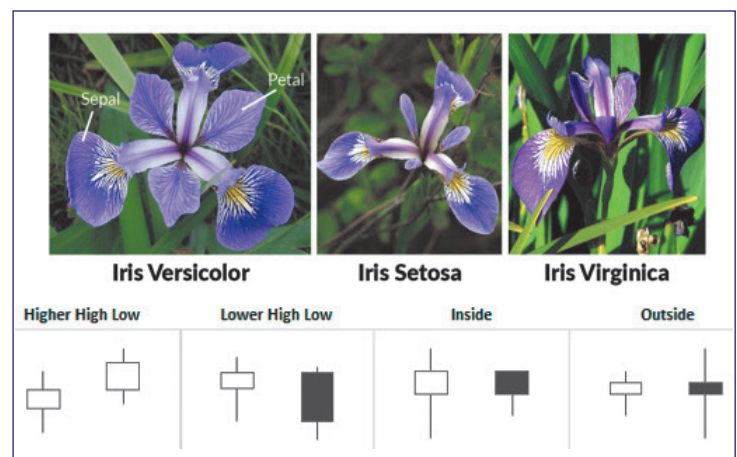


FIGURE 1: DATA CLASSIFICATION. Could trading sessions be classified into four patterns, similar to the way iris species were classified?

Iris Dataset					
id	Sepal Length (cm)	Sepal Width (cm)	Petal Length (cm)	Petal Width (cm)	Species
1	5.1	3.5	1.4	0.2	Iris Setosa
2	4.9	3	1.4	0.2	Iris Virginica
3	4.7	3.2	1.3	0.2	Iris Setosa

Trading Dataset Example					
day	Stochastic 14	Stochastic 28	Rsi 14	Macd 12,26,9 Histo>0	Next Session Pattern
1	70	60	60	Yes	Higher High/Lowr
2	30	50	50	No	Lower High/Low
3	50	55	60	No	Inside

FIGURE 2: DATASET STRUCTURING AND PATTERN RECOGNITION. Indicator readings could be classified similar to the way that iris species are classified. This way, the dataset is not analyzed as a time series.

by Domenico D'Errico

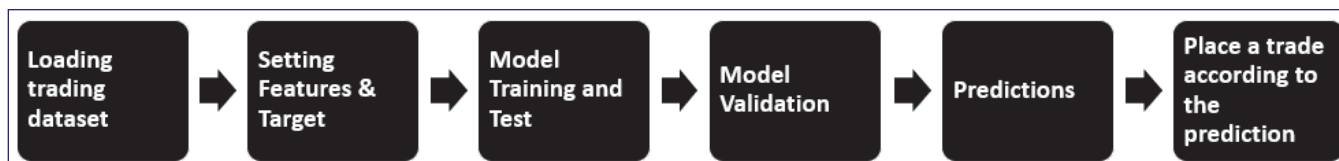


FIGURE 3: MACHINE LEARNING. Here you see the steps that the trading model, based on machine learning, needs to go through. The model's objective is to predict whether tomorrow's session will have a higher high/low day (model target).

approach is not time-based, and the trading dataset is *not* analyzed as a time series.

HOW THE AI MODEL WORKS

Let's delve into the details using some basic Python concepts. Traders who are not familiar with this language should know that most of the tools needed to apply machine learning models are built-in. You don't need to be a scientist to work with them. What you do need is a clear purpose, and as a trader, your purpose is to gain insight into the next bar's price movement.

I know many experienced traders who are not familiar with Python and have no time to learn it. However, believe me, it is easier for a trader to grasp some basic Python concepts than for a data scientist with no market experience to learn how to trade. Why? I hope not to offend any data scientists (many of whom are my friends) when I say that if you study programming, you can eventually learn any programming language. In contrast, if you study trading, there is no way to learn without real-life market practice. This requires time, money, and an incredible amount of psychological energy and motivation to persevere through the numerous failures traders encounter.

Now, let's focus on the market. In my experience as a quant developer for hedge funds, I closely collaborated with hundreds of experienced professional traders to build their customized trading tools. Many times, I heard phrases like, "When the price makes this movement, it is very likely for the next bar to do this or that." What are they doing? They are applying some kind of personal model they have developed over years of observation and trading. This is precisely how the machine learning model I am presenting works.

So, the model attempts to answer questions like:

- Can today's stochastic oscillator reading help predict if tomorrow will have a higher high/low pattern?
- Can today's RSI oscillator reading help predict if tomorrow will have a higher high/low pattern?
- Can today's MACD histogram above zero help predict if tomorrow will have a higher high/low pattern?

Generally speaking, traders use current indicators/oscillators readings to gain insights into the next bar's move. However, the exact relationship between technical indicators and the next bar's move is challenging to calculate because there is no clear linear function between them. Sometimes the indicator is up, and the price continues to rise, while other times the opposite occurs.

This is where Python comes into play. Everything we need is readily available in its libraries for traders to use. Let's see how to proceed.

In Figure 3, you can observe the different steps that our trading model, based on machine learning, needs to go through:

- 1. Loading data** (the easiest step): In this example, I loaded 20 years of daily bars of USDJPY from a CSV file exported from TradeStation.
- 2. Setting features and target** (the most crucial step for technical traders): For this article's purpose, I considered three standard technical indicators:
 - a. stochastic (14)
 - b. RSI (14)
 - c. MACD (12, 26, 9)

The model's objective is to predict whether tomorrow's session will have a higher high/low day (model target).

- 3. Model training and testing:** Python leveraged its ML libraries to analyze the first 12 years of USDJPY data (from 2000 to 2012) to find the best fit between the features and the model target. Then, Python applied the best model obtained to the next 10 years of out-of-sample data (from 2013 to 2023).
- 4. Scoring:** Python informs me whether all these efforts make any sense by calculating an accuracy score ranging from 0 to 1 and generating a *confusion matrix*.

This is where Python comes into play. Everything we need is readily available in its libraries for traders to use.

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Jupyter Notebook is an easy-to-use Python IDE (Integrated Development Environment) that is highly recommended for beginners. Jupyter Notebook (jupyter.org) is a web application for creating and sharing computational documents.

Shown here is an example of using Jupyter Notebook to access and use Python-based machine learning tools to test and train your model.

```
1 from sklearn.linear_model import LogisticRegression
2 my_model = LogisticRegression(max_iter=100)
3 my_model.fit(X_train,y_train)
4 y_pred=my_model.predict(X_test)
```

Following is an explanation of each of these steps:

5. Prediction: Python provides me with a prediction for tomorrow, answering the question: Is tomorrow likely to exhibit a higher high/low pattern? (yes or no)

6. Trading: To place a trade based on the prediction.

See the sidebar, “Python Development Using Jupyter Notebook,” for an example of using Jupyter Notebook, an Integrated Development Environment (IDE) for Python and other programming languages, to help you access and use Python-based machine learning tools to test and train your model and obtain predictions from it.

TECHNICAL INDICATORS AS FEATURES FOR THE MACHINE LEARNING MODEL

Let’s discuss the *feature* selection briefly. In machine learning models, it is very important that the data is normalized, meaning they are within a defined range, or that they are binary (0/1).

I used three very common technical indicators to build the model. I left the stochastic and RSI readings as they are (as they vary from 0 to 100 and are already normalized) and simplified the MACD reading with a binary feature: MACD histogram > 0 is assigned a value of 1, while MACD histogram < 0 is assigned a value of 0.

Many data scientists prefer to transform data. *Data transformation* is the process of taking raw data from the

Line 1: Scikit-learn (Sklearn) is a simple and powerful Python library. It provides a set of efficient tools for statistical modeling and machine learning, like classification, regression, clustering, and dimensionality reduction. In line 1, we import the Sklearn logistic regression model into our Jupyter Notebook.

Line 2: We give a name to the logistic regression function we’ve just imported, such as “my_model”.

Line 3: We give instructions to train (fit) my_model on in-sample data: in-sample features (X_train) will be matched with in-sample targets (y_train) according to the mathematical and statistical functions built into the Sklearn library.

Line 4: We use the my_model, already trained, to provide predictions (y_pred) on out-of-sample data (X_test).

real world and turning it into something that can be used by a computer. It’s an important step in any ML project, but it can be confusing and complicated; this is why we choose ready-to-use technical readings.

MODEL VALIDATION

A *confusion matrix* is a common tool used in machine learning and statistics to evaluate the performance of a classification model, such as a binary classifier. It provides a summary of the model’s predictions compared to the actual true values in a tabular format. The main purpose of a confusion matrix is to help assess the model’s accuracy and its ability to correctly classify different classes.

In Figure 4, you can see a confusion matrix based on 3,000 days in-sample and 3,000 days out-of-sample data for USDJPY. There are a total of 3,135 out-of-sample days (from January 2011 to September 2023). Out of these, 1,261 days exhibited the higher high/low pattern, and the model correctly predicted 801 of them (64%). On the other hand, 1,874 days did not show the pattern, and the model correctly predicted 1,517 of them (81%). The total accuracy of the model is 74%.

TRADING PLAN

Assuming we trust the model, here is the trading plan:

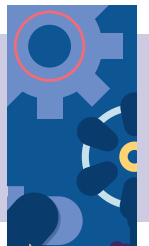
- Buy on close when the prediction is bullish, with a stop-loss at the current low.
- Sell short on close when the prediction is bearish,

	Right predictions	Wrong predictions	Tot	Predictions Accuracy %
Days with pattern	801	460	1261	64%
Days without pattern	1517	357	1874	81%
Tot	2318	817	3135	74%

Days with pattern	35%	56%	40%
Days without pattern	65%	44%	60%
Tot	100%	100%	100%

FIGURE 4: BACKTEST. How often was the model correct? The overall accuracy of the model was 74%.

The main purpose of a confusion matrix is to help assess the model’s accuracy.



- with a stop-loss at the current high.
- Exit on the next bar's close.

BACKTEST AND WALK-FORWARD ANALYSIS

We conducted backtesting on USDJPY for the period 2008–2023, applying the walk-forward methodology. Walk-forward analysis (WFA) involves splitting the train-test process into several parts (see Figure 5). In this example, the model went through a rolling walk-forward of 2000/50, meaning that it was trained on 2,000 days and then tested on the next 50 out-of-sample days. I strongly recommend performing such an analysis for any trading system, not just those based on ML. Many trading platforms offer this useful feature, and it's essential to subject your systems to this process.

In Figure 6 you find a performance summary and in Figure 7, the corresponding equity line.

CONCLUSION

So, can we think of a trading day as a flower? I would say yes, because trading patterns can be represented by a binary combination, just like an Iris species. The main difference is that we need to recognize something that hasn't happened yet.

Is this machine learning model good? We can say yes because the accuracy is high, and the confusion matrix makes sense.

Can we use this model to trade with real money? Well, the backtest provided positive results. Long and short trades are fairly balanced, and the equity curve shows consistent growth. However, we need to work on improving the average trade, as it is quite low when considering broker spreads and commissions. Nevertheless, we are satisfied with our first artificial intelligence model applied to technical trading, and we are confident to be on the right track.

Domenico D'Errico is a quant developer for algorithmic hedge funds. He is an EasyLanguage specialist and a two-time winner of the 2011 TradeStation developers contest where he presented trading tools for pairs trading. He is currently involved in a research project on artificial intelligence applied to technical trading. He is based in Matera, Italy and can be reached at domderrico@gmail.com.

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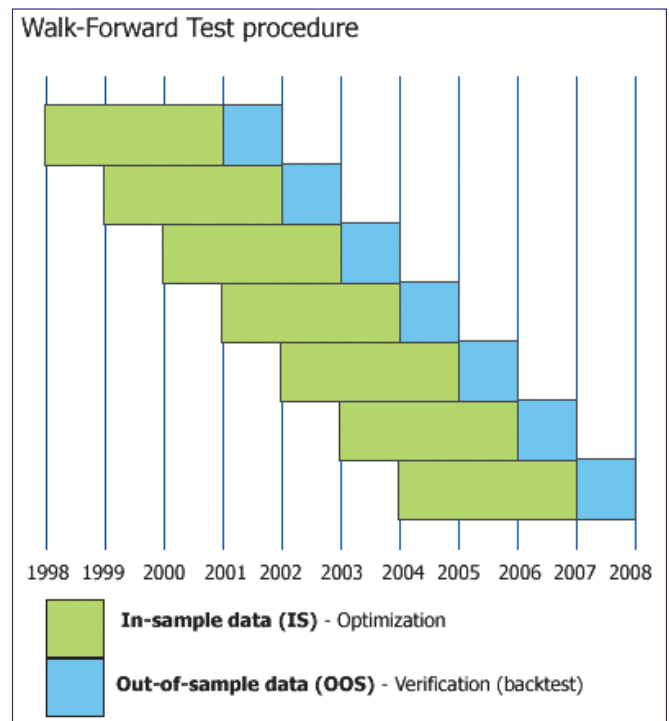


FIGURE 5: WALK-FORWARD TEST. A backtest was performed using USDJPY for the period 2008–2023, applying the walk-forward methodology. The model was trained on 2,000 days and then tested on the next 50 out-of-sample days.

Performance Summary USDJPY			
2008-2023			
	long-short	long	short
Tot_Profit	\$ 96,499	\$ 45,889	\$ 50,610
Tot_Trades	4150	1518	2632
Win_Trades	1905	741	1164
Avg_Trade	\$ 23.00	\$ 30.00	\$ 19.00
Hit_Rate	46%	49%	44%
size=100,000 usd			

FIGURE 6: PERFORMANCE SUMMARY. Good results were obtained from a backtest of the model, and long and short trades were balanced.

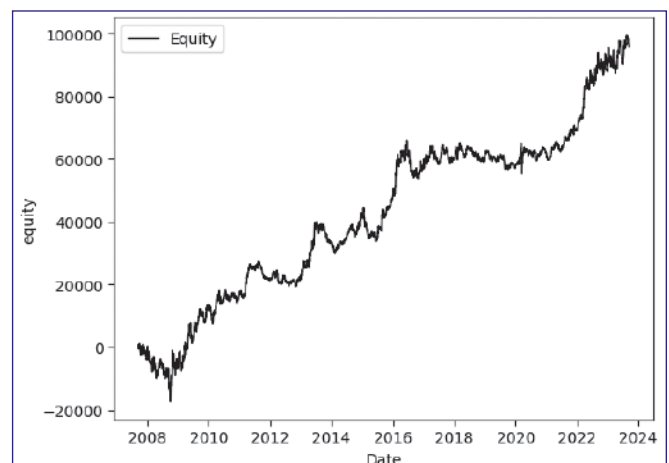


FIGURE 7: EQUITY LINE. The equity curve for the model shows consistent growth.



Taking A Page From The On-Balance Volume

Gap Momentum

Here's a way to use opening gap data to create a momentum strategy.

by Perry J. Kaufman

THE MOMENTUM OF GAPS

If we apply the same concept as OBV using gap openings (today's open minus yesterday's close), we get a cumulative series as follows:

1. Start with zero.
2. Add all the positive gaps over the past N days.
3. Separately, add all the negative gaps (as positive numbers) over the last N days.
4. Calculate the *gap ratio*, the positive gaps divided by the negative gaps.
5. Add the gap ratio to the cumulative gap ratio, and call it *gap momentum*.
6. Keep moving forward as you would an N -day moving average.

See the sidebar "Gap Momentum Indicator And System, In EasyLanguage" for code to make these calculations.

In the following examples, I have used only a 1-day ratio, that is, $N = 1$. I consider that the benchmark test. I have also used $N = 20$ with the result even better. You will need to find your own smoothing value. As you



I was reminded recently that J. Welles Wilder, who I knew personally, was fascinated by opening gaps. We have all thought about those pesky moves that can give you a poor fill or jump through your stop-loss. I have tried to take advantage of them by buying a pullback

or selling an unusually large gap up. I have had some success trading intraday, but always thought there might be other ways to take advantage of gaps.

Do gaps have a pattern? Can they tell us where prices are going?

Let's take a page from Joseph Granville's on-balance volume (OBV). In a new series, he added the volume when prices closed higher and subtracted the volume when prices closed lower. It simply accumulated the volume. If you used the OBV series instead of price, you find that, in many cases, a trend system worked better. I'll leave that for you to try.

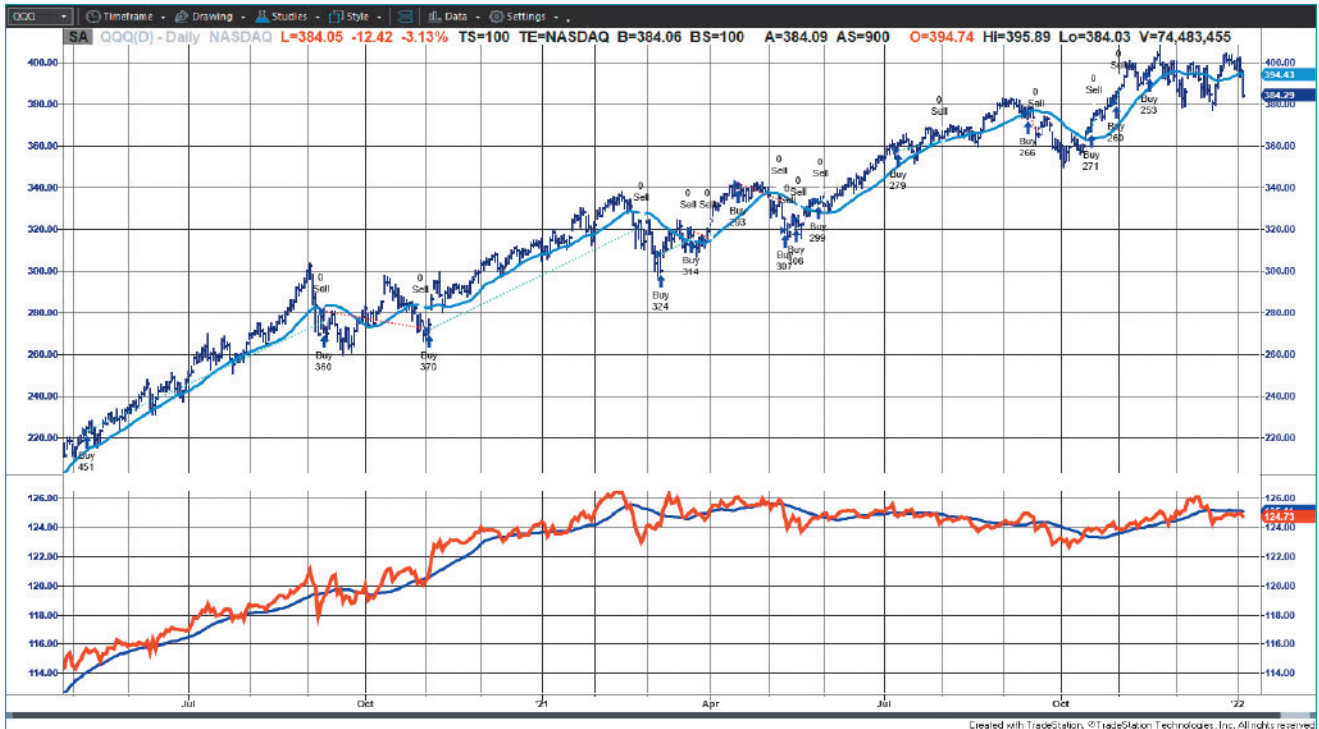


FIGURE 1: GAP MOMENTUM INDICATOR. In the top panel is the QQQ with a 20-day moving average and trading signals based on the gap momentum indicator. In the bottom panel is the gap momentum (red) and the signal line (blue).

smooth more, you will increase the lag.

The new series, *gap momentum*, will be treated in the same way as we used OBV. But first we apply a moving average because the series is a bit noisy, just like prices.

PARAMETERS

Only slow moving averages seem to work for equity index markets. They also work for most stocks. We collected the average gap ratio using a 1-day ratio (you might try 20 days) then applied a 40-day average to the gap ratio to get our signal line. It is the direction of the signal line that determines our trade.

TRADING RULES

That gives us trading rules:

- *Buy* when the signal line is moving higher.
- *Exit* when the signal line is moving lower.

Because we are trading stocks, we will only take long positions. For each new trade, the position size is the initial investment divided by the closing price. We execute on the open following a new trading signal, which was generated without the current day's gap.

Ticker	Net Profit	Profit Factor	Trades	% Prof. Trades	MaxDD	Profit/Drawdown
SPY	\$93,447	3.25	61	49.2%	(\$23,778)	3.93
QQQ	\$189,977	4.51	40	50.0%	(\$32,868)	5.78
AMZN	\$253,389	3.63	63	49.2%	(\$69,671)	3.64
BA	\$147,881	1.96	84	41.7%	(\$84,376)	1.75
BAC	\$164,263	2.79	46	37.0%	(\$31,254)	5.26
MCD	\$88,299	2.82	64	39.1%	(\$27,944)	3.16
TSLA	\$1,468,969	6.97	67	35.8%	(\$779,566)	1.88
Average	\$343,746	3.70	61	43.1%	(\$149,922)	2.29

FIGURE 2: TEST RESULTS FOR 100-DAY SMA SYSTEM. Shown here are the results of a test of a 100-day simple moving average system. This test uses stocks and ETFs over 10 years of data (2010 through 2021).

Ticker	Net Profit	Profit Factor	Trades	% Prof. Trades	MaxDD	Profit/Drawdown
SPY	\$82,245	2.09	104	54.8%	(\$22,133)	3.72
QQQ	\$122,695	2.37	112	61.6%	(\$20,166)	6.08
AMZN	\$158,068	2.68	71	50.7%	(\$69,671)	2.27
BA	\$150,639	2.04	82	56.1%	(\$69,097)	2.18
BAC	\$188,465	2.09	112	57.1%	(\$54,867)	3.43
MCD	\$101,242	2.97	64	50.0%	(\$16,862)	6.00
TSLA	\$853,803	10.28	65	60.0%	(\$151,278)	5.64
Average	\$236,737	3.50	87	55.8%	(\$57,725)	4.10

FIGURE 3: TEST RESULTS FOR GAP MOMENTUM. Shown here are the results of a test of a 1-day gap momentum system with a 20-day signal line, on the same instruments and time period as in Figure 2 for comparison. In the test, the simple moving average system shows higher profits and higher risk, while the gap momentum system shows smoother returns but lower net profits.

GAP MOMENTUM INDICATOR AND SYSTEM, IN EASYLANGUAGE

```
// Gap Momentum
// An idea inspired by J. Welles Wilder, using Ehlers method
// Copyright 2023 P.J. Kaufman. All rights reserved.

inputs: period(40), signalperiod(20), longonly(true),
printfile(true);
vars: gap(0), upgaps(0), dngaps(0), gapratio(0), ix(0),
signal(0), size(0),
investment(100000), adate(" "), todayPL(0);

for ix = 1 to period begin
    gap = open[ix] - close[ix + 1];
    if gap > 0 then upgaps = upgaps + gap
    else if gap < 0 then dngaps = dngaps - gap;
end;
if dngaps = 0 then gapratio = 1
else gapratio = 100*upgaps/dngaps;
signal = average(gapratio,signalperiod);

if marketposition <= 0 and signal > signal[1] then begin
    buy to cover all shares next bar on open;
    size = investment/close;
    buy size shares next bar on open;
end
else if marketposition >= 0 and signal < signal[1] then
    begin
        sell all shares next bar on open;
        if longonly = false then begin
            size = investment/close;
            sell short size shares next bar on open;
        end;
    end;
todayPL = size*marketposition*(close - close[1]);

If printfile then begin
    adate = ELdatestring(date);
    once begin
        print(file("c:\tradedstation\Gap_Momentum.csv"),
            "Date,Open,High,Low,Close,upgaps,dngaps,gapra
            tio,signal,pos,todayPL");
    end;
    print(file("c:\tradedstation\Gap_Momentum.csv"),adate,
        ",", open:8:4, ",", high:8:4,
        ",", low:8:4, ",", close:8:4, ",", upgaps:8:4, ",", dngaps:8:4, ",",
        gapratio:8:4, ",", signal:8:4, ",", marketposition*currentcontra
        cts:8:4, ",", todayPL:8:2);
    end;
```

To see what this looks like, Figure 1 is a TradeStation chart of QQQ, with the gap momentum (in red) and the signal line (in blue) in the bottom panel. Trading signals are shown in the top panel along with a 20-day moving average just for reference.

EXAMPLES

I used data for the 10 years ending at the end of 2021. While it includes a long bull market, prices became erratic in 2019 and Covid-19 caused extreme changes and sector rotation in 2020 and 2021. Those 10 years seem to be a reasonable test period. Choosing a few markets to test is always a problem. Are they representative of the way the strategy will work? I can't say. There are always markets that work better and those that do not work. You will need to test them yourself to get

	Net Profit	Profit Factor	Trades	% Prof. Trades	MaxDD	Profit/Drawdown
SMA	\$35,385	1.31	51	29.4%	(\$131,999)	0.27
Gap Mom	\$32,224	1.26	106	56.6%	(\$42,301)	0.76

FIGURE 4: SAME TEST, DIFFERENT TIME PERIOD. Here are results from a test of both the SMA system and the gap momentum system using a different, less bullish time period, 1999–2009, to further analyze how both systems perform under different conditions. Compared to the SMA system, the gap momentum system, in this test, has a higher percentage of profitable trades and a much lower drawdown.

a better idea of the robustness of the method.

These tests used the ETFs: SPY, QQQ, and the stocks: Tesla (TSLA), Amazon (AMZN), Bank of America (BAC), Boeing (BA), and McDonalds (MCD). They seem to cover a range of popular and diverse markets.

Figure 2 shows the results of a simple 100-day moving average and Figure 3 is a comparable table of the 1-day gap momentum results with a 20-day signal line. Both reflect the data from 2010 through 2021. Both use the direction of the trendline to decide the buy and sell timing. Both execute on the following open.

COMPARING RESULTS

The first number we notice is the much lower net profit using the gap momentum system. But a closer look will show that it is not that simple. The profit factors are nearly the same, the percentage of profitable trades increases from 43% to 55%, and the average maximum drawdown

The comparative performance of the simple moving average and the gap momentum is typical of the decisions that need to be made.

is close to 1/3 of the moving average system. When we compare the profits divided by the maximum drawdown, a ratio that shows returns for risk, we get a value that is nearly twice as good, 4.10 versus 2.29, as the simple moving average.

Long-term moving averages work, as we see from the consistent profits. But alternatives offer both diversification and a new performance profile. In this case, you accept lower returns with much lower risk. The profit/drawdown ratio shows it gives a better “payout.”

TESTING THE END OF THE INTERNET BUBBLE

The data interval used for the tests might seem suspiciously favorable, even though it wasn’t chosen that way. After all, it looks as though all stocks were profitable during that 10-year period. To see what would have happened at the end of the internet bubble and through the 2008 financial crisis, we tested QQQ from 1999 to 2010. The results are shown in Figure 4.

While the profits are lower, they are only lower by 9%; otherwise, the comparison is similar. The gap momentum method had a much higher percentage of profitable trades and a much lower drawdown. The profit/drawdown ratio was nearly three times better.

WHAT PERFORMANCE PROFILE DO YOU WANT?

Some traders are risk seekers, others are risk averse, and most fall somewhere in between. We want more profits but not much more risk. Figure 5 shows the total profits of QQQ using the simple moving average and the gap momentum system. The simple moving average has higher profits and higher risk. The gap momentum method has much smoother returns but lower net profits.

Trading is very personal. No one can, or should, tell you how much risk to take. The comparative performance

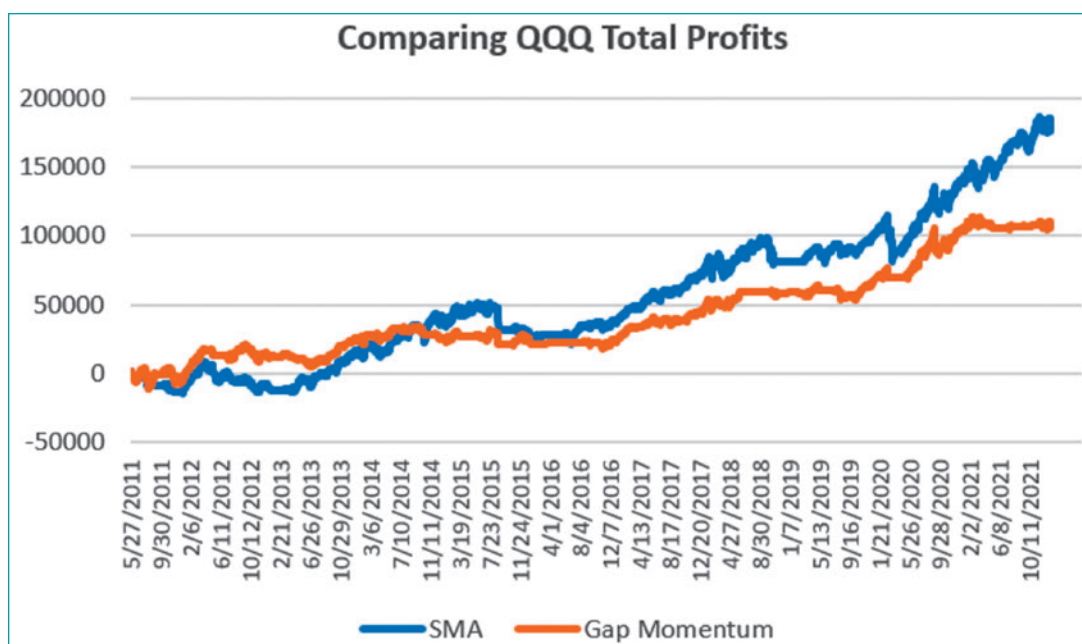


FIGURE 5: COMPARISON OF MOVING AVERAGE SYSTEM VS. GAP MOMENTUM SYSTEM RETURNS. Using the QQQ instrument, this charts the total profits from the simple moving average system versus gap momentum system on a decade of data. The gap momentum system has lower returns than the moving average system, but as was seen in Figure 4, the gap momentum system has a better profit/drawdown ratio.

of the simple moving average and the gap momentum is typical of the decisions that need to be made. In this case, they are both profitable, which is a big bonus.

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.

*See the **Traders’ Tips** section beginning on page 40 for translation and/or implementation of Perry Kaufman’s technique in various technical analysis programs and trading platforms. Accompanying program code can be found in the Traders’ Tips area at Traders.com.*

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

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Do gaps have a pattern? Can they tell us where prices are going?



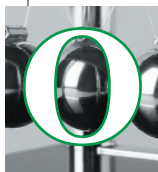


A Risk-Offsetting Debit Spread

Newton's Cradle And The Short Butterfly

In option trading, a "Newton's cradle" is an offsetting debit spread position. Here is a look at this type of trade and why it is used.

by John A. Sarkett



One type of option trade that is never taught or even mentioned in trading circles or seminars is the *short butterfly*. Sell a \$5 butterfly for a \$1 credit? And take on \$4 of risk? No way. Who in their right mind would do that?

Turns out that a fair number of people will make this trade: 1) market makers, and 2) a very few canny and intrepid retail traders.

Why would someone want to make this type of trade? I put this question to Stratagem Trading founder Scott Ruble, and he cited four reasons:

1. Creating a short butterfly can transform a losing trade to near breakeven, or even generate a credit.

Creating a short butterfly is a way to lay off and wiggle out of a bad trade. Here's a classic situation: The trader puts on an at-the-money call debit spread, and in short order the market moves down one strike. What to do? You can: 1) close out the trade for a loss, and never have the chance to make it back, 2) turn it into a long butterfly by selling the spread just below it, or 3) although it's rarely employed, a third option is to sell the spread *above* the call debit vertical spread and transform it into a short butterfly.

"This third option gives the trader time," he says, "all day to put on what we call a Newton's cradle that will give the trader a profit opportunity instead of a straight, irreversible loss."

In the world of gadgets, *Newton's cradle* is a set of suspended balls. When one is pulled out, and plunked back into the set, the one on the opposite end moves in reaction. The energy from impact is transferred from the ball that was set in motion to one that was "resting."

In options trading, in the nomenclature used at Strata-

gem Trade, a “Newton’s cradle” is an offsetting debit spread. Say the trader is short the 4500/4505/4510 SPX butterfly. If the market moves up another strike, the trader can buy the 4510/4505 put debit spread to transform the trade into a long put debit spread one strike lower. Conversely, if the market moves down, the trader can purchase the 4500/4505 call debit spread.

A risk profile of a basic short butterfly is shown in Figure 1.

After the market rises, and the put debit spread is purchased, ideally at or below \$1, the risk curve transforms. If the short butterfly generated a \$2 credit, the trader has locked in \$100 gain, and has an opportunity to earn as much as \$600. Figure 2 shows what the transformation looks like from short butterfly to long put debit spread, one strike lower.

2. Sometimes butterflies are too

expensive to buy, so they make better sense to sell. “I will never, ever buy a \$5 butterfly for \$1.65,” Ruble says. Point 3 below explains why.

3. Over long periods of time, statistics favor short butterfly sellers. Butterflies (BFs) are based on Brownian motion, he says, and using a long BF position while hoping to “pin” the position to the middle strike for maximum gain is akin to playing roulette. Roulette has 38 numbers: 18 red, 18 black, 2 green (the greens are for the house, a free BF to them.) Given, say, a 14 VIX for the SPX, and an expected range of 38–39, the likelihood to “pin” a BF, that is, earn the maximum with an expiration at the peak, is approximately 1/39, or 2.5%. To finish with a profit, that is, the area under the tent minus the debit, depending on variables, might bring the odds to something like 17%. Betting on 17% in-the-money winners is a sure road to ruin; better to sell them, Ruble says.

4. End-of-day volatility opportunity. With one eye on market-on-close (MOC) imbalances, and another on the price of the at-the-money (ATM) fly, Ruble is a fan of trading short butterflies near the close. He will sell an ATM BF at \$2 or better, and then put in an order for a long call and/or put debit to offset the risk, a.k.a. a New-

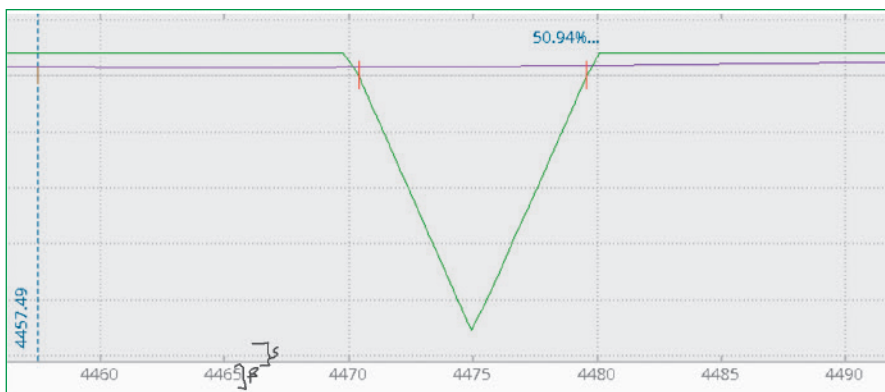


FIGURE 1: SHORT BUTTERFLY, RISK PROFILE. A risk profile of a basic short butterfly is shown.

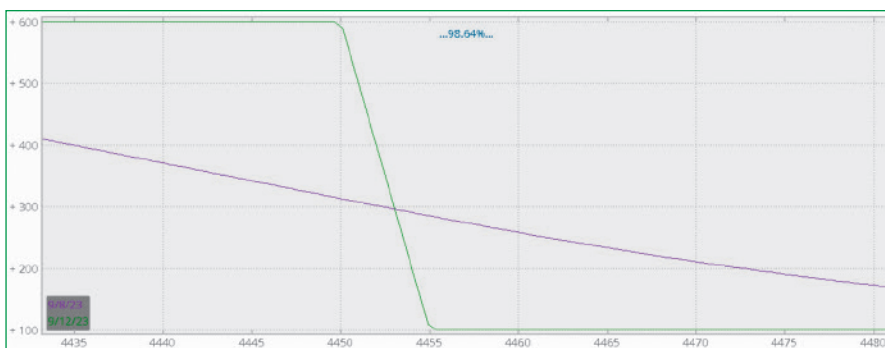


FIGURE 2: NEWTON'S CRADLE, RISK PROFILE. In the risk-offsetting option strategy called the Newton's cradle, the risk curve transforms, such as seen here. In the Newton's cradle, the trade goes from a short butterfly to a long put debit spread (or long call debit spread).

ton's cradle. If he is filled on the debit spread at \$1, he locks in \$100 gain, 33% on the \$300 risk. If he pays up to \$2, the trade is breakeven. Worst case: If the market doesn't move at all, he will pay even more to lock in a loss, or just cover the fly directly.

There is a special situation that occurs every so often: sometimes he will get filled at \$1 on both the call and put debit spreads. In that scenario, he locks in a \$500 gain, the size of the long debit spread, the \$2 BF sale and \$2 debits offsetting each other at 0.

TRANSFORMING LOSING POSITIONS

In his spare time, Ruble is an avid motorcyclist as well as both a pilot and skydiver (13 jumps). So clearly, he is not a person who is adverse to risk-taking. However, one

Continued on page 21

Over long periods of time, statistics favor short butterfly sellers.



Swing Trading VIX Reversals

This month's column will give you useful tips to confirm upward reversals in UVXY.

by Ken Calhoun

U.S.

equity markets began selling off at the beginning of August

2023. When this happens, the VIX moves upwards. Since the VIX itself cannot be traded directly, those of us who seek to profit from volatile downtrends in equity markets trade volatility ETFs and ETNs like UVXY and UVIX.

TRADING MARKET SELLOFFS WITH UVXY

When markets begin to drop, you will see UVXY start to consolidate, then rise on increasing volume, as

illustrated in Figure 1, a chart of ProShares Ultra VIX Short Term Futures ETF (UVXY). Since it trades in the opposite direction of the S&P, any strong down day in the markets is a good place to start looking for entries in UVXY. If it has consolidated for many weeks, as is the case now, we can simply wait for a breakout above any recent high to enter our position, e.g., over \$20/share in this example.

STEP-BY-STEP ACTION PLAN

Here's how you can start using this strategy:

Step 1: Look for a consolidation pattern in UVXY, as seen in Figure 1.

Step 2: Wait for price to break out above any recent high, e.g. \$20/

share. Enter at a price \$0.50 above the prior day's high if it starts to go up again. In Figure 1, that would be $(\$20 + \$0.50) = \$20.50$.

Step 3: Set your stop-loss just under the prior day's high. You may wish to trail a stop to protect open profits with this swing trading strategy.

INSIGHTS: WHY THIS TECHNIQUE WORKS

The VIX itself will slowly trend down during rising markets, then suddenly spike up during market downturns.

You may wish to trail a stop to protect open profits with this swing trading strategy.



FIGURE 1: UVXY REVERSAL TESTS RECENT HIGHS. This consolidation also shows increasing volume on up days, indicating a long entry is called for.

It is important to therefore prepare for upward surges in volatility instruments like UVXY that accompany occasional VIX spikes. It is useful to look at this as a breakout-from-consolidation technique, because of how the VIX works.

TRADE MANAGEMENT TIPS

Trading volatility instruments like UVXY, especially for swing trading, is difficult, due to the unpredictable nature of price action moves. In trading these for over a decade, I've

The VIX itself will slowly trend down during rising markets, then suddenly spike up during market downturns.

found out (the hard way!) that careful position sizing, along with rapid exits, is essential. For example, if I buy the current breakout just over \$20/share, I'd add a second position over \$25, and a third over \$30. Trailing a tight stop of no more than \$5 total in this example would be the correct

parameter to use.

Ken Calhoun is the founder of TradeMastery.com, an educational site for active traders and is a UCLA alumnus.

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SARKETT/NEWTON'S CRADLE

Continued from page 19

of his special strengths in option trading is his ability to transform losing positions into winners or breakeven. "All traders have losses," he says. "It's how you handle the losses that determines your success or failure."

His trading facility comes from a lifetime of labor, but for him, a labor of love. Ruble traded on the floors of the Chicago Board of Trade, Chicago Mercantile Exchange, and Chicago Board Options Exchange. He has lectured at universities and was lead instructor for a notable options education firm. He founded Stratagem Trading in 2017, and shares his daily insights into trading, politics, and current topics of personal interest in his *Morning Coffee Report*. He has written a number of books as well as a couple articles for this magazine under the *nom de plume* J.L. Lord.

BUTTERFLIES, CRADLES, AND MORE

The short butterfly is a favorite strategy of Ruble's among many others, including colorfully named strategies like the unbalanced condor, the razzle dazzle, jelly rolls, the morning fade, rolling thunder, risk reversal, ViPars (volatility pairs), the Billy Baroo, broken wing butterflies (Ruble is credited with developing and naming this now widely adopted strategy), the 3-legged box (long call, long higher put debit spread, or the reverse), and of course, the risk-offsetting debit spread known as the Newton's cradle.

Butterflies are based on Brownian motion.



John A. Sarkett has written for Technical Analysis of STOCKS & COMMODITIES since 1995, most recently on ODTE options. He is the author of Option Wizards: Real Life Success Stories From The Financial Markets, and Market Mentors.

Scott Ruble of Stratagem Trade can be contacted at admin@stratagemtrade.com.

FURTHER READING

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Exploiting Winning Streaks

Z-Score: How To Use It In Trading

The Z-score can help to analyze sequences of trades to determine the relationship between wins and losses. You can use this statistic to refine your trading strategy to maximize profitability. We'll show you how.

by Andrea Unger

However, a trading platform (for example, we use Multi-charts and TradeStation) can provide the Z-score for you for a given strategy, such as shown in Figure 1.

(Note: There are several different statistics named “Z-score” in use, so before proceeding with the technique described in this article, please be sure to check on the formulation that your trading platform or software uses.)

Next, we'll look at how we interpret and use our Z-score value.

The Z-score's value is generally between -3 and +3, where:

- a value within the range (+2 to +3) indicates a tendency to have alternating trades of the opposite sign
- a value within the range (-3 to -2) indicates a tendency to have sequences of trades of the same sign
- a value within the range (-2 to +2) does not indicate a real interdependence of trades.



The Z-score discussed here is a parameter that measures how interdependent trades are, that is, in a sequence of trades, it indicates the extent to which the outcome of a trade (in terms of a profit or loss) depends on the previous trades.

The formula may seem complicated:

$$\text{Z-score} = \frac{N(R-0.5) - X}{\sqrt{X(X-N)/N-1}} \quad \text{Eq. 1}$$

where:

N = # of trades

R = # of series of winning or losing trades

X = 2 × (# of winning trades × # of losing trades)

HOW TO EXPLOIT THE Z-SCORE IN A TRADING STRATEGY

In the previous section, we saw that Z-score values between -2 and $+2$ do not provide significant hits, and it is quite common for a trading strategy to fall into this case.

Otherwise, with a Z-score greater than $+2$, we have a good chance of seeing alternating winning and losing trades; we can then define what to do based on the last trade:

- We skip the next trade if the last trade was a winning trade (in fact, it is more likely that a losing trade will occur, which should be avoided).
- Instead, we open a position if the last trade was a losing trade (in this case, it is more likely that a winning trade will occur).

HOW TO PAUSE A SYSTEM

For a starting strategy with a Z-score greater than $+2$, it would make sense to use a filter that allows (prevents) market entries if the last trade was a loss (profit).

Thus, the strategy code could be modified to allow entries only after a negative trade. In EasyLanguage, the following line of code allows a long position to be opened if the last trade was a loss:

```
if PositionProfit(1) < 0 then buy next bar market;
```

Everything solved? Unfortunately, no.

Remember that we want to trade or not based on the result of the previous trade. If we were to enter a condition like the one above, the system would stop immediately after the first profitable trade. In this case, the `PositionProfit(1)` function would return a positive value and prevent any trade from then on.

We may want to skip trades, but all traders must decide whether or not to trade based on their profit or loss.

How can we do that? This is one of the cases where performing a reliable backtest is not trivial. One possible solution is to resort to a system known in the jargon as a “ghost system” or “mirror system.” This system faithfully reproduces all the trades of the original strategy but allows us to open only those that meet specific criteria.

Let’s look at a simple example to understand the concept. Let us assume we are trading a stock index future, and the original system is as follows:

Trade Series Analysis	
Z-score	0,74
Confidence Limits	0,54
Strategy ME	171,14 \$
Max Consec. Winners	6
Max Consec. Losers	6
Largest Consec. Profit	17.912,50 \$
Largest Consec. Loss	(19.900,00 \$)
Largest Consec. Profit (%)	19,48%
Largest Consec. Loss (%)	(18,29%)

FIGURE 1: Z-SCORE. Some trading platforms will calculate a Z-score statistic for a given strategy or series of trades. This example is from MultiCharts.

```
if t = 1730 then buy next bar market;
setexitonclose;
```

Using this code, we open a long position every day at 5:30 pm and close the trade at the end of the session. Suppose that the backtest of this system shows a Z-score = $+2$, and therefore we want to enter the market only after a losing trade.

The ghost system corresponding to this system could be:

```
var: entrypr(0), exitpr(0), myprofit(0);
if t = 1730 then entrypr = c;
if time = 1600 then begin
    exitpr = c;
    myprofit = exitpr - entrypr;
end;
if myprofit < 0 then begin
    if t=1730 then buy next bar market;
end;
setexitonclose;
```

Every day at 5:30 pm, we record the last price in the variable `entrypr`, corresponding to the so-called “theoretical” entry price—given we do not enter the market daily.

At 4:00 pm of the following day, that is, at the end of the session, we record the last price reached by the market in the variable `exitpr`, which corresponds to the “theoretical” exit price. Thus, we calculate the “theoretical” profit of the trade as `myprofit = exitpr - entrypr`.

Every day at 5:30 pm, the variable `myprofit` then contains the value of the “theoretical” profit of the trade from the previous day; we need to check if it is negative to make our trade for the day.

It is important to note that the variable `myprofit` is calculated in every session, regardless of whether we entered the market or not: this is the concept behind the ghost system.

With a Z-score greater than $+2$, we have a good chance of seeing alternating winning and losing trades; we can then define what to do based on the last trade.





FIGURE 2: ORIGINAL SYSTEM, GHOST SYSTEM, & Z-SCORE. You can create a trade filter based on the result of the previous trade by incorporating the Z-score. One way to carry this out is to create a ghost or mirror system. In the top chart, you see the original system performing one trade per day. In the middle is an indicator that turns green (or red) depending on whether the previous day's trade was a profit (or loss). In the lower chart, you see the ghost system, which allows market entries only if there was a "theoretical" losing trade the previous day.

In Figure 2, you can see how such a filter could work:

- In the top chart, we see the original system performing one trade per day;
- In the middle, we see an indicator that turns green (or red) depending on whether the previous day's trade was a profit (or loss);
- In the lower chart, we see the ghost system, which allows market entries only if we had a "theoretical" losing trade the previous day.

CONCLUSIONS

In this article, I've shown how the Z-score can be profitably used under certain conditions to improve trading strategies. The example provided has also shown us how to pause and reactivate our trading later.

Many other logics could be tested, such as:

- setting a minimum amount below which a losing trade will be considered
- waiting for several losing trades in a row before allowing a market entry

... and many more. We know that the limit is only our imagination, although developing ghost systems with articulated strategies is not easy.

This technique can be profitable because it is based on

This technique can be profitable because it is based on the alternating profit and loss trades of specific systems.



the alternating profit and loss trades of specific systems, an alternation that the Z-score identifies superbly!

Andrea Unger is a full-time professional trader, president of The Unger Academy, and author of The Unger Method. He is a four-time World Trading Champion (2008, 2009, 2010, and 2012), an honorary member of SIAT (Italian Society of Technical Analysis, a branch of IFTA), and speaks throughout Europe, America, Australia, and Asia. He may be reached at Andrea@UngerAcademy.com. The Unger Academy provides services to traders, including individuals, to help them improve their approach to trading (more information can be found at <https://autc.pro/tasc9>).

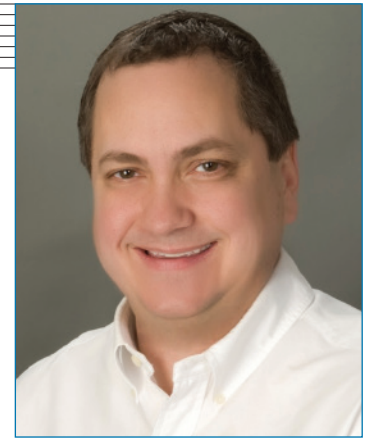
FURTHER READING

Unger, Andrea [2021]. *The Successful Trader's Guide To Money Management*, Wiley Trading.
 — [2021]. *The Unger Method*, The Boss Books.

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ALGORITHMIC TRADING

Have a question about system or algo trading? Kevin J. Davey has over 30 years of system trading experience. Kevin is a full time trader, and also teaches and consults via his Strategy Factory® online workshop (<https://kjtradingsystems.com>). He is the author of 5 bestselling trading books, including “Building Winning Algorithmic Trading Systems” and his latest book “Algo Trading Cheat Codes.” 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

EXPECTATIONS

What is the toughest part of algo trading?

Great question! There is so much about algo trading (and trading in general) that is difficult. From developing a strategy, to avoiding curve fitting and over optimization, to trading responsibly and to avoiding emotional or psychological collapses, the road to algo trading success is very difficult. I could write a book on any one of these topics—there is a lot to unpack.

In this article, though, I’ll keep it simple. For many, the toughest part of algo trading is dealing with and setting proper expectations. This is harder than it sounds. Most algo traders, for example, first enter trading based on the outlandish claims made on YouTube, X (Twitter) and other social media. “Double your money every day/week/month,” “win 80–90% of your trades,” “say goodbye forever to drawdowns,” etc. If you have been around trading for any length of time, you have certainly seen these claims. If you are a bit seasoned, you understand that 99% of them are outright lies.

For someone new to algo trading though, these claims can easily become the expectation. New traders feel it is totally logical to believe the advertised hype. After all, would social media allow blatant lies to be broadcast of their platforms? Unfortunately, we all know the answer to that question—

yes! Misinformation is king in the social media age.

So, how do we counter the expectations for algo trading success with actual facts? My first step is to doubt everything. For every claim of trading success, I ask the question “does this seem too good to be true?” I find the answer eliminates 95% of the nonsense out there. For example, I saw an ad for an algo trading strategy that claimed “only one losing trade in the past 15 years.” Could that be true? Possibly, especially if the

One key to success is to set realistic expectations for return and drawdown right from the start.

strategy only took 2 or 3 trades over that period! But, is it likely to be true? Probably not. Believing it would require seeing proof of a significant number of actual trades, which will never be offered to you.

Just asking the “too good to be true” question will filter out a lot of garbage. Another superb way to set proper expectations is to see what the performance of professional traders looks like. There are 3 excellent sources of professional trader results:

- <https://iasg.com>
- <https://autumngold.com>

- <https://barclayhedge.com>

Each of these databases has actual results for many professional trading firms, commonly known as CTAs (Commodity Trading Advisors). Once you sign up for a free account, you can explore the database. This allows you to see what returns and drawdowns professionals have experienced, and gives you a great perspective on what is “realistic.” Since all of the funds listed are audited and regulated, you can believe the results you see—certainly a better alternative than what you are bombarded with via social media.

Without a doubt, algo trading is difficult. But, it can also be very rewarding. One key to success is to set realistic expectations for return and drawdown right from the start. Being grounded in this manner will help the new algo trader dismiss much of the nonsense that is part of social media. And having realistic expectations certainly improves the trader’s odds of success.

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Using Inflection Points In The Market

A Pivot Point Trading Strategy

Pivot points project where price may change course. They can be calculated with simple arithmetic. Here is a basic trading strategy based on pivot points to use in the crypto or other trending markets.

by Azeez Mustapha

The pivot point trading strategy that I will describe in this article hinges on numerical analysis in the financial markets. Cryptocurrency prices are quantified, just as dates and times are. Indicators and algorithms rely on numerical data, Fibonacci grades calculate swing levels based on percentages. Trading, therefore, is a numerical pursuit, and modern analysis tools employ various graphic representations. Comprehending these tools' foundations grants a trader a lucid methodology for trading.

As trading is a mathematically oriented activity, successful traders often rely on mathematical principles. Larry Williams, a former champion trader who transformed \$10,000 into over \$1 million in only 12 months and won the Robbins World Cup Championship of Futures

Trading in 1987, once said, "In trading, it is essential to understand the mathematical principles that govern market movements." Frequently, traders may become exceedingly sentimental during their trades. This can often lead to a deviation from their original trading plan and subsequently result in incorrect and undesirable decisions. Trading psychologist and trading coach Van Tharp wrote, "A quantitative method to trading can help one maintain discipline and adhere to their trading plan, despite volatile market conditions."

THE PIVOT POINT STRATEGY

This pivot scheme is a simple quantitative model for trading. Paul Wilmott, a mathematician and author specializing in derivatives, risk management, and quantitative finance, wrote, "Quantitative models have the potential to anticipate market shifts with a high degree of precision, enabling traders to profit from such projections."

In trading, a *pivot point* refers to possible levels of support and resistance as determined by technical analysis indicators. Pivot points are computed based on the preceding day's high, low, and closing prices, and are employed to identify potential price levels at which the

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FIGURE 1: PIVOT POINT STRATEGY, BITCOIN/US DOLLAR ONE-HOUR. Aspects of the pivot point strategy are shown here on a one-hour chart of BTC/USD, including an MA cross, a test of the 9-period MA, and the RSI in the lower pane. The crossing of moving averages suggests a new trend, and an RSI above 50 suggests the trend is bullish. The red horizontal dashed lines show the open, high, and close of the candle that tests the 9-period MA. The black line shows resistance. The blue lines show the support levels.

market may change course.

To utilize pivot points in forex trading, abide by the following steps:

- *Determine the pivot point:* The pivot point is determined by summing the previous day's high, low, and closing prices and then dividing the result by 3. This will yield the pivot point.
- *Calculate support and resistance levels:* Once you have the pivot point, you can determine the support and resistance levels. The first support and resistance levels are calculated by multiplying the pivot point by 2 and then subtracting the previous day's high and low, respectively. The second support and resistance levels are calculated by taking the difference of the previous day's high and low and subtracting it from or adding the pivot point value, respectively.
- *Utilize the levels in your trading:* The support and resistance levels can be used as potential entry and exit points for your trades. If the price approaches a support level, it may be a propitious moment to buy. If the price approaches a resistance level, it may be a propitious moment to sell.

Pivot points can also be used in conjunction with other technical analysis indicators to confirm potential trade signals.

There exist various techniques to determine pivot

points. In cryptocurrency trading, the most commonly used is a method that entails the following computations:

Compute the pivot point (P):

$$(H + L + C) / 3$$

Compute the first level of support (S1):

$$(2 \times P) - H$$

Compute the second level of support (S2):

$$P - (High - Low)$$

Compute the first level of resistance (R1):

$$(2 \times P) - L$$

Compute the second level of resistance (R2):

$$P + (High - Low)$$

where:

H = high, L = low, C = close,

R = resistance, S = support

Trading opportunities can be spotted using these calculated levels. Traders may seek bullish signals for a long position when the price of a currency pair nears a

The pivot points are used to determine entry, exits, and stop-losses.





FIGURE 2: PIVOT POINT STRATEGY, DOGECOIN/US DOLLAR, DAILY. The strategy can also be used for swing trading. This chart of DOGE/USD shows an example of a bullish swing trade.

significant support level. Conversely, if the price nears a significant resistance level, traders may look for bearish signals to enter a short position.

THE TECHNICAL INDICATORS USED IN THE STRATEGY

Indicators provide visual representations of mathematical analysis. This strategy involves the implementation of moving averages (MA) and the relative strength index (RSI). The crossing of moving averages indicates a new trend. The moving averages of periods 9 and 21 are used in the strategy. After the MA cross, the candle that tests the MA on a pullback is utilized to compute the pivot strategy. The bullish trend is indicated when the RSI is above 50, and the bearish trend is indicated when it is below 50. The direction is determined by the moving average cross and the RSI.

Figure 1 shows an example of some of the aspects of the pivot point strategy, including an MA cross, a test of the 9-period MA, and the RSI in the lower pane.

AN EXAMPLE CALCULATION

In the strategy, the pivot points are used to determine entry, exits, and stop-losses. The pivot point strategy works well with a trending market.

On the chart in Figure 1, the three horizontal dashed red lines show the level of the open, high, and close of the candle that tests the 9-period MA (as annotated on the chart). The horizontal dashed black lines show the resistance levels. The horizontal dashed blue lines show the support levels.

To calculate the pivot point and its associated support and resistance levels, we can use the following example values.

Given the values:

High = 24786.92

Close = 24688.15

Low = 24551.64

We can calculate the pivot point (P) as follows:

$$P = (\text{High} + \text{Low} + \text{Close}) / 3 = (24786.92 + 24551.64 + 24688.15) / 3 = 24675.57$$

Next, we can calculate the first resistance level (R1):

$$R1 = (2 \times P) - \text{Low} \\ = (2 \times 24675.57) - 24551.64 = 24899.50$$

Then we can calculate the second resistance level (R2):

$$R2 = P + (\text{High} - \text{Low}) \\ = 24675.57 + (24786.92 - 24551.64) = 24810.85$$

Next, we can calculate the first support level (S1):

$$S1 = (2 \times P) - \text{High} \\ = (2 \times 24675.57) - 24786.92 = 24564.22$$

Finally, we can calculate the second support level (S2):



FIGURE 3: PIVOT POINT STRATEGY, DOGECOIN/US DOLLAR, TWO-HOUR. A long trade example is shown on an intraday timeframe. The strategy's trade is based on calculating a pivot point and its associated support and resistance levels to find the trade entry, stop-loss level, and a take-profit level.

$$S2 = P - (High - Low) \\ = 24675.57 - (24786.92 - 24551.64) = 24442.29$$

Therefore, the standard pivot point and its associated support and resistance levels are:

Pivot point (P) = 24675.57 — Sell entry
 First resistance (R1) = 24899.50 — Partials
 Second resistance (R2) = 24810.85 — Stop-loss slightly above
 First support (S1) = 24564.22 — Partials
 Second support (S2) = 24442.29 — Take-profit

SWING TRADING WITH PIVOT POINTS

The same strategy can also be used for swing trading. It functions well for bullish markets. Figure 2 shows an example of a bullish trade that is a swing trade.

In the chart in Figure 2, the three horizontal dashed red lines show the level of the open, high, and close of the candle that sets the 9-period MA. The horizontal dashed black lines show resistance levels. The horizontal dashed blue lines toward the bottom of the price chart show the support levels.

To calculate the standard pivot point and its associated support and resistance levels, we can use the following example values.

Given the values:
 High = 0.0897
 Close = 0.0799
 Low = 0.0771

First resistance level (R1):

$$R1 = (2 \times P) - L \\ = (2 \times 0.08223) - 0.0771 = 0.08736$$

Then we can calculate the second resistance level (R2):

$$R2 = P + (H - L) \\ = 0.08223 + (0.0897 - 0.0771) = 0.09483$$

Next, we can calculate the first support level (S1):

$$S1 = (2 \times P) - H \\ = (2 \times 0.08223) - 0.0897 = 0.07416$$

Finally, we can calculate the second support level (S2):

$$S2 = P - (H - L) \\ = 0.08223 - (0.0897 - 0.0771) = 0.06963$$

Therefore, the standard pivot point and its associated support and resistance levels are:

Pivot point (P) = 0.08223
 First resistance level (R1) = 0.08736
 Second resistance level (R2) = 0.09483
 First support level (S1) = 0.07416
 Second support level (S2) = 0.06963

Based on these levels that were found, an order for a long

trade is placed as follows (Figure 3):

The entry is set at the pivot point (P) = 0.08223
The stop-loss is set below the first support level (S1)
= 0.07416
The take-profit is set at the second resistance level
(R2) = 0.09483

This gives a 1:1.5 risk-to-reward.

A FINAL WORD

It is important to note that there is no 100% perfect strategy. This means that as good as a strategy may be, there is still always a need for caution; there will always be times when the strategy can fail. But if a strategy has a consistent risk-to-reward ratio and a high win rate, traders can rest assured that a strategy can provide an edge in the market.

After the MA cross, the candle that tests the MA on a pullback is utilized to compute the pivot strategy.



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

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BOOKS FOR TRADERS



The following selection of book descriptions represents a sampling of recent book releases in the investing field. Books described here may be from some of the major book publishers or from independent book publishers. These are not critical reviews or editorial evaluations, but rather a brief look at the book marketplace to help keep readers up to date on new or recent book offerings.

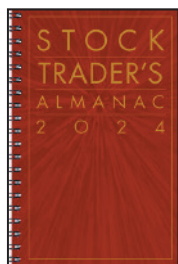


Trend Following Masters (Volume 2): Trading Psychology Conversations (280 pages, September 2023, hardcover £30, ebook £22.50, ISBNs 9780857199997,

9781804090060) by **Michael Covell**, published by Harriman House. This book is a collection of transcribed interviews from a long-running podcast. Covell launched his "Trend Following" podcast over a decade ago and has gained many followers. On the podcast, he interviews experts in investor psychology to gather their wisdoms, guidance, and ideas to help investors manage their trading mindset. This second volume of *Trend Following Masters* features Covell's conversations with psychologists and behavioral scientists including: Annie Duke, Alexander Elder, Van Tharp, Denise Shull, Daniel Crosby, Daniel Kahneman, Charles Faulkner, Gerd Gigerenzer, Brett Steenbarger, Philip Tetlock, K. Anders Ericsson, and Alison Gopnik. Covell is the author of five books includ-

ing the international bestseller *Trend Following* and his investigative narrative *TurtleTrader*. He is known for popularizing a trend-following approach to trading.

Harriman-house.com

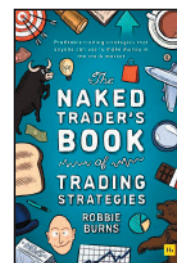


veteran trader and market strategist Jeffrey Hirsch looks at US stock market trends, patterns, and historical cycles. In keeping with its tradition, it presents and updates patterns that the *Almanac* has become well-known for, such as the "January barometer," the "Santa Claus rally," the "best six months," and the four-year "presidential election cycle," as well as other seasonal and annual cycles. The *Almanac* explores strategies for getting a

Stock Trader's Almanac 2024 (208 pages, October 2023, spiral-bound softcover \$55, ebook \$33, ISBN 978-1-394-20322-2) by **Jeffrey A. Hirsch**, published by Wiley. In this 57th edition of the annual *Almanac*,

handle on increased market volatility, identifying past periods of exceptional price movement in the market, as well as streaks of positive and negative performance likely to repeat. This edition offers a 2024 outlook, a 2024 strategy calendar, and month-by-month and day-of-the-week historical statistics.

Wiley.com, www.StockTradersAlmanac.com



The Naked Trader's Book of Trading Strategies (256 pages, July 2023, softcover £18.99 includes ebook, ISBNs 9780857199782, 9780857199799) by **Robbie Burns**, published by Harriman House. Twenty-

two years ago, the author quit his day job and took the leap into trading full-time. Along the way, he recorded many of his trades and documented what strategies worked most consistently. This book describes some of his strategies and shows them in action. In his personal trading, the author trades both long and short, and he uses a spread betting approach. This book follows previous books in his popular *Naked Trader* series, including *Trade Like A Shark* and *Spread Betting*.

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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

AUTOMATION IN TRADING: A REAL LIFE SAVER (PART 1 OF 2)

In the vast sea of operational finance, a clear distinction is often made between “discretionary” technical analysis, a type of analysis based on subjective interpretation of charts and indicators, and “quantitative” (or “systematic”) technical analysis, which relies on a set of statistically tested patterns from the past, thus endowed with scientific validity. These two factions are often fiercely opposed, with the former denying any statistical-scientific background to financial analysis and instead proclaiming complete reliance on artistic-intuitive dictates, while the latter firmly asserts that only the scientific method ultimately prevails in financial markets.

In recent years, thanks to various platforms that have made quantitative trading readily accessible even to retail investors, reducing data reception costs and the software necessary for real-time trading orders to almost zero, it seems that the pendulum of history is swinging in favor of trading systems. These systems are the algorithms on which quantitative trading is based.

Stated this way, it may seem complex, but in reality, a trading algorithm is nothing more than a set of rules for buying and selling, often quite straightforward. For example, whenever a stock is above its 200-day moving average (indicating

an upward trend), and a common oscillator like the RSI falls below 30 (indicating oversold conditions in the short term), the algorithm buys when the stock surpasses its previous weekly high. It exits at a +10% target or with a stop-loss at 15% below the entry price.

As evident, these are often very simple formulas that allow the trader to anticipate the percentage of profitable trades, the average trade, the maximum drawdown of the profit

In reality, a trading algorithm is nothing more than a set of rules for buying and selling, often quite straightforward.

curve, and many other details that help control the emotions of trading because all statistical parameters of the model are known.

On the other hand, those who advocate traditional technical analysis, which I refer to as “classic,” believe that financial markets are essentially unpredictable due to their variability. Therefore, they argue that much experience and an artistic touch are necessary to outline various operational scenarios.

While classic technical analysis may have an easy appeal and promises much but delivers little (at least for beginners), quantitative trading

not only intimidates newcomers but also veterans because it imposes several entry barriers that seem insurmountable to most. The first obstacle is programming algorithms, which is perceived as more challenging than learning a foreign language. However, the reality is different; learning a programming language is often easier than mastering a foreign language. The second obstacle is the common belief that programming a trading system requires considerable market experience or a genius ability to innovate. This is far from true. Literature on technical analysis has made thousands of ready-to-use trading systems available, some with uncertain results, but others are genuinely interesting in terms of effectiveness and authority.

In my experience, while many market players have experience and knowledge of classic technical analysis (perhaps distrusting their artistic intuition), only a few today operate with automatic trading algorithms.

Above, I’ve discussed the two opposite poles in the way that traders approach the markets, discretionary versus fully algorithmic. However, there is also an intermediate pole—one that is often overlooked. Next month in this column, I’ll discuss that middle ground and I’ll show how and why more individual traders could make use of it to their advantage.



ETFs Focused On Disruptive Innovation

A Look At ARK ETFs: Are They Ready For A Resurgence?

ARK ETFs got crushed from their 2021 peak. Are they ready for a resurgence, or is more bad news ahead for this well-known family of ETFs? We'll examine some potentially deciding factors.

by Leslie N. Masonson

Back in October 2020 with the COVID-19 pandemic still raging and the ARK ETFs soaring, I was considering writing an article about them, but I was hesitant because of their gangbuster performance, popularity, and over-the-top press coverage. Why was that an issue for me? Skyrocketing pandemic beneficiaries eventually reach a crescendo and then collapse, and I didn't want the article to come out just as the ETFs started to (possibly) turn a corner. As it happened, these ETFs started a decline in late February 2021, so I was relieved that I put this article on a backburner until now.

ARK INVESTMENT MANAGEMENT PROFILE

ARK Investment Management LLC and the family of ARK ETFs comes under the management of Catherine

Wood, who is chief investment officer (CIO) and portfolio manager. This popular group of ETFs have been part and parcel of ETF euphoria for the past four years. The ARK ETFs are well-known to most investors and traders, not only because of Wood's strong media presence and her famously keen interest in technology, but also because of the spectacular performance of some ARK ETFs, which gained 200% or more for the two years ending February 12, 2021. However, over the next 21 months, the ETFs experienced a devastating average decline of 75% or more.

Wood founded the firm in January 2014 with a laser focus on uncovering companies offering disruptive innovation. She would research stocks, sectors, and industries to find potential star performers in areas including the internet, blockchain, bitcoin, robotics, autonomous vehicles, genome sequencing, artificial intelligence, space exploration, fintech, 3D printing, and energy storage.

According to the ARK website: "ARK aims to deliver long-term capital appreciation by investing in leaders, enablers, and beneficiaries of disruptive innovation. Disruptive innovation is defined by the firm as the introduction of technologically enabled new products or

services or new scientific advancement that change the way the world works.”

The company identifies 14 investable technologies that are considered launching pads for innovation:

- 3D printing
- Adaptive robotics
- Programmable biology
- Multiomic technologies
- Precision therapies
- Digital wallets
- Smart contracts
- Cryptocurrencies
- Advanced battery technology
- Autonomous mobility
- Intelligent devices
- Next-gen cloud
- Reusable rockets
- Neural networks

The company realizes and points out that there are risks and uncertainties that could impact their projections and research models, and that investors should read their fund prospectuses, fact sheets, and reports to understand all the risks involved including market price risk, company and sector risk, competitive risk, regulatory and political risk, and other risks before investing.

With an extensive research staff, ARK’s recommendations are found in a number of these ETFs. The firm has an iterative investment process that includes not only a “top-down” but also a “bottom-up” approach scoring system. The former process searches for stocks that can earn a premium over the market, provide price potential over three to five years, and have sufficient outstanding shares to purchase over time.

The “bottom-up” process evaluates investment reports and valuation models. In addition, ARK staff members use weekly analysis to assign scores to companies. For this, they use six key metrics:

1. Company, people and culture
2. Execution of objectives
3. Moat or barriers to entry
4. Product and service leadership
5. Thesis risk
6. Valuation: 5-year return (15% compound annual return hurdle rate)

ARK ETFs COME TO MARKET

In 2014, four ETFs came to market with a slow start and no fanfare: ARK Innovation, ARK Genomic Revolution,

ARK Next Generation Internet, and ARK Autonomous Technology and Robotics ETF. Then came ARK Fintech Innovation in February 2019, followed by ARK Space Exploration & Innovation in March 2021. One or more of ARK ETFs were in the news almost daily during their book period because of the high number of disruptive tech portfolio components (big bets on three dozen stocks), high daily average volume, and totally transparent portfolio management. Their price appreciation not only climbed to the stars with 200%+ runs in the two boom years, but also experienced a fall back to earth.

Full transparency is one of the key hallmarks of these funds, as opposed to most active portfolio managers who want to keep their trades relatively private for a while to avoid others front-running their accumulation of new positions. ARK ETF portfolios can be viewed every evening to determine any changes. Moreover, individuals can sign up to receive ARK’s “trade notifications” email whenever trades occur.

Wood, ARK’s ever-present CEO and CIO, was sought after for business show interviews, podcasts, and print media. She is not shy about sharing her vision of the future of technology to transform the world, and her belief that a long-term holding period—of at least five years—is necessary to reap the rewards of the innovative companies in the portfolios.

She was and still is a big believer in Tesla’s future growth prospects, with a stake of \$544 million in share value. She was early with her NVIDIA purchase but sold a big chunk of those shares in January 2023, just before its majestic advance from about \$150 to \$500 in August 2023 before its recent giveback. This was another bad-timing call that was costly to perplexed ARK ETF shareholders.

ARK ETFs REVIEW

The ETFs to be reviewed here are listed in Figure 1. Note that all the data presented in this article was obtained

Ticker	Fund Name
ARKK	ARK Innovation ETF
ARKG	ARK Genomic Revolution ETF
ARKW	ARK Next Generation Internet ETF
ARKQ	ARK Autonomous Technology & Robotics ETF
ARKF	ARK Fintech Innovation ETF
ARKX	ARK Space Exploration & Innovation ETF
PRNT	The 3D Printing ETF
IZRL	Israel Innovative Technology ETF

FIGURE 1: ARK ETFs. The tickers and names of the eight ARK ETFs are shown here. They are all managed by ARK Investment Management LLC under the portfolio management of CIO Cathie Wood.

Ticker	Fund Name	Inception Date	AUM (\$mm)	Expense Ratio	Holdings	% in Top 10 Stocks	Average Daily Volume	Dividend Yield	Performance			Flows		
									1 Year	3 Years	5 Years	1 Year (\$mm)	3 Years (\$mm)	5 Years (\$mm)
ARKK	ARK Innovation ETF	10/31/2014	\$5,939	0.75%	31	61.7%	14,092,171	0	-9.96%	-29.25%	-2.41%	(\$1,085)	\$9,368	\$14,909
ARKG	ARK Genomic Revolution ETF	10/31/2014	\$1,441	0.75%	39	52.4%	1,502,990	0.04%	-32.59%	-31.79%	-2.26%	(\$203)	\$4,231	\$5,905
ARKW	ARK Next Generation Internet ETF	9/30/2014	\$1,142	0.88%	34	62.4%	269,419	0.01%	4.99%	-23.90%	3.21%	(\$178)	\$639	\$2,135
ARKQ	ARK Autonomous Technology & Robotics ETF	9/30/2014	\$882	0.75%	36	66.2%	67,939	0.36%	1.99%	-7.79%	9.08%	(\$75)	\$831	\$1,259
ARKF	ARK Fintech Innovation ETF	2/4/2019	\$741	0.75%	29	62.5%	500,823	0.12%	5.52%	-25.75%		(\$114)	\$1,751	\$2,490
ARKX	ARK Space Exploration & Innovation ETF	3/30/2021	\$238	0.70%	35	58.6%	38,686	0.61%	-3.65%			(\$33)	\$425	\$425
PRNT	3D Printing ETF	7/19/2016	\$125	0.66%	54	36.0%	14,437	0.66%	-16.19%	-11.34%	-4.10%	(\$33)	\$300	\$315
IZRL	ARK Israel Innovative Technology ETF	12/5/2017	\$72	0.49%	46	23.4%	24,770	0.24%	-15.08%	-15.72%	-4.36%	(\$19)	\$164	\$177

FIGURE 2: ARK ETF COMPARISON. The flagship fund and leader by far is ARKK with \$5.9 million in AUM and 56% of all the assets of the eight ETFs. The negative one-year flows for all these ETFs are not a good sign.

from ETFAction.com, a comprehensive ETF software platform, which has been enhanced greatly since my review of it in the May 2020 issue of this magazine. The common characteristics of the ETFs are as follows:

- open-ended
- non-leveraged equities only
- annual dividend frequency
- global with respect to market, region, and country
- no currency hedges used
- actively managed (except for PRNT and IZRL which are passively managed), advised by ARK Investment Management LLC, and distributed by Foreside Fund Services, LLC
- shares listed on the NYSE Arca (ARKK, ARKW, ARKF) or on the Cboe BZX US Equities Exchange (the five others).

Moreover, PRNT and IZRL are tiered and market-cap weighted, while the others have a proprietary weighting with no underlying index as a benchmark. The closure

risk for these ETFs is low at this time, but may change in the future dependent on market conditions and AUM levels.

Most of this review will focus on the six ARK disrupters, and less so on PRNT and IZRL, which have a slightly different focus and have non-ARK tickers. In total, the eight ETFs have \$10.58 billion in AUM, have an average expense ratio of 0.72%, and have year-to-date outflows of \$1.345 billion as of October 27, 2023.

The first four ARK ETFs entered the scene in fourth quarter of 2014, as seen in Figure 2. Assets under management (AUM) didn't really accelerate until 2019 to early 2021 when the ETFs skyrocketed in price. Since that peak, the total AUM has probably declined by 50% or more due to the dramatic price decline, lack of interest, and the apparent lack of risk management in the funds. Since these ETFs are actively managed, it was shocking to see them decline at least 75% during the 2021 to 2022 period. The portfolio manager and team must have thought their holdings were bullet-proof due to their unique business model. But their buy-and-hold approach was catastrophic and the funds bleed assets at an alarming rate. More on that later.

Referring again to Figure 2, we see that ARKK had the most assets at \$5.9 billion, followed by ARKG at \$1.4 billion, ARKW at \$1.1 billion, ARKQ at \$882 million, and ARKX at \$238 million. ARKK holds 56% of the AUM of the entire group, by far the behemoth of the portfolios. Likewise, ARKG holds 13.6%, and in third place, ARKW maintains 10.8%. Thus, these three biggest



This popular group of ETFs have been part and parcel of ETF euphoria for the past four years.

players control 80% of all the ARK assets.

Four of these ETFs have a expense ratio of 0.75%, which is in line for actively managed funds, however their turnover ratio is much less than expected for active ETFs because of the long-term holding philosophy of Wood, which she has stated on numerous occasions is at least five years. ARKW is the outlier on the high side at 0.88%, while IZRL is on the low side at 0.49%. PRNT is in middle at 0.66%.

These ETFs offer a low dividend yield with ARKG, ARKW, and ARKF all at 0.12% or less. ARKK is lowest at 0% and PRNT is highest at 0.66%. Moreover, the number of portfolio positions is similar in each ETF, ranging from 29 to 35, which means the portfolios are very highly concentrated, which is both good and bad—in a booming market when these stocks are in favor, the portfolio value will soar, but in a rapidly declining market they will collapse. And we’ve experienced both of these scenarios since 2019.

The daily trading volume of ARKK of 14 million is by far the most active of the group. In second place is ARKG at 1.5 million, followed by ARKF at half a million, and ARKW at 269,000. ARKQ rounds out the top five at 67,000.

ARK Innovation ETF (ARKK)

ARKK is the flagship ETF of this group, and therefore it will be the only ARK ETF that I will cover here in detail. If you are interested in their other ETFs, then you can go to their website at <https://ark-invest.com> to view their fact sheets, prospectuses, and performance data.

ARKK’s composition is a conglomeration of analysts’ highest-conviction names, names that are also in the other four ARK ETFs. That is why ARKK has the highest overlap to these funds. More on that in the “ETF overlap” discussion below.

The ARKK ETF underperformed its broad-based global benchmark for the third quarter 2023 with particularly poor performance from Unity Software (U) and Block Ins. (SQ). On the flip side, the top performers were Roku Inc. (ROKU) and DraftKings Inc. (DKNG). Roku reported positively skewed earnings, and DKNG was upgraded by a Bank of America analyst.

ARKK is listed on the NYSE Arca and typically holds between 35 to 55 securities curated from the other four ARK ETFs. Its top-10 holdings as of November 2, 2023 are provided in Figure 3. With almost \$6 billion in AUM, it is the largest of the ARK ETFs, with a high concentration of 62% in these top-10 stocks. This ETF is the only ARK ETF that doesn’t pay a dividend, although the other dividend payers are quite minor at 0.36% or below. At

Company	Ticker	CUSIP	Shares	Market Value (\$)	Weight (%)
1. TESLA INC.	TSLA	88500R2	2,318,320	\$333,195,427.20	8.97%
2. COINBASE GLOBAL INC -CLASS A	COIN	19090Q207	7,044,174	\$325,565,822.74	8.84%
3. ZOOM VIDEO COMMUNICATIONS A	ZM	98980L K01	7,952,820	\$473,192,790.00	7.96%
4. Roku Inc.	ROKU	77548R001	7,844,099	\$442,485,624.59	7.45%
5. UPRATH INC - CLASS A	PATH	90364R105	27,253,177	\$466,625,544.56	7.01%
6. BLOCK INC.	SQ	85222R101	7,235,820	\$302,464,779.44	5.09%
7. ROBOLOX CORP -CLASS A	ROBLX	77104R001	8,442,157	\$257,997,896.35	4.34%
8. TWILIO INC - A	TWLO	90188R101	4,742,822	\$248,703,216.50	4.07%
9. DRAFTKINGS INC CL A	DKNG	26142R105	9,147,666	\$229,351,802.22	4.04%
10. UNITY SOFTWARE INC	U	91003R101	8,143,783	\$271,161,079.79	3.54%

FIGURE 3: ARKK TOP-10 HOLDINGS. Tesla still remains the top holding and has been over the years. Coinbase and Zoom round out the top three. The holdings can be viewed daily on the ARK website with full transparency.

just over 14 million shares a day, this is by far the most actively traded ETF and the most well-known. Its three-year price performance of -29.25% is the second-worst of the group, followed by ARKG at 31.79%. ARKG is heavy on smallish biotech and genome stocks, which tend to be very volatile with minimal if any earnings and a high risk of price decline if new drugs fail their required federal stringent testing criteria.

ARKK’s loss of \$1 billion in AUM over the past year is an indication of loss of confidence in ARK Management and the portfolio holdings. Over the past nine months, when both stocks and bonds fell on hard times, nervous investors have been placing their money in short-term instruments.

ARK ETF MONEY FLOWS

As Figure 2 shows, all these ETFs have been disgorging assets over the past one year, with ARKK expelling just over \$1 billion. At one point during the price peak in February 2021, ARKK had \$28 billion in AUM compared to its current \$6 billion number. This 79% AUM decline has resulted in ARK management and its distributor Foreside Fund Services giving up approximately \$165 million in fees, given that its expense ratio is 0.75%. Moreover, Wood had half of her personal retirement account invested in ARK ETFs, which have been hit hard.

Full transparency is one of the key hallmarks of these funds.



Both ARKG and ARKW lost around \$190 million each. ARKF was next in line with a loss of \$114 million. ARXX, PRNT, and IZRL lost \$33 million or less. Losing assets is a big negative for any ETF, as management fees are reduced and their trading liquidity may be hampered by their low trading volume, and in some instances, the bid-to-ask spread.

The flows over five years were positive since that reflects the impressive returns in early 2019 through early 2021 where assets kept accelerating until the ETFs began their inevitable fall. That was also the period encompassing the 2020 COVID pandemic where certain stocks grabbed investors' attention such as ZOOM, FB (now Meta), and companies engaged in stay-at-home offerings.

Although flows for three years were also positive, the decline in shares and investor interest was apparent, especially after February 2021 when share prices started their bear market descent. Not shown in Figure 2 are the flows for the past 90 days. They are also negative, with ARKK losing another \$575 million and ARKW \$113 million. The only ETF with positive 30-day flows is ARKG at \$4 million.

PORTFOLIO ASSET COMPOSITION

Figure 4 provides a snapshot of the composition of the portfolios of the eight ETFs. The overwhelming majority of the assets are invested in U.S. companies, except for IZRL with only 10% in U.S. companies. On the opposite side of the spectrum, there are no assets in frontier countries and minimal assets in emerging markets.

As far as market capitalization shown in the table, large-cap is the category most often invested in except for ARKG and IZRL. This makes sense since many biotech and genome companies are small- or mid-cap, and Israeli companies are also small in magnitude.

Moving on to sector composition (no figure provided), ARKG has the highest concentration in the healthcare area at 88.5% of its portfolio, with the remaining 16.5% split between materials and information technology. ARKX has 56.2% of assets in industrial companies and 25% in information technology, 9.2% in communications services, and 5% in consumer discretionary. ARKQ assets are split with 35% each in industrial and information technology companies, 17% in consumer discretionary,

Ticker	Percent in Top 10	U.S.	Developed Ex-US	Emerging Markets	Large Cap	Mid Cap	Small Cap	Micro Cap
ARKK	61.74%	93.30%	6.64%	0.00%	45.84%	36.24%	17.17%	0.66%
ARKG	52.41%	93.49%	6.06%	0.00%	10.59%	35.22%	35.83%	17.84%
ARKW	62.41%	90.43%	7.09%	0.24%	63.08%	25.75%	10.02%	1.12%
ARKQ	66.16%	87.87%	9.18%	2.90%	47.76%	30.77%	15.55%	5.88%
ARKF	62.52%	67.16%	17.61%	3.56%	59.09%	37.64%	3.16%	
ARKX	58.58%	81.41%	16.71%	1.74%	38.56%	35.74%	15.84%	5.26%
PRNT	35.98%	62.97%	35.77%	0.00%	36.27%	17.23%	21.20%	24.04%
IZRL	23.37%	10.79%	89.07%	0.00%	4.62%	17.66%	48.44%	29.13%

FIGURE 4: PORTFOLIO COMPOSITION. Large-cap was the dominant asset category while emerging markets and frontier markets were almost nonexistent. Also, large- and mid-cap were the predominant choices for company size. PRNT and IZRL focused on smaller companies, as expected.

and 9% in communications services.

ARKF has 42.6% devoted to the financial sector, as expected, with 30.5% in information technology, 16% in consumer discretionary, and 8.5% in communication services. ARKW's biggest allocation of assets is 35.2% in information technology, 20.4% in financials, and 13.6% in consumer discretionary. ARKK has the broadest asset base of the group with 31.2% of its assets devoted to information technology, 21.6% to healthcare, 16.6% to financials, 13.6% in consumer discretionary, 13.1% in communication services, and 2.8% in materials.

Both PRNT and IZRL have different sector weightings. PRNT has a heavy 45.4% in information technology, followed by 32.4% in industrials, 11.1% in healthcare, and 7.1% in consumer discretionary. On the other hand, IZRL has the highest concentration in information technology at 57.8% with 13.5% in communication services, 13.0% in healthcare, 8.6% in industrials, and 6.9% in consumer discretionary.

ETF PORTFOLIO PERCENTAGE OVERLAP AND COMMON HOLDINGS

The portfolio composition reviewed above indicates a heavy focus on information technology, industrials, and consumer discretionary companies. Now let's review the percentage of securities that are common to combinations of these ETFs, using data from ETFAction.com.

Figure 5 compares the common holdings of six disruptive ETFs. Clearly, ARKW and ARKK have the highest overlap score at 69%. The next highest correlation was from ARKX and ARKQ at 58%, with ARKF and ARKW at 47%, ARKK and ARKF at 43%, and ARKK and ARKG at 27%. The remaining ETFs compared to each other had less than eight stocks in common since they had a different focus.

There are 123 different stocks held in all these six ETFs combined. All funds own UPath (PATH) with a total

ARK position of \$643 million. The following stocks are owned by four of these ETFs: Teledoc Health (TDOC) with \$297 million, Unity Software (U) with \$271 million, and NVDA Corporation (NVDA) with \$61.9 million. Unfortunately, Wood sold most of its large NVDA position in January 2023 when the stock was around \$150, thereby missing out on the spectacular run to \$500 in August 2023, another unforeseen blunder, after being a big proponent of the company for years.

Sadly for buy-and-hold shareholders, she rode the stock down from its \$347 high in November 2021 to lose 43% off that point on the shares held. I don't know the price paid for NVDA, but to ride a stock down without a defensive strategy in place is insanity, especially for an active manager with nothing stopping her from selling out or greatly reducing her position at any time. Where is their risk management? There must be none to speak of if they are holding losing positions that keep declining in price.

Three stocks were held in common by three ETFs. Their tickers are as follows: DKNY, SHOP, TWLO, HOOD, RBLX, TER, ACHR, VCYT, PLTR, and TWOU. These positions each average \$100 million to \$400 million, but the outliers are COIN at \$672 million, TSLA at \$544 million, and SQ at \$399 million. The outlier of this group on the low asset size is TWOU at \$16 million, probably one that was sold off from a much larger position size. ARK expects the value of TSLA to hit \$2,000 a share by 2030 or before from its current price of \$375.

PRICE PERFORMANCE COMPARISON

The earliest common date of inception for five of these ETFs is February 4, 2019, which is the inception date of ARKF. Four ETFs had an earlier date of September and October 2014, but I wanted to include ARKF in the mix for comparative purposes. Their performance through October 27, 2023 is shown in Figure 6. Clearly, this is an ugly chart. Three of these ETFs had a lower price than their opening price in 2019. The big COVID 200%+ run-up from March 2020 to early 2021 was then followed by the devastating reversal of the entire move.

Figure 7 provides the 2019–2022 bull and bear market performance, respectively of six ARK ETFs compared

	ARKK	ARKG	ARKW	ARKQ	ARKF	ARKX
ARKK						
ARKG	27.7% 14 names					
ARKW	68.6% 18 names	8.2% 4 names				
ARKQ	19.6% 6 names	4.5% 2 names	15.4% 8 names			
ARKF	43.0% 11 names	6.5% 3 names	46.7% 15 names	7.5% 2 names		
ARKX	7.0% 4 names	3.4% 1 names	5.2% 2 names	57.9% 22 names	3.9% 1 names	

FIGURE 5: ETF OVERLAP. Among the six ETFs viewed here, ARKK had the most overlap with ARKW (69%) and ARKF (43%). ARKQ and ARKX had a 58% overlap, and ARKF and ARKW had a 47% overlap.



FIGURE 6: FIVE ARK ETFS PERFORMANCE VS. COMMON BENCHMARKS. Clearly, these ETFs have had a roller-coaster ride to the clouds and then back to earth. Both the S&P 500 index and the Nasdaq-100 beat all these ETFs in performance.

Ticker	% Price Change	
	Bull Market Run 2/2/2019–2/12/2021	Bear Market Run 2/12/2021–12/28/2022
ARKK	246.60%	–80.90%
ARKG	295.30%	–75.70%
ARKW	277.50%	–80.50%
ARKQ	197.20%	–59.90%
ARKF	208.30%	–78.30%
SPY	49.90%	–1.30%
QQQ	101.60%	–21.80%

FIGURE 7: ARK ETF BULL AND BEAR MARKET RETURNS. These ETFs had massive bull market runs, but gave back most of it during the ensuing bear market. Moreover, the AUM took a 50% or more wallop. Note that by comparison, the benchmark indexes had only a minor negative performance during the bear market.

to the common S&P 500 index and the Nasdaq 100 benchmarks. Clearly, these ETFs were exceptional on the way up and disastrous on the way down, especially compared to the two benchmarks. An actively managed fund, the portfolio managers seemed to have been oblivious to risk without any strategy to stem the losses. As a result, the AUM plummeted as well from the peak level in February 2021.

ARK ETFs		View: Raw RS																
Name	Symbol	10/29/23	10/20/23	10/13/23	10/6/23	9/29/23	9/22/23	9/15/23	9/8/23	9/1/23	8/25/23	8/18/23	8/11/23	8/4/23				
1. Ark Next Generation Internet ETF	ARKW	21.815	21.516	21.558	21.117	17.128	20.185	21.727	22.9	21.385	22.08	21.725	22.059	21.257				
2. Ark Fintech Innovation ETF	ARKF	21.812	21.524	22.474	22.367	16.368	20.213	22.764	24.597	23.187	24.672	22.512	22.744	22.773				
3. Ark Autonomous Tech & Robotics ETF	ARKQ	13.728	21.466	22.175	18.122	12.31	15.085	21.817	16.785	24.442	22.047	17.953	30.186	26.958				
4. Ark Innovation ETF	ARKK	9.1519	16.338	13.56	12.15	3.957	7.8333	17.779	6.1185	23.85	5.3181	12.512	25.772	20.917				
5. Ark Space Exploration & Innovation ET	ARKX	7.5476	8.5813	8.7588	5.791	7.0741	7.6287	7.4415	5.0435	12.895	3.7646	10.22	22.456	26.776				
6. Ark Israel Innovative Technology ETF	IZRL	-13.389	-6.6511	-5.0658	3.0508	-0.02216	1.6755	3.6717	1.6923	14.519	5.7099	8.4771	16.301	13.845				
7. 3D Printing ETF	PRNT	-14.885	-7.2734	-7.6628	-6.9998	-6.9629	-6.9767	-4.1147	-7.9236	7.4654	0.28222	4.1831	14.115	15.595				
8. Ark Genomic Revolution ETF	ARKG	21.215	16.432	16.711	15.445	15.525	11.956	5.1953	14.172	0.3076	10.591	2.5785	4.4501	3.4768				

FIGURE 8: PERFORMANCE OVER PAST 43 WEEKS. ARKW, ARKF, and ARKQ are top performers. At the opposite end of the spectrum, PRNT, ARKG, and IZRL have negative returns for the period.

Since May 2022 through October 2023 the stocks have been in a tight roller-coaster trading range. Notice that the S&P 500 (black color) and the Nasdaq Composite (turquoise) had better performance than all the respective five ARK ETFs. And of course, the latter two benchmarks are much more diversified with a lower beta. So, as we all know or will learn when trading or investing in ETFs, a concentrated portfolio like these ARK ETFs or sector ETFs are only profitable when the trend is your friend, otherwise bail out before the dam bursts.

The 2023 year-to-date performance for all eight ETFs is shown in the October 29, 2023 column in Figure 8. Each column represents the last 43 weeks of performance. For example, the column date August 4, 2023 is the performance for the prior 43 weeks, and ARKW was up 34.28% for that period. Notice that three ETFs at the bottom of the table—IZRL, PRNT, and ARKG—all had negative returns for year-to-date, while two had over 20% returns—ARKW and ARKF—matching the Nasdaq Composite's 20.8% return. In comparison, the S&P 500 index has gained 7.24% for the YTD.

Just one week later (week ending November 4, 2023), as I write this review, the market had a huge rally and the ARK ETFs were big participants with ARKK gaining 18.6%, ARKG gaining 17.1%, ARKW up 16.1%, and ARKF up 15.7%. The other four advanced 6.2% to 10.5%. This compares with a 5.8% gain for the S&P 500 index and 6.5% for the Nasdaq 100. So there still might be another march higher for these ETFs, if the market continues its one-week rebound in the historically strong seasonal period of November to January.

CONCLUSION

While Wood is still speaking positively about these ETFs, as she has for the last five years based on her 5-year minimum hold periods for performance, these ETFs have been through the ringer and have not performed as she had predicted. This year they are performing much better than the averages. Interestingly, ARKK, the dominant player of the group, has not performed better than the NASDAQ since its inception with much more downside risk.

I placed the current top-10 holdings of ARKK into

my VectorVest software platform that rates stocks on both a fundamental and technical basis, as of the close on November 3, 2023, and found that only Square and CRISPR Therapeutics had a “buy” rating, while Unity Software and Twilio Inc. had “sell” ratings, and the others were a hold. And this is after a very positive week for the market.

Furthermore, all the stocks had a VectorVest value below their current market price except for Twilio. Overall, of the 9,146 stocks and ETFs followed by VectorVest, 6.5% of them (5,955) are on a “buy” recommendation, 30.6% (2,801) are on a “sell” recommendation, and 62.9% (5,749) are on a “hold” recommendation. VectorVest analysis of the eight ETFs directly in their “ETF Viewer” tool yields seven “hold” recommendations and one “sell” (ARKG), again another indication of lackluster current performance and limited upside potential.

None of the ETFs in the ARK lineup appear to be exceptional from a long-term performance perspective and the weak financials of some of the portfolio holdings adds to my conclusion that I will not purchase these ETFs at this time. Broader index technology ETFs have actually performed better over multiple years. It is possible that one or more of these ETFs will turn into a “star” performer in future years, but no one knows which one that will be, if any.

S&C Contributing Writer and ETF columnist Leslie N. Masonson is president of Cash Management Resources, a firm focusing on ETF strategies. He is an active NASDAQ futures and ETF trader, and the author of six books including Buy—Don't Hold: Investing With ETFs Using Relative Strength To Increase Returns With Less Risk; All About Market Timing (two editions), as well as Day Trading On The Edge. He can be reached at lesmasonson@yahoo.com or 845 323-7276.

FURTHER READING

Masonson, Leslie N. [2020]. “ETFAction.com,” product review, *Technical Analysis of STOCKS & COMMODITIES*, Volume 38: May.

Futures For You

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

WHAT IS A MISCONCEPTION MANY HAVE ABOUT MARKETS BEFORE THEY BEGIN SPECULATING?

Over the years, I have had seemingly endless conversations with folks new to trading or just exploring their curiosity about futures and options speculation. Very few realize that markets don't owe participants execution at their desired or requested prices. There is a widespread expectation that if a trader wants to buy or sell at a particular price, someone on the other end of the tape will always be willing to do so. Further, beginning traders fail to recognize the potential for price slippage when using market and stop orders. More importantly, many traders assume stop-loss orders are concrete risk management tools in which their risk is limited to the price listed in their working stop-loss order. While this is relatively true in most market environments, it is not always true. Because stop-loss orders become market orders once the stated price is hit, the fill price might be substantially different than the stop-loss price to cause slippage. Even worse, futures markets can gap through a working stop price between sessions, and in extreme circumstances, intraday volatility can cause stop orders to be unfillable. Keep in mind, just because one trader needs to sell to get out doesn't mean another wants to buy to get in.

The misunderstanding of market

mechanics and logic goes even deeper for those looking to trade options. This is because the options market is not nearly as liquid as the underlying futures market. Thus, there are fewer buyers and sellers to enable transactions to occur. In fact, most option transactions are only made possible by the market makers. If traders needed to wait for another retail order to take the other side of their transaction, they would be waiting for quite some time or

Very few realize that markets don't owe participants execution at their desired or requested prices.

have to adjust their execution price to something highly unfavorable to lure other speculators to take the plunge. This is also true of a thinly traded futures market such as orange juice or lumber. In recent years we've seen these two markets explode with volatility. Some of that volatility was created by unusual fundamental events such as COVID-19 and freezes in Florida. Still, the price moves were undoubtedly exacerbated by a lack of liquidity and the emotional toll that takes on market participants. Additionally, in my humble opinion, the daily price limits set by the

exchange for these, and other, futures contracts also played a role. Imagine being short orange juice during the largest rally in history but not being able to exit in the session you deem "too much to bear" because the market is locked limit despite only 200 contracts trading hands that day. This is exactly the emotional turmoil many unsuspecting orange juice traders faced in the second half of 2023.

Those who venture into the markets must recognize that the reality of trading isn't identical to the comfort of paper trading. Paper traders can say, "I'd like to buy corn at \$4.50 with a stop loss at \$4.00 and a profit target of \$5.00," without considering the reality of getting filled at those prices. Yet, those participating in the markets understand that things go as expected most of the time, but there is plenty of opportunity for unexpected hitches that interfere with results. For this reason, those who backtest algorithmic systems often reduce performance figures by a set percentage to account for the difficulties with live trading that don't show up in paper trading results.

On another note, I find beginning traders often become angry when price slippage or unfilled orders arise. They assume their broker or a market maker is out to get them and

Continued on page 46



The focus of Traders' Tips this month is Perry Kaufman's article in this issue, "Gap Momentum." Here, we present the January 2024 Traders' Tips code with possible implementations in various software.

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

- Traders.com → S&C Magazine → Traders' Tips

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

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



◆ TRADESTATION: JANUARY 2024 TRADERS' TIPS CODE

In his article in this issue, "Gap Momentum," Perry Kaufman explores using opening gap data to create a momentum strategy, drawing inspiration from J. Welles Wilder as well as from Joseph Granville's on-balance volume (OBV), by accumulating positive and negative gap values to derive a cumulative gap ratio he calls gap momentum. A signal line, computed as a moving average of the gap ratio, is used to determine strategy signals, where buy signals occur when the signal line is moving higher and sells occur when the line is moving lower.

Strategy: Gap Momentum

```
// TASC JAN 2024  
// Gap Momentum  
// An idea inspired by J. Welles Wilder, using Ehlers method  
// Copyright P.J. Kaufman. All rights reserved.
```

inputs:

```
Period( 1 ),  
SignalPeriod( 20 ),  
LongOnly( true ),  
PrintFile( false ),  
FilePath( "C:\TradeStation\Gap_Momentum.csv" );
```

variables:

```
Gap( 0 ),  
UpGaps( 0 ),  
DnGaps( 0 ),  
GapRatio( 0 ),  
Idx( 0 ),  
Signal( 0 ),  
Size( 0 ),  
Investment( 100000 ),  
Adate( "" ),  
TodayPL( 0 );
```

for Idx = 1 to Period
begin

```
Gap = Open[Idx] - Close[Idx + 1];  
if Gap > 0 then  
    UpGaps = UpGaps + Gap  
else if Gap < 0 then  
    DnGaps = DnGaps - Gap;  
end;
```

```
if DnGaps = 0 then  
    GapRatio = 1  
else  
    GapRatio = 100 * UpGaps / DnGaps;
```

Signal = Average(GapRatio, SignalPeriod);

```
if MarketPosition <= 0 and Signal > Signal[1] then  
begin  
    Buy to cover all shares next bar on Open;  
    Size = Investment / Close;  
    Buy size shares next bar on Open;  
end  
else if MarketPosition >= 0 and Signal < Signal[1]  
then  
begin  
    Sell all shares next bar on Open;
```

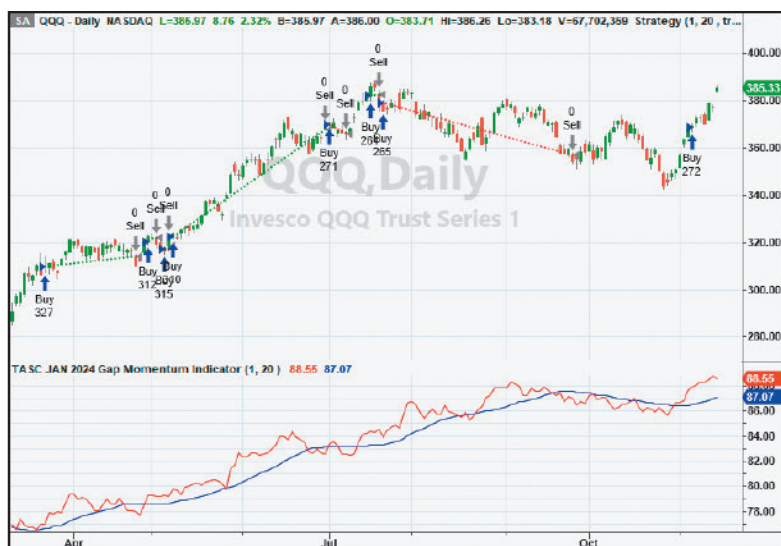


FIGURE 1: TRADESTATION. This TradeStation daily chart of the ETF QQQ shows a portion of 2023 with the strategy and indicator applied. The period is set to 1 and the SignalPeriod is set to 20.

Gap Momentum 1.00

Common Inputs Colors Levels Scale Visualization

Variable	Value
01 Gap Period	40
01 Signal Period	20

Load Save

OK Cancel Reset

EURUSD, Daily: Euro vs US Dollar

GAP MOMENTUM (40, 20) 42.30 53.96

```

    double &result_gapratio[],
    double &result_signal[]
{
//--- bar index start
int bar_index;
if(prev_calculated == 0)
    bar_index = 0;
else
    bar_index = prev_calculated - 1;
//--- main loop
for(int i = bar_index; i < rates_total && !StopFlag; i++)
{
    result_gapratio[i] = EMPTY_VALUE;
    result_signal[i] = EMPTY_VALUE;
    if(i >= prd)
    {
        double gap = 0.0, upgaps = 0.0, dngaps = 0.0;
        for(int j = 0; j < prd; j++)
        {
            gap = open[i - j] - close[i - j - 1];
            upgaps += gap > 0.0 ? gap : 0.0;
            dngaps -= gap < 0.0 ? gap : 0.0;
        }
    }
}

```

```

Sell Order:
mpds:= 40;
spda:= 20;
gap:= OPEN - Ref(CLOSE, -1);
upgap:= Sum( If( gap > 0, gap, 0), mpds);
dngap:= Sum( If( gap < 0, Neg(gap), 0), mpds);
denom:= If(dngap = 0, -1, dngap);
gapratio:= If(denom = -1, 1, 100 * (upgap / denom));
sig:= Mov(gapratio, spda, S);
dir:= roc(sig, 1, $);
cross(0, dir)

```

—Shaun Bosch
shadavbos@gmail.com



◆ **METASTOCK: JANUARY 2024 TRADERS' TIPS CODE**

◆ **WEALTH-LAB: JANUARY 2024 TRADERS' TIPS CODE**

The gap momentum indicator presented by Perry Kaufman in his article in this issue of has been added to Wealth-Lab 8, helping power any tool and extension of the product.

With cumulative indicators such as the gap momentum or

Gap momentum indicator:

```

mpds:= Input("Gap Momentum Periods", 2, 500,
40);
spda:= Input("Signal Line Periods", 2, 200, 20);
gap:= OPEN - Ref(CLOSE, -1);
upgap:= Sum( If( gap > 0, gap, 0), mpds);
dngap:= Sum( If( gap < 0, Neg(gap), 0), mpds);
denom:= If(dngap = 0, -1, dngap);
gapratio:= If(denom = -1, 1, 100 * (upgap / de-
nom));
sig:= Mov(gapratio, spda, S);
gapratio;
sig

```

Gap momentum system test:

```
Buy Order:
mpds:= 40;
spda:= 20;
gap:= OPEN - Ref(CLOSE, -1);
upgap:= Sum( If( gap > 0, gap, 0), mpds);
dngap:= Sum( If( gap < 0, Neg(gap), 0), mpds);
denom:= If(dngap = 0, -1, dngap);
gapratio:= If(denom = -1, 1, 100 * (upgap / de-
nom));
sig:= Mov(gapratio, spda, S);
dir:= roc(sig, 1, $);
cross(dir, 0)
```

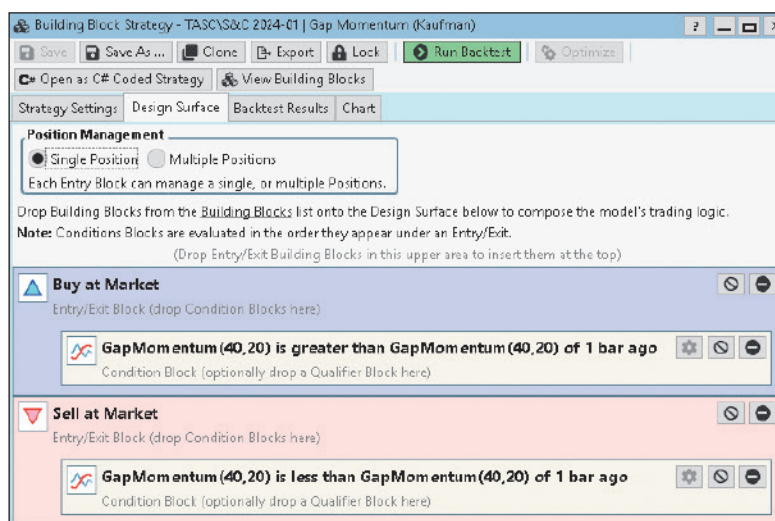


FIGURE 4: WEALTH-LAB. An outline of a system's trading logic can be expressed using Conditions Blocks.



FIGURE 5: WEALTH-LAB. Some exemplary trades can be seen here for the strategy on a chart of QQQ. Data provided by Yahoo! Finance.

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```
if (IsSeriesCachable) Calc_Volatility;
xVmp = xVolatility * Calc_Volatility;
xVmp = xVolatility * Calc_Volatility;
xVmp = xVolatility * Calc_Volatility;
xVmp = xVolatility * Calc_Volatility;
```



```
if (xVmp.GetValue(LengthVortex) == null || xVmp.TrueRange.GetValue(
for (i = Math.Max(LengthVortex, LengthTR); i >= 0; i--) {
if (i < LengthVortex) {
xVmpSum += xVmp.GetValue(i);
}
```



8 by selecting the menu New → NinjaScript Editor → Indicators folder from within the control center window and selecting the file.

A sample chart displaying the indicator is shown in Figure 7. Please refer to the article in this issue for details about the author's strategy and any settings for the indicator. The backtest shown here may represent a different time period than the one used by the author, which may lead to a difference in signals displayed.

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

—NinjaTrader, LLC
www.ninjatrade.com



◆ NEUROSHELL TRADER: JANUARY 2024 TRADERS' TIPS CODE

To implement the gap momentum indicator in NeuroShell Trader, simply select “new indicator” from the *insert* menu and use the indicator wizard to create the indicators below:

```
Gap: Sub( Open, Lag(Close,1)
GapUp: IfThenElse( A>B(GAP,0), GAP, 0 )
GapDown: IfThenElse( A<B(GAP,0),
Neg(GAP), 0 )
GapMomentum: Avg( Mul2(100, Divide(
Sum(GAPUP,40), Sum(GAPDOWN,40)) ), 40)
```

To implement the trading system, select “new strategy” from the *insert* menu and use the trading strategy wizard to create the following strategy:

BUY LONG CONDITIONS:
A>B(Momentum(
GapMomentum(Open,Close,40), 1), 0)

SELL LONG CONDITIONS:
A<B(Momentum(GapMomentum(Open,Close,40), 1), 0)

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

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

◆ ZORRO: JANUARY 2024 TRADERS' TIPS CODE

In this issue, the article “Gap Momentum” presents a trading strategy based on upward and downward gaps. I'm going to split his code in two parts: the gap momentum indicator and the trading system. The indicator code is just an 1:1 translation of his EasyLanguage

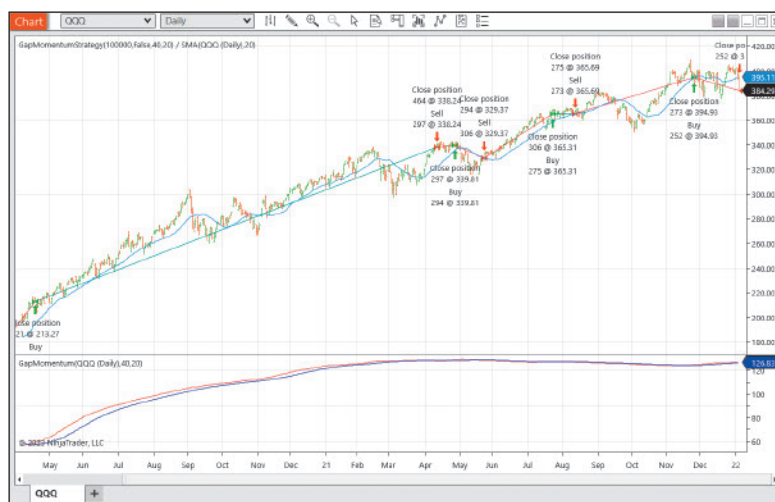


FIGURE 7: NINJATRADER. Here's an example of the gap momentum indicator on QQQ.

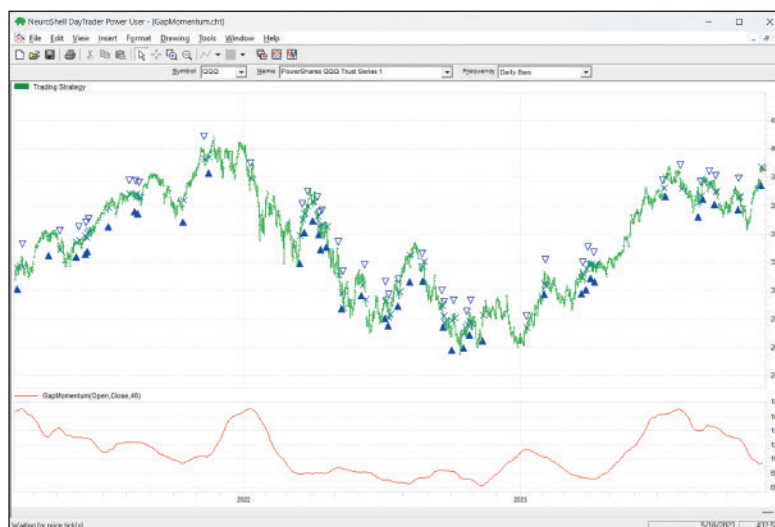


FIGURE 8: NEUROSHELL TRADER. This NeuroShell Trader chart shows the gap momentum trading system on QQQ.

code to C, as follows:

```
var GAMP(int Period, int SignalPeriod)
{
    var UpGaps = 0, DnGaps = 0;
    int ix;
    for(ix = 0; ix < Period; ix++) {
        var Gap = priceO(ix) - priceC(ix+1);
        if(Gap > 0) UpGaps += Gap;
        else if(Gap < 0) DnGaps -= Gap;
    }
    var GapRatio = ifelse(DnGaps == 0, 1, 100*UpGaps/DnGaps);
    return SMA(series(GapRatio), SignalPeriod);
}
```

The system trades QQQ, a NASDAQ ETF. The historical data for the backtest is loaded from Yahoo. It enters a long position when upward gaps are on the rise, and closes the position otherwise. The code in C for the Zorro platform is as follows:



```
function run()
{
    StartDate = 2011;
    EndDate = 2023;
    BarPeriod = 1440;
    Fill = 3; // trade on next open
    var Investment = 100000;

    assetAdd("QQQ","YAHOO:*");
    asset("QQQ");

    vars Signals = series(GAPM(40,20));
    if(!NumOpenLong && rising(Signals))
        enterLong(Investment/priceC());
    if(NumOpenLong && falling(Signals))
        exitLong();
}
```

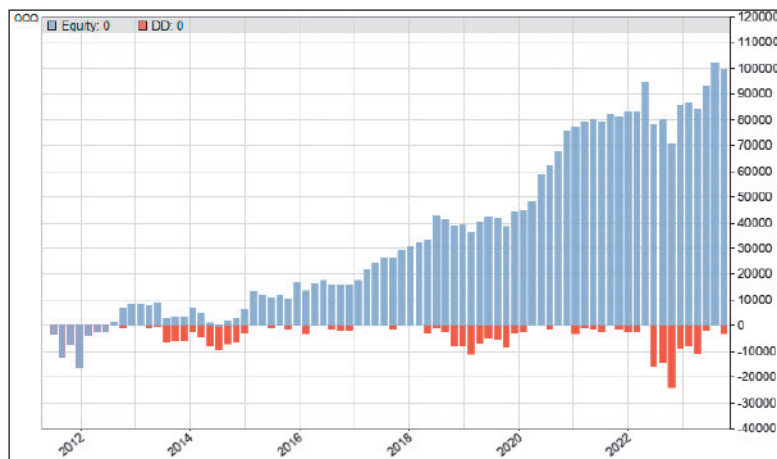


FIGURE 9: ZORRO. This shows an example equity curve from a test of the gap momentum indicator, which is based on the concept of upward and downward gaps.

The resulting equity curve is shown in Figure 9.

The system achieves 12% return on investment, well above buy-and-hold, with 56% winning trades.

The GAPM indicator and the trading system can be downloaded from the 2023 script repository on <https://financial-hacker.com>. The Zorro platform for C/C++ algo trading can

be downloaded from <https://zorro-project.com>.

—Petra Volkova

The Zorro Project by oP group Germany
<https://zorro-project.com>

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Futures For You

GARNER

Continued from page 39

has indirectly stolen their money, or at least their trading profits. I can assure you this is not the case. Futures and options contracts, specifically, are centralized products traded on exchanges. The broker merely introduces the order to the exchange via order routing; the broker does not participate in the transaction as one might in other arenas. For instance, forex traders generally trade against their brokerage, as do CFD (contract for difference contracts, which are illegal in the US) traders and, to a lesser extent, stock traders. Again,

commodity brokers simply facilitate the order; they are not involved with the trade-matching process.

As a commodity broker, I can assure you that we would love nothing more than for all clients to be successful. We are in the business of accepting leverage risk in exchange for commission. The more money clients make, the longer they stay in the game and the more commission their account generates for the brokerage. When a customer loses money, the broker loses potential earnings. Unfortunately for traders and brokers, futures and options trading is a dog-eat-dog world where the odds of success are unfavorable to

The broker merely introduces the order to the exchange via order routing; the broker does not participate in the transaction as one might in other arenas.

the average retail trader. Accordingly, there is no easy money to make in the commodity markets or the brokerage business.

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Continued from page 54

20%—or occasionally with a loss. The reason to consider this rule is that the risk curves head lower the higher the underlying stock price rises above the options' strike price.

On the flip side, there are no hard and fast rules for cutting a loss. Intuitively, it might make sense to exit if the trade shows an open loss of -20% or more (since 20% is our upside profit target). However, the reality of trading suggests that a calendar spread can accrue losses due to time decay if the stock merely languishes relatively unchanged for a period of time. Then a sharp, sudden burst higher can result in a decent profit appearing very quickly.

So, for the sake of example, let's consider two stop-loss measures:

- Look at the stock chart, identify a reasonable support level (if possible), and determine to close the option position if the stock takes out that level (the rationale being that the stock will then be less likely to bounce back)
- Set an arbitrary percentage stop-loss level (for example, 40% to 60% of the cost of the position)

In most cases, it is best not to hold a losing trade until the expiration of the short option but to try to

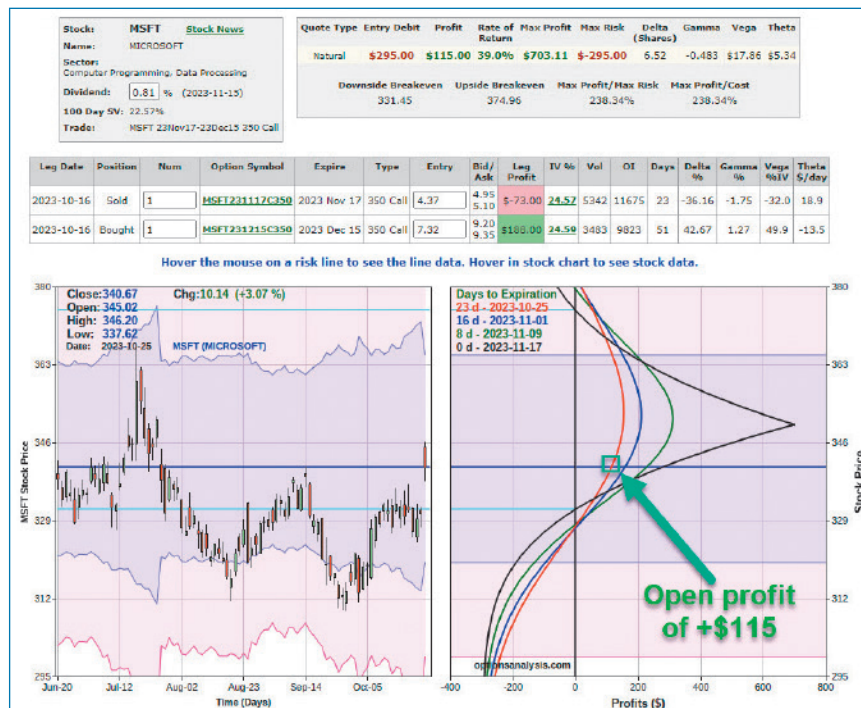


FIGURE 6: MONITORING THE TRADE. So how did the option trade from Figure 4 fare? The underlying stock traded sideways for a little over a week after entering the calendar spread, then the stock price jumped in the expected direction, giving the trader an open profit of 39% (\$115). At that point, the trade could be closed out (closing both sides) for a profit. One "rule of thumb" that could be used as an exit plan is that you could consider exiting a calendar spread if there is an open profit of 20% or more.

harvest whatever premium you can by exiting.

BACK TO THE MSFT TRADE

Microsoft traded sideways for a little over a week following the entry of the calendar spread example above. By October 23, 2023, the calendar spread showed an open loss of -\$90 (or -30.5% of the \$295 entry cost). But the stock was still well above any reasonable support level, and

the short option still had 25 days left until expiration.

In the next two days, MSFT popped from \$329.69 a share to \$340.67 a share on October 25, 2023. At this point, the calendar spread stood with an open profit of \$115, or +39% (Figure 6). This would have been an ideal time to close both sides of the trade, book a profit, and move on to the next trade.

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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 (Dec '23)	CME	5.4	23.2	4	>>
10-Year T-Note (Dec '23)	CBOT	2	7.4	8	>
5-Year T-Note (Dec '23)	CBOT	1.4	7.2	11	>
Ultra T-Bond (Dec '23)	CBOT	5.4	6.8	2	>
Ultra 10-Year T-Note (Dec '23)	CBOT	2.7	6.8	5	>
2-Year T-Note (Dec '23)	CBOT	0.6	7.1	13	.....
30-Year T-Bond (Dec '23)	CBOT	3.7	7.4	4	.....
Nasdaq 100 E-Mini (Dec '23)	CME	5.8	16.6	2	.....
Russell 2000 E-Mini (Dec '23)	CME	3.8	10.4	4	.....
Natural Gas (Jan '24)	NYMEX	20.5	8.5	3	.....
3-Month SOFR (Dec '23)	CME	0.2	3.1	17	.....
Crude Oil WTI (Jan '24)	NYMEX	9.7	13.1	4	.....
Euro FX (Dec '23)	CME	1.7	13.1	13	.....
Corn (Mar '24)	CBOT	8	10.8	13	.....
Soybean (Jan '24)	CBOT	2.7	8	5	.....
Soybean Meal (Jan '24)	CBOT	1	3.3	3	.....
Japanese Yen (Dec '23)	CME	3.4	7.6	6	.....
Wheat (Mar '24)	CBOT	11	7.1	5	.....
30-Day Fed Funds (Jan '24)	CBOT	0.1	1.2	10	.....
Gasoline RBOB (Jan '24)	NYMEX	9.6	9.5	3	.....
Gold (Dec '23)	COMEX	4.3	21.5	6	.....
ULSD NY Harbor (Jan '24)	NYMEX	8.2	9.1	2	.....
Sugar #11 (Mar '24)	ICE/US	4.9	10.1	16	.....
Hard Red Wheat (Mar '24)	KCBT	10.7	8.2	6	....
S&P 500 VIX (Dec '23)	CME	54.1	33.3	10	....
Australian Dollar (Dec '23)	CME	2.4	11.4	16	...
British Pound (Dec '23)	CME	2.6	15	16	...
Coffee (Mar '24)	ICE/US	7.2	13.2	7	...
Cotton #2 (Mar '24)	ICE/US	9.4	9.4	6	...
Dow Futures Mini (Dec '23)	CBOT	5	26.1	7	...
High Grade Copper (Mar '24)	COMEX	5.2	16.4	8	...
Palladium (Mar '24)	NYMEX	12.2	5.8	1	...
Canadian Dollar (Dec '23)	CME	1.5	11.2	23	..
Cocoa (Mar '24)	ICE/US	4	8.5	12	..
Live Cattle (Feb '24)	CME	4	10.9	9	..
Nasdaq 100 Micro (Dec '23)	CME	5.8	16.6	21	..
Canola (Jan '24)	ICE/CA	6.9	9.3	22	.
Crude Oil Brent (F) (Jan '24)	NYMEX	9.1	12.7	4	.
Feeder Cattle (Jan '24)	CME	4.3	10.8	5	.
Lean Hogs (Feb '24)	CME	6.2	7.4	10	.
Mexican Peso (Dec '23)	CME	4.9	21.9	35	.
New Zealand Dollar (Dec '23)	CME	2.5	11.3	17	.

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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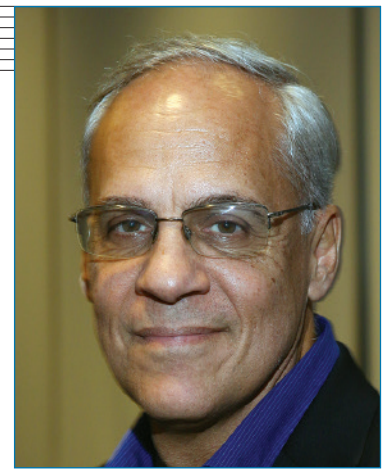
hope this will help you learn about products to help in your trading endeavors.

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Explore Your Options

GOT A QUESTION ABOUT OPTIONS?

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



Jay Kaepfel

DIRECTIONAL CALENDAR SPREADS

I like the concept of calendar spreads. Unfortunately, the underlying stock goes wild every time I put on an at-the-money. And when I try to go directional with out-of-the-money options, I guess the wrong direction. Any suggestions?

I can't offer any "holy grail" for timing when individual stocks or indexes will or will not move. But we can create some reasonable "rules of thumb" for trading directional calendar spreads.

- Step 1 is to have an objective method for determining the trend and when

- to enter a directional trade
- Step 2 is to have an exit plan

The following are examples and should not be considered a surefire guide to making money.

The timing method we will use to buy is:

- Look for the 10-day average to cross above the 30-day average

On the day it happens, look for the following confirmation criteria:

- 10-day average > 200-day average
- 30-day average > 200-day average

- 30-day average > 30-day average yesterday
- 200-day average > 200-day average yesterday

An example of this setup for Microsoft (MSFT) appears in Figure 1 (courtesy of AIQ TradingExpert).

We will look for a long call option with at least 50 days until expiration, typically preferring the standard monthly options (expiring on the third Friday of the month) over weekly options. This is not a rule but is based on the fact that the standard monthly options tend to have more volume and often tighter bid/ask spreads than the

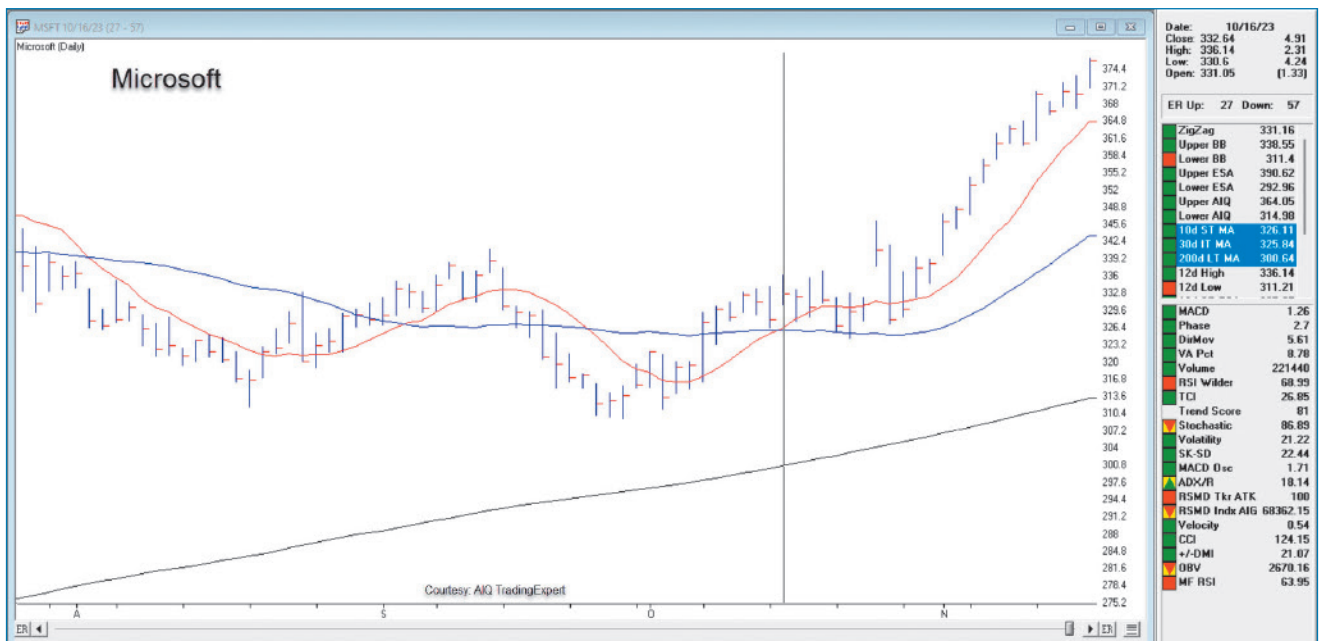


FIGURE 1: FINDING A CANDIDATE FOR THE UNDERLYING STOCK. When selecting an underlying stock for trading a directional option play such as a calendar spread, look for a stock that you are expecting to head in a particular direction. Using objective trend identification methods can help you to determine the expected direction or trend.

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weeklies.

In Figure 2, we see the expirations available for MSFT options. The 2023 Dec 15 series is the first standard monthly series available with at least 50 days left until expiration. We will then look for the previous standard monthly expiration, which is the 2023 Nov 17 series in this example.

Once we settle on the long expiration date, we will look to buy the first call option with a delta of less than 40. Figure 3 shows this is the December 350 strike price call. We simultaneously sell the call option with the same strike price in the earlier November expiration series.

Remember that a calendar spread

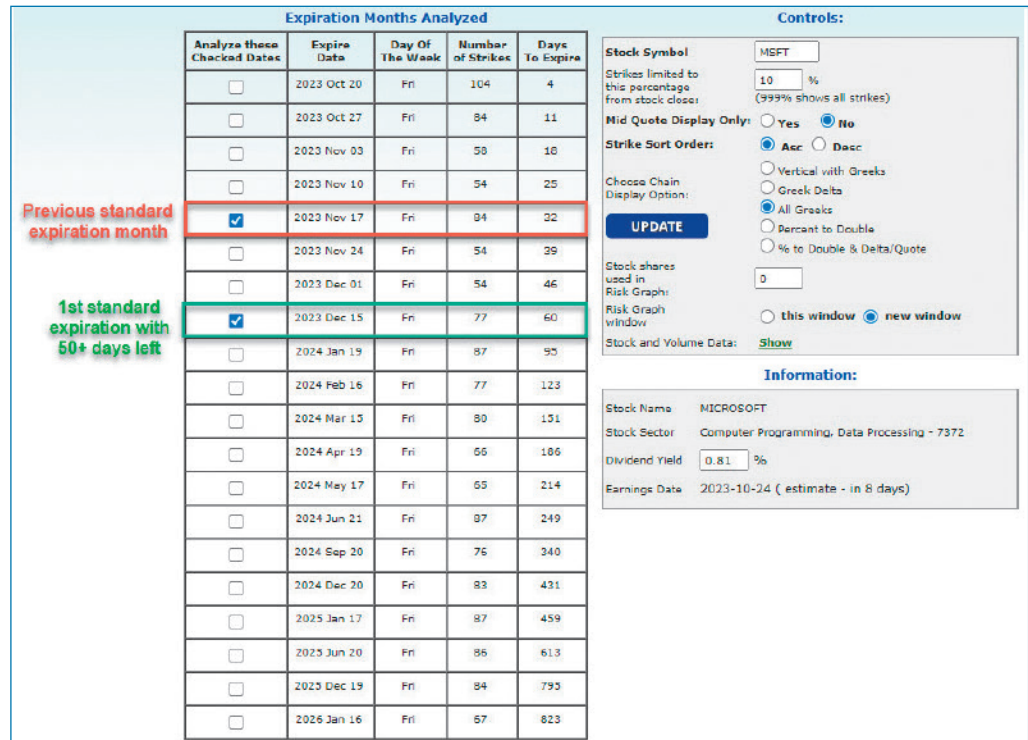


FIGURE 2: OPTION EXPIRATION DATES. When preparing to set up a calendar spread trade, examine the available option expiration choices for the underlying. In this example, the 2023 Dec 15 series is the first monthly series available with at least 50 days left until expiration. We then look for the previous monthly expiration, which in this example is the 2023 Nov 17 series.

We can create some reasonable “rules of thumb” for trading directional calendar spreads.

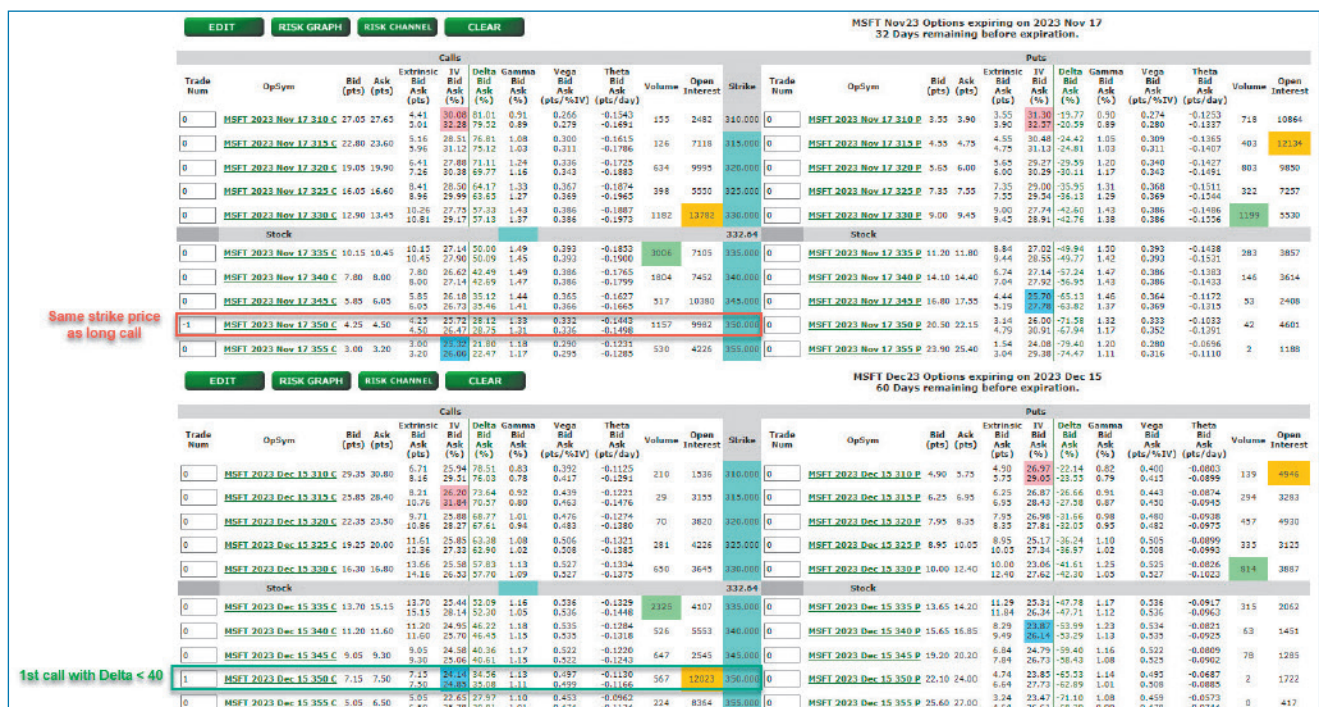


FIGURE 3: STRIKE PRICE AND DELTA. Setting up a calendar spread involves simultaneously buying and selling an option at the same strike price but with different expiration dates. In Figure 2, we identified the 2023 Dec 15 option series as the first monthly series available with at least 50 days left until expiration. We then look to buy the first call option in that series with a delta of less than 40, which in this case is the December 350 strike price call.

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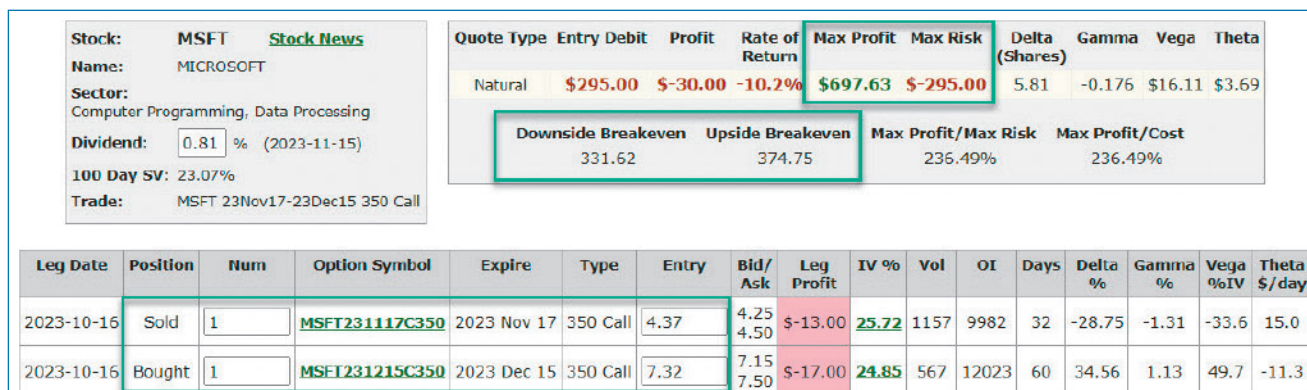


FIGURE 4: TRADE PARTICULARS, CALENDAR SPREAD. Here are the particulars for the example calendar spread trade using the underlying stock MSFT. Here, one call is sold and one call is bought, both with the same strike price. This trade has a maximum profit potential of \$697 and a maximum risk of \$295.

has limited profit potential. Therefore, when entering a calendar spread, it is suggested to use limit orders that attempt to trade at the midpoint of the bid/ask range. The particulars for our MSFT calendar spread appear in Figure 4.

We can see in Figure 4 that the position has a maximum profit potential of \$697 and a maximum risk of \$295. The risk curves (that is, the expected P/L for the option position based on the price of MSFT shares as of four different dates leading up to November option expiration) appear in Figure 5.

There are some important things to note in Figure 5:

- MSFT shares must advance in price at some point before November option expiration for this trade to generate a profit
- If MFT shares advance beyond the strike price of \$350 a share, the risk curves “roll over” and



FIGURE 5: RISK CURVES, CALENDAR SPREAD. Here you see the risk curves for the trade from Figure 4. The risk curves show the expected P/L for the option position based on the price of the underlying shares as of four different dates leading up to option expiration.

head back down

Based on what we see in Figure 5, some important decisions are to be made as this trade is entered, about how to handle the trade depending on the action of MSFT shares.

POSITION MANAGEMENT IDEAS

The good thing about options trading is that it offers great flexibility in crafting a position to take advantage of a certain expectation. The tradeoff is that certain decisions must be made, and, in most cases, there are no “perfect rules” to cover every contingency. As a result, a trader must assess their priorities, make their decisions, and then live with the result of those decisions (most

notably, not dragging any psychological baggage forward following a bad trade).

A good starting point “rule of thumb” is to exit a calendar spread entered using the criteria above if a profit of 20% or more can be obtained. A trader might review the position near the end of trading each day and close the trade before the close if the open profit is 20% or more.

Another fail-safe rule might be to exit the position if the underlying stock will close the day trading above the strike price for the options, regardless of the actual P/L. In some cases, this may result in closing the position with a profit of less than

The good thing about options trading is that it offers great flexibility in crafting a position to take advantage of a certain expectation.

Continued on page 48

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