Bargain hunting options

If you get the willies every time you read "standard deviation," take heart: This volatility analysis approach and option trading strategy takes the mathematical sting out of finding inexpensive options.

BY GEORGE HOEKSTRA

FIGURE 1 CISCO PRICE ACTION

Cisco (CSCO) rallied through much of 2003, topped out in January 2004 and has traded sideways to lower since.

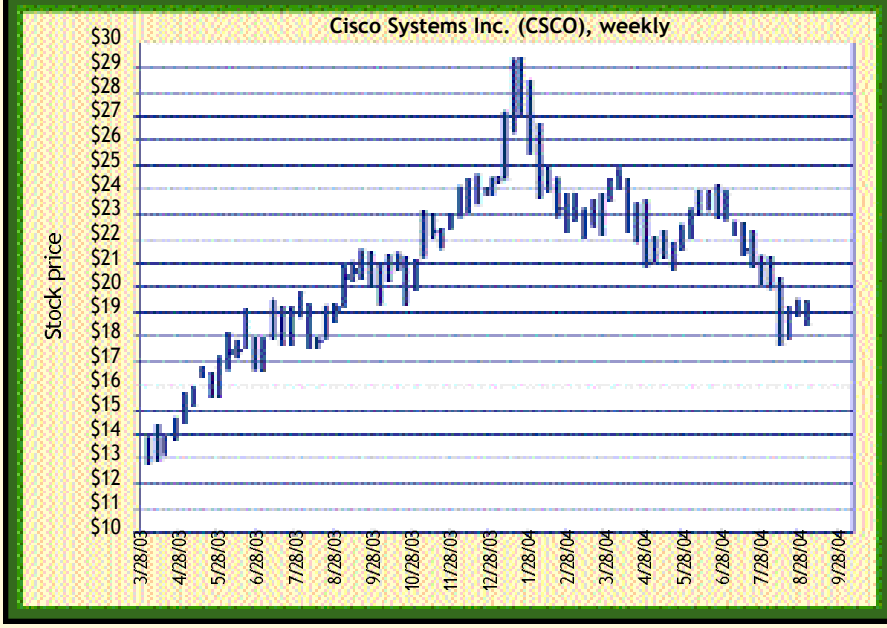
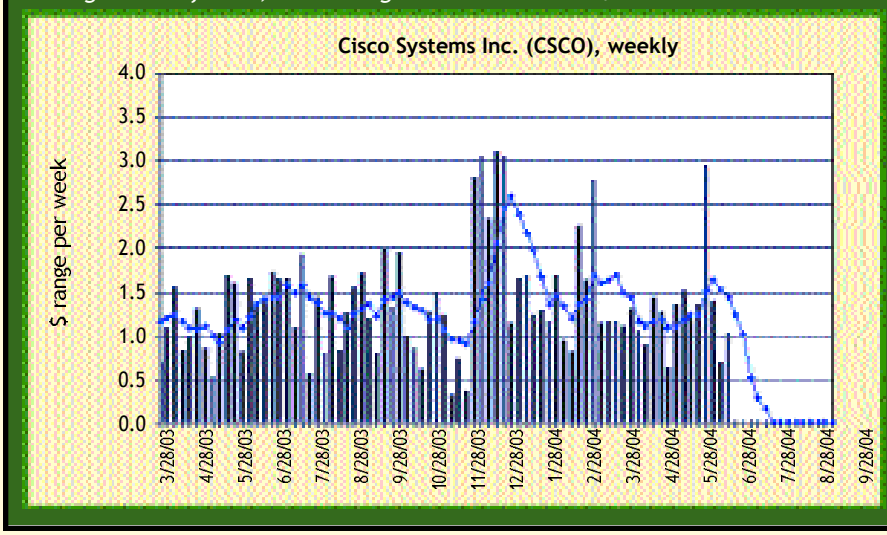


FIGURE 2 CISCO WEEKLY RANGES

For the period in Figure 1, Cisco's weekly range was as large as $3 and as little as 40 cents. The blue line is a six-week moving average of the weekly range — a simple, convenient measure of average historical volatility. Through most of 2004, the average has been around $1.50.



There are many computerized tools that make it easy to sort through the thousands upon thousands of listed options and analyze how they are priced. Web sites such as ivolatility.com and optionetics.com provide data and tools for this, as do most online brokers.

But to make such tools useful, you need some logical criteria for sorting. To do that, you must understand the ideas of historical volatility and implied volatility. The most important distinction between the two is historical volatility is about the past, and implied volatility is about the future.

Historical (sometime referred to as *statistical*) volatility measures past stock price movement. It tells you how variable a stock's price has been over some

past time period — e.g., 20 days, 100 days, etc. Historical volatility is usually measured by the ***standard deviation*** of stock prices (see "Variance and standard deviation" for a more detailed explanation). Higher historical volatility means the stock has fluctuated more over the period in question.

The implied volatility is a measure of expected future stock price volatility and is derived from the current price of options. Implied volatility tells you how variable the options market *expects* the stock price to be in the future.

The implied volatility is calculated from the current option price, using an option pricing model. The implied volatility is the standard deviation that causes the pricing model to compute the current option price. As a measure of the "priciness" of options, higher implied volatility means higher-priced options. Both historical and implied volatility calculations are available on many Web sites.

Shopping for options

When you are shopping for a product, you examine the item and look at its price. If you're a good shopper, you do a quick mental calculation to determine whether the product's features justify that price. How much am I getting with

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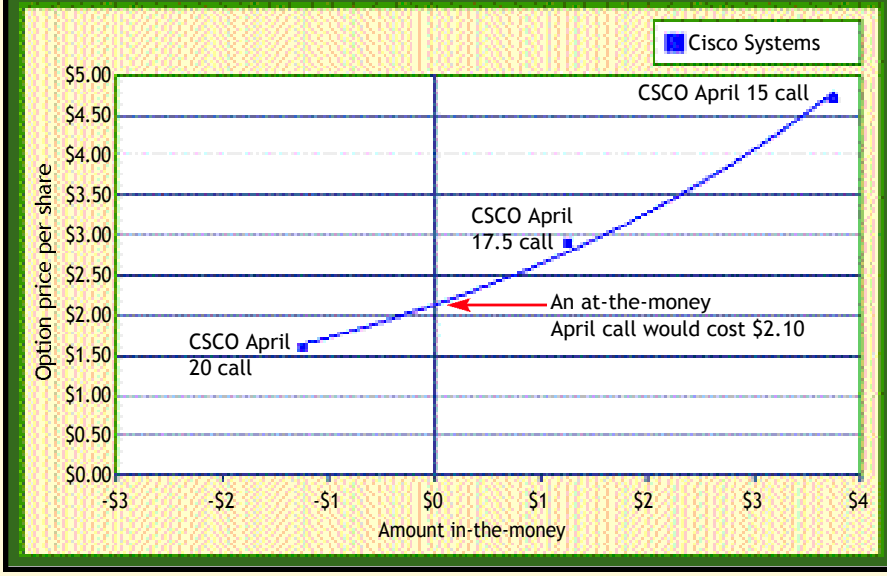
TABLE 1 CSCO OPTION PRICES WITH STOCK PRICE AT $18.75

These are the prices of Cisco April 2005 call options on Sept. 3, 2004, when the stock closed at $18.75. Assume you would have to pay the ask price if going long.

Option	Amount in-the-money	Bid	Ask
April 15 call	$3.75	$4.50	$4.70
April 17.5 call	$1.25	$2.80	$2.90
April 20 call	-$1.25	$1.50	$1.60

FIGURE 3 PRICING OF CISCO APRIL 2005 CALL OPTIONS

Plotting the premiums from Table 1 produces a curve that shows the options in terms of the amount each option is in the money. In the short term, the Cisco April options will move along this curve. This makes it possible to estimate the cost of an at-the-money April call option.



Variance and standard deviation

Consistency between average and median values suggests consistency in a data set. Broadly speaking, if two trading systems have produced 100 trades each, the system whose average and median returns are closer together is likely to be the more reliable strategy.

Variance measures how spread out a group of values are — in other words, how much they vary. Mathematically, variance is the average squared "deviation" (or difference) of each number in the group from the group's mean value, divided by the number of elements in the group. For example, for the numbers 8, 9 and 10, the mean is 9 and the variance is:

$$\{(8-9)^2 + (9-9)^2 + (10-9)^2\}/3 = (1 + 0 + 1)/3 = .667$$

Now look at the variance of a more widely distributed set of numbers, 2, 9, 16:

$$\{(2-9)^2 + (9-9)^2 + (16-9)^2\}/3 = (49 + 0 + 49)/3 = 32.67$$

The more varied a system's returns, the higher their variance or standard deviation, and the riskier the system will likely be to trade. The more varied a market's price changes from day to day (or week to week, etc.), the more volatile that market is.

A common application of variance in trading is ***standard deviation***, which is the square root of variance. The standard deviation of 8, 9, and 10 is: sqrt(.667) = .82; the standard deviation of 2, 9, and 16 is: sqrt(32.67) = 5.72.

FIGURE 4 MAYTAG PRICE ACTION

Maytag followed a similar pattern to CSCO over the 18 months before September 2004.

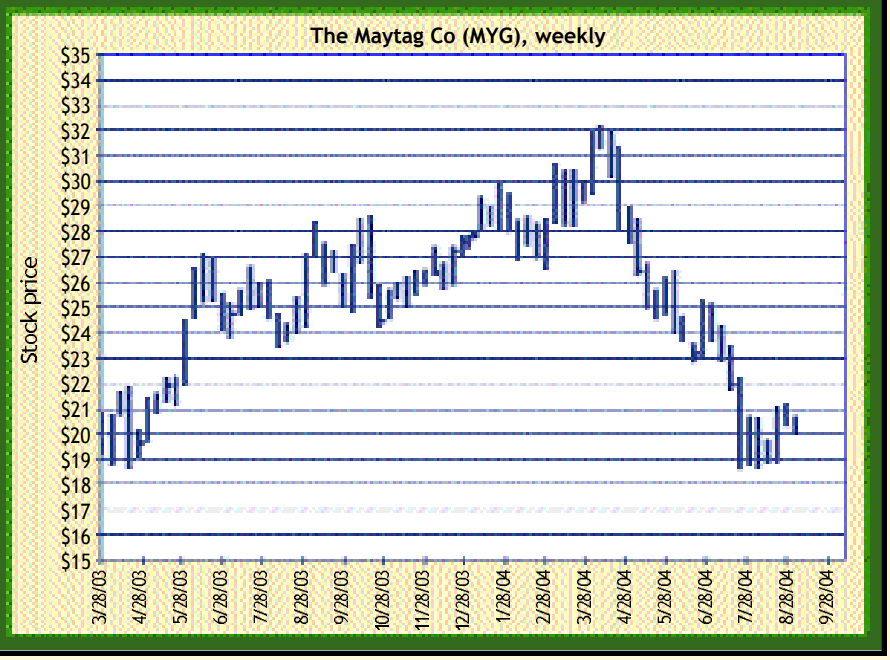
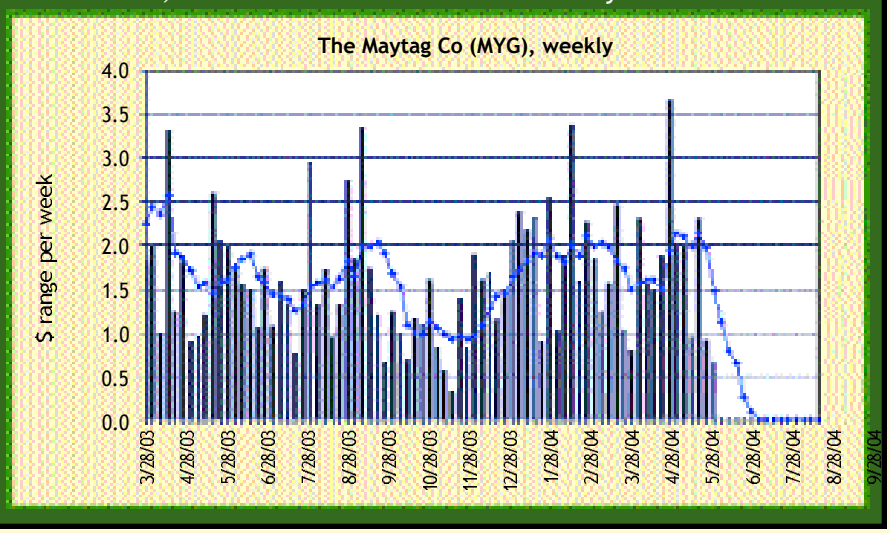


FIGURE 5 MAYTAG WEEKLY RANGES

The weekly ranges from Figure 4, along with a six-week moving average. Maytag's typical weekly range was consistently larger than Cisco's (see Figure 2). In the six months up to Sept. 3, Maytag's weekly range was 2 points or more 14 times, while Cisco reached that milestone only three times.



this product, and how much am I paying for it?

Similarly, when you're shopping for options, the questions become, how volatile is this stock and how much volatility is priced into its options?

The option bargain hunter wants to get as much volatility as possible for the price. This means looking for stocks with high historical volatility and options with low implied volatility.

One problem with historical and implied volatilities is, although they are readily accessible online and through option analysis programs, they are difficult to relate to the actual prices you see in the newspaper.

To make things more tangible, the following analysis uses actual stock and option prices to directly help option shoppers sniff out bargains.

Historical volatility snapshot: The weekly range

Figure 1 (p. xx) is a weekly chart for Cisco Systems (CSCO) for the 18-month period ending Sept. 3, 2004. The stock rallied through much of 2003, peaked in January 2004 and traded mostly lower over the subsequent months. The stock traded between $13 and $29 over the 18-month period, a $16 range.

Figure 2 (p. xx) shows the weekly ranges of Cisco for the period in Figure 1. There were a few weeks when the weekly range was as high as $3, and a few weeks when it was less than $1. The blue line on the chart is a six-week moving average of the weekly range. Through most of 2004, this average has been around $1.50. This is a simple, convenient measure of historical volatility on average.

Implied volatility snapshot: The option price chart

Table 1 (p. xx) shows the prices of Cisco April 2005 call options on Sept. 3, 2004, when the stock closed at $18.75. Figure 3 shows these option prices in terms of the amount each option is in the money.

Seven months was the longest-term listed option for most of the candidate stocks on Sept. 3. This kind of analysis is equally valid for other durations, provided you do your comparison shopping with options of the same duration. Long-term options are better because you're expecting the inherent stock volatility to play out over time; you need to give the option time for that to happen. (From past experience, more bargains appear in the seven- and eight-month options.) With short-term options, the outcome would depend more on the next move of the stock, and the analysis tells you nothing about that.

With the stock at $18.75, the April 15 call option is $3.75 in the money. This option can be purchased for $4.70, which positions it at the upper right of Figure 3. The points representing the other two options are also plotted, and a smooth

curve is drawn through them to show how the April option series is priced. In the short term, the Cisco April options will move along this curve.

This is the same curve that could be calculated with an option pricing model. Using a model, we could calculate an implied volatility. But to keep things tangible, we will continue working with this chart that shows the actual price data for the April options.

The arrow points to the implied price of an at-the-money April call trading at $2.10. This can be used as a simple, tangible indicator of the priciness of the April options — that is, a seven-month at-the-money CSCO call option costs $2.10.

Without using advanced software, online analysis tools or option-pricing models, we now have a picture of historical volatility (the weekly range chart and an average weekly range of $1.50 per week) and a picture of implied volatility (the option pricing chart and a value of $2.10 for an April at-the-money call). The next step is to determine whether the weekly volatility of $1.50 range per week is worth the $2.10 price of a seven-month at-the-money call option.

Comparison shopping

To help answer this question, let's do some comparison shopping. Figure 4 shows an 18-month price chart of Maytag (MYG). Maytag followed a similar pattern to CSCO. The range for 18 months was $19 to $32, or $13. Eyeballing the chart, the weekly range looks to be about $2. Figure 5 shows the weekly ranges from Figure 4, along with a six-week moving average.

Table 2 shows the pricing data for Maytag April options and Figure 6 shows the option pricing chart with the curve connecting the three options.

An at-the-money April call option would cost $2.05, which means the Maytag and Cisco April options are priced essentially the same (see Figure 7). As a result, these options essentially have the same implied volatility. If you buy April options on either stock, you will be paying for the same amount of volatility.

How much volatility would you get for the price? For this, go back and com-

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TABLE 2 MAYTAG OPTION PRICES WITH STOCK AT $20.20

The prices of April Maytag options, and the amount each is in or out of the money are shown here.

Option	Amount in-the-money	Bid	Ask
April 17.5 call	$2.70	$3.50	$3.80
April 20 call	$0.20	$2.10	$2.15
April 22.5 call	-$2.30	$1.05	$1.20

FIGURE 6 PRICING OF MAYTAG APRIL 2005 CALL OPTIONS

The option pricing curve shows an at-the money Maytag April call option would cost $2.05, which means the Maytag and Cisco April options (Figure 7) are comparably priced.

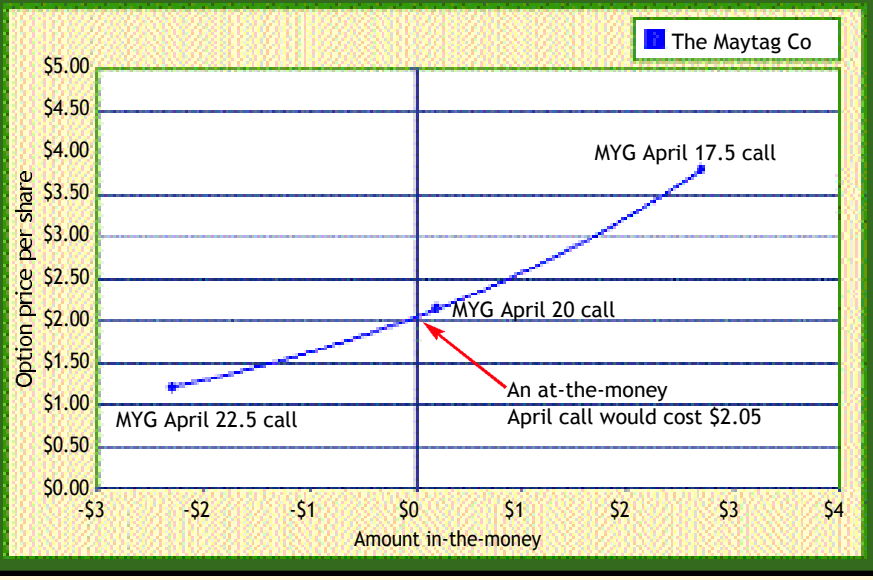


FIGURE 7 PRICING OF MAYTAG AND CISCO APRIL 2005 CALL OPTIONS

The Maytag and Cisco options have roughly the same implied volatility.

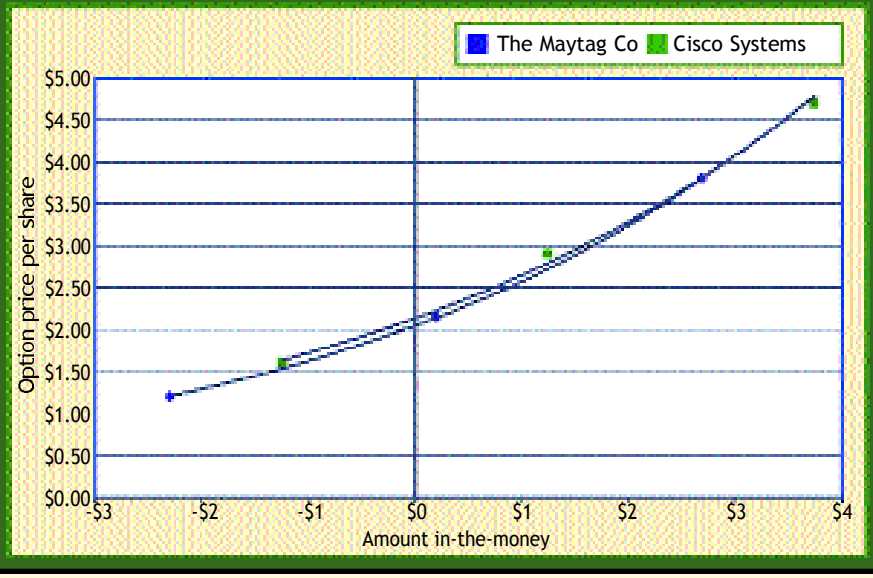
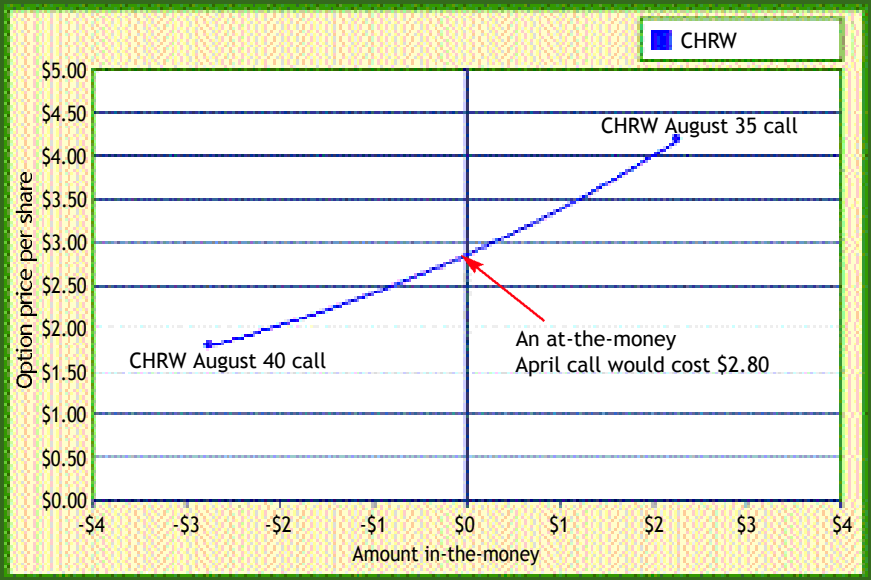


FIGURE 8 PRICING OF CH ROBINSON AUGUST 2004 CALL OPTIONS

The price curve shows an at-the-money seven-month call was trading at $2.80 on Dec. 22, 2003 with the stock trading at $37.25.



pare the weekly range charts (Figures 2 and 5). Maytag looks like the better deal because its typical weekly range is consistently larger than Cisco's. In the six months up to Sept. 3, Maytag's weekly range was 2 points or more 14 times; Cisco had only three such weeks. Maytag's weekly range is almost always above $1.50, while Cisco's is almost always below $1.50. Looking at this data, it is reasonable to expect that in the next few months you will get more price action from Maytag than Cisco — for the same price.

Why are the options priced so similarly? There could be many reasons. Perhaps the Cisco option is inflated because of the price spike that occurred in January 2004. During a two-week period that month, the price jumped $5 to its 2004 high of $29. This spike would greatly increase the standard deviation calculated over any time interval that included those weeks. That would increase the value assigned to an option by a pricing model.

TABLE 3 COMPARISON SHOPPING TABLE

Generally, a seven-month at-the-money call option priced nearly equal to (or less than) the stock's weekly range is a bargain (see Elbit Systems and Maytag). Option sellers can invert this analysis to find shorting opportunities in overpriced options.

Stock	Stock Price	Average weekly range (historical volatility)	Price of 7-month at the money call (implied volatility)
Cisco Systems	$18.75	$1.50	$2.10
Maytag	$20.20	$2.00	$2.05
Barrick Gold	$19.76	$1.30	$2.05
Noven Pharmaceuticals	$20.12	$2.00	$3.20
Mylan Labs	$17.56	$1.50	$2.10
California Pizza Kitchen	$19.81	$1.30	$2.20
Filenet Corp	$19.48	$1.90	$2.70
Elbit Systems LTD	$19.78	$2.10	$1.80
Annaly MTG MGMT	$17.83	$0.70	$1.00
Deutsche Telekom AG	$17.42	$0.70	$1.50
Hilton Hotels	$18.30	$0.90	$1.70
Pride International	$18.74	$1.00	$2.15
Comverse Technology	$17.57	$1.50	$2.40
Peoplesoft	$17.68	$1.40	$2.40

Trading approach

One way to put this volatility analysis technique to work is to buy long-term options on stocks that show weekly volatility that is consistently high compared to option implied volatility. Analysis of the weekly range is a simple and practical way to find such stocks.

This strategy leads to buying long-term options on stocks such as Maytag that have exhibited consistently high weekly price volatility relative to implied volatility. It leads to avoiding options on stocks such as Cisco, whose volatility has been dominated by anomalous spikes.

Table 3 shows the results of this analysis for 14 stocks (priced between $17 and $21) that were trading April 2005 options on Sept. 3, 2004. As a general rule, if you can find a seven-month at-the-money call option that is priced nearly equal to (or less than) the stock's weekly range, you have found a bargain. Elbit Systems, along with Maytag, look like bargains.

For option sellers, this analysis can be inverted to identify shorting opportunities. And there are many ways to capitalize on these opportunities, from outright purchase or sale, to spreads, straddles and other combinations.

Trade example

On Dec. 22, 2003, CH Robinson Worldwide (CHRW) was trading at $37.25. Figure 8 is the option price chart on that date and shows an at-the-money seven-month call was trading at $2.80.

Figure 9 shows the weekly range chart. The average weekly range was

around $2.40. This means the estimate of implied volatility was $2.80 vs. an historical volatility estimate of $2.40 per week — relatively speaking, a bargain. August 40 call options were purchased for $1.80 on Dec. 22.

Buy the option expecting to hold it until you hit your profit target or it expires, in which case you lose 100 percent of the option premium on a losing trade. Limit your overall risk by holding a portfolio of long options that are diversified over time.

Figure 10 shows CHRW through expiration of the option on Aug. 20, 2004. The options were sold on Feb. 5, 2004, at $2.75, which yielded the target 50-percent profit for the trade — a $3 move in the stock over six weeks. This $3 move was well within the normal variation of the stock price. This is the benefit of buying cheap options — normal fluctuations can yield big percentage profits.

We will use a 50-percent profit target (i.e., sell the option when it has increased in value by 50 percent) to avoid the temptation of timing the exit, which is not the goal of this strategy. In general, the profit target should be small enough to maintain a high probability of being reached given the stocks's normal price fluctuations, and large enough to dwarf transaction costs. With a 50-percent profit target for winners and 100 percent loss for losing trades, a good goal is to make profits on 75 percent of your trades.

Other considerations

The analysis shown here, using weekly ranges and option price charts, provides a sound way to organize stock and option price data in a way that helps identify underpriced or overpriced options. After initial screening, the analysis requires no mathematics beyond simple subtraction, averaging and charting of raw price data.

When shopping for options, the correct volatility number to use is the one that best describes what you expect the stock to do while you own the option. It is difficult to do this by just comparing statistical parameters derived from option models. Analysis of weekly ranges gives a sound, tangible basis for developing an informed opinion on future volatility.

The analysis can be used to find bargains in all kinds of options, but it doesn't tell you whether to buy call, puts or straddles, etc. Spread quotes are often wide and volume thin, so you usually must pay the asking price, do your analysis with this in mind. Finally, check for unusual dividend situations, takeovers, pending mergers or rumors that might explain odd option pricing before making a trade.

For information on the author see p. xx.

FIGURE 9 CH ROBINSON WEEKLY RANGES

The average weekly range was approximately $2.40, which means the implied volatility estimate of $2.80 was, relatively speaking, a bargain.

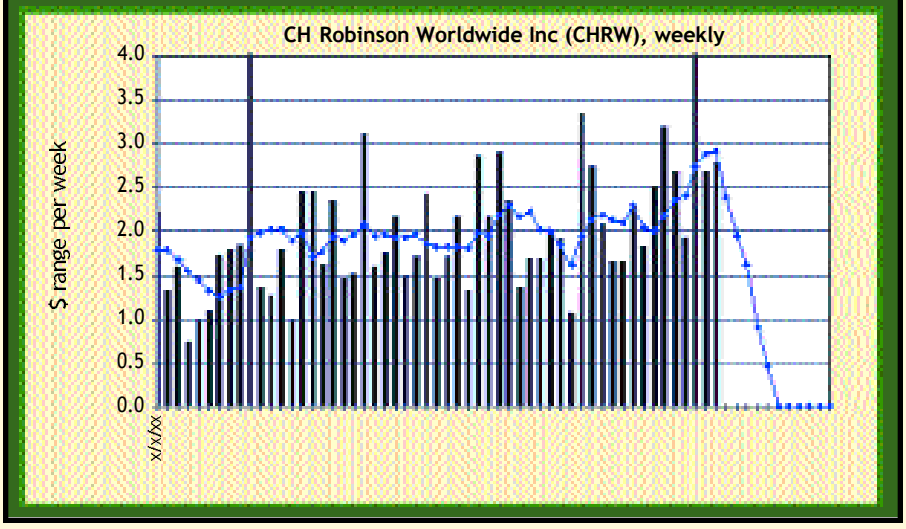


FIGURE 10 MAKING THE TRADE

August 40 call options were purchased for $1.80 on Dec. 22. The options were sold on Feb. 5, 2004, at $2.75, which yielded a 50-percent profit. One of the benefit of buying cheap options is normal fluctuations can yield big percentage profits.