

The quest for cheap options

Comparing historical and implied volatilities can lead to attractive option-buying opportunities.

GEORGE HOEKSTRA

Option traders often attempt to gain an edge by purchasing options on a stock they expect to be more volatile than what is implied in the price of its options. Higher volatility translates into higher option prices, so if the assessment of future volatility is correct, it will increase the chances of a profitable trade.

Is it possible to make money this way? Many academic studies tried to answer this question by focusing on stock index options and have concluded the answer is no. However, one recent academic study of options on individual stocks has drawn different conclusions.

Despite the challenges of analyzing individual stock options — they are often thinly traded and have outdated prices and wide bid-ask spreads — professors Amit Goyal and Alessio Saretto recently reported some of their findings in a paper titled “Option returns and volatility mispricing.”

They concluded that **historical volatility** can provide a significant edge in trading individual stock options.

In short, you can find cheap options by searching for large differences between a stock’s historical and **implied volatilities**. But how practical is this approach for retail traders?

Finding cheap options

To help understand the Goyal-Saretto study, consider the following strategy: Each month, sort all stocks in the options market into 10 percentile groups based on the difference between their historical and implied volatilities. Then, label the top 10 percent of those stocks “tier 1” for that month. This group has the biggest difference between historical and implied volatility values.

Options on these stocks should be underpriced in the sense that they are priced for an expected (implied) volatility lower than what the stock has actually experienced in the last year.

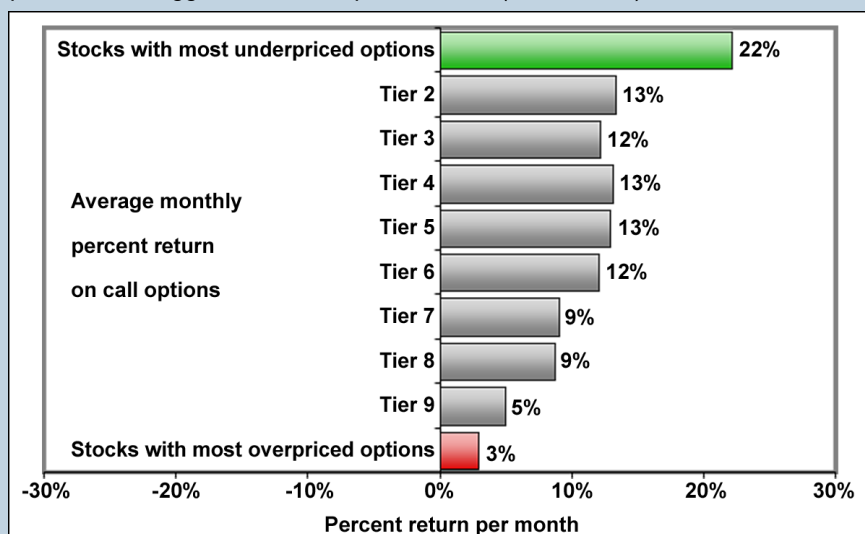
The strategy buys options on all tier-1 stocks. On the Tuesday after each month’s expiration day, buy a one-month, **at-the-money** (ATM) call on each tier-1 stock. Sell this portfolio of calls at expiration. The next Tuesday, repeat the process with updated volatility data and buy another portfolio of underpriced calls.

The idea is that tier-1 stocks will, on average, be about as volatile as they have been in the past year. If so, the odds of success are improved because the stocks’ actual, or historical, volatility will be higher than the expected (implied) volatility of their options.

This strategy of buying underpriced call options would have earned an average 22 percent per month from January 1996 to December 2005, according to the Goyal-Saretto study. The authors simulated this approach

FIGURE 1 — MONTHLY RETURNS FOR CALLS

A portfolio of the cheapest calls (tier 1) gained 22 percent per month, while performance lagged for more expensive calls (tiers 2 to 10).



Source: Goyal-Saretto study

using bid-ask option prices on 3,885 stocks covering the entire U.S. equity option market from 1996 to 2005. They also calculated option returns for the other nine stock tiers, from the cheapest options (tier 1) to the most expensive (tier 10).

Figure 1 shows the study's results. The green bar represents the tier-1 stock options' monthly profit (22 percent), the gray bars show the monthly performances of Tiers 2 to 9, and the red bar shows the performance of options on the tier-10 stocks, which you would avoid buying.

Profits deteriorate as you move down the tiers. This downward trend shows there was a large advantage in buying cheap calls, measured by the difference between one-year historical and implied volatilities.

What about puts?

What if you had chosen to buy tier-1 puts instead of calls? Figure 2 shows the monthly performance of puts in Tiers 1 to 10, from cheapest to most expensive. Performance suffered as the tier number climbed, proving that cheap puts had an advantage over expensive ones. Tier-1 puts earned only 0.4 percent per month (green bar), while the other nine tiers lost money. By contrast, the most expensive tier-10 puts (red bar) lost an average 28 percent per month for 10 years. (In reality, anyone buying tier-10 puts would have gone broke long before the study ended in December 2005.)

Why did calls perform so much better than puts? Figure 3's weekly S&P 500 chart shows the market doubled during the study's 10-year time period, despite the 2000-2003 bear market. However, Figure 2 shows you could have eked out a profit buying only cheap tier-1 puts during the 10-year study period.

If you had simply bought individual stocks from January 1996 to December 2005, you would have earned 1.3 percent per month. Figure 4 shows little deviation among the 10 tiers, which means the various option groups from Figures 1 and 2 didn't perform differently because of their stocks' directional movement; rather, these differences were driven by bias in options pricing, a bias that is, on average, predictable

from the difference between historical and implied volatility.

(To download the Goyal-Saretto article, which also discusses straddles, buy-sell strategies, and other hedging strategies, [click here](#).)

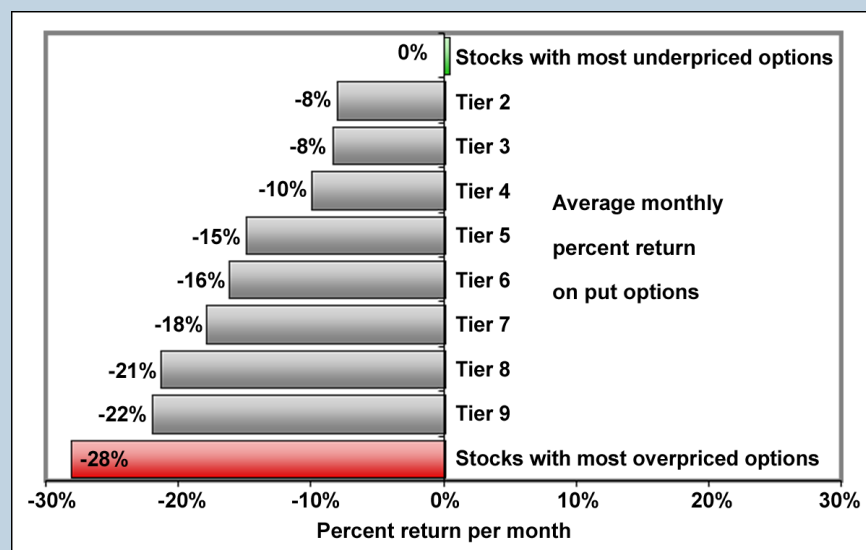
Real-world trading

Although the study shows volatility analysis can theoreti-

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FIGURE 2 — MONTHLY RETURNS FOR PUTS

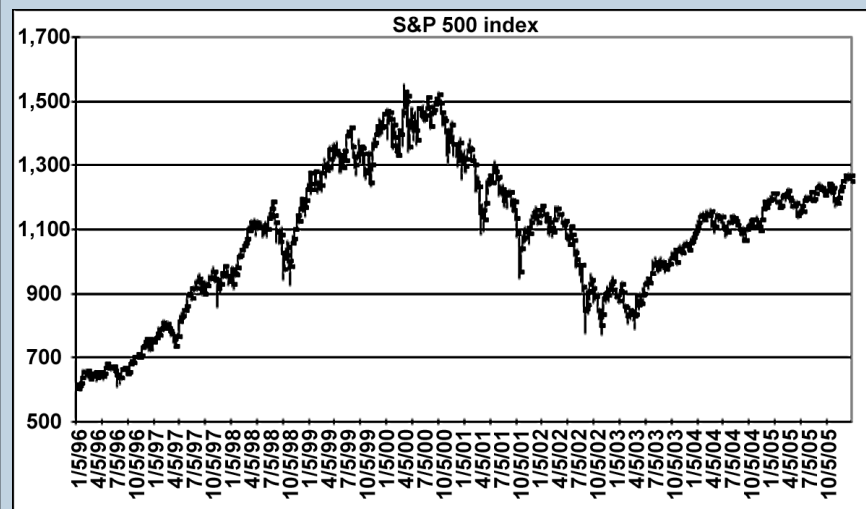
Most puts lost money during the study's 10-year time period because the S&P 500 doubled from 1996 to 2005. But you could have eked out a small profit if you had bought cheap tier-1 puts during this period.



Source: Goyal-Saretto study

FIGURE 3 — S&P 500, 1996 TO 2005

Despite getting cut in half from 2000 to 2002, the S&P 500 doubled from January 1996 to December 2005 — which is why most puts lost money during the 10-year study.





Volatility explained

Implied volatility

Volatility is one of the standard variables of an option's price. The others (for stock options) are the underlying price, the strike (exercise) price, the time (days) until expiration, the prevailing interest rate, and dividends.

Implied volatility can be thought of as a reflection of the volatility in the market at a given time (though it is sometimes referred to as the "market's current estimate of future volatility"), rather than the actual historical volatility calculated over a certain past period.

With all other factors static, higher volatility will result in higher option prices. As a result, many traders look for high relative volatility when selling options and low relative volatility when buying options. It is possible to determine the implied volatility by working backward from the option price, inserting all the other variables from the price of the option in an option pricing model and "solving" for implied volatility.

Historical volatility

Historical volatility is the measure of a stock's price movement based on historical prices. It measures how active a stock price typically is over a certain period of time. Usually, historical volatility is measured by taking the daily (close-to-close) percentage price changes in a stock and calculating the standard deviation over a given time period. This standard deviation is then expressed as an annualized percentage. Historical volatility is often referred to as actual volatility or realized volatility.

Short-term or more active traders tend to use shorter time periods for measuring historical volatility, the most common being five-day, 10-day, 20-day, and 30-day. Intermediate-term and long-term investors tend to use longer time periods, most commonly 60-day, 90-day, 180-day and 360-day.

cally offer a huge edge in the equity options market, applying this strategy in the real world poses several problems, among them:

Risk. Buying portfolios of calls or puts is risky, because returns are extremely volatile. Even if you could make money within 10 years, there would be many drawdowns along the way.

Trade execution. Low-volume stock options have wide bid-ask spreads. A significant chunk of potential profits will disappear because you would end up buying illiquid options at above-bid prices.

Transaction costs. The academic study ignored commissions. In reality you would be buying and selling hundreds of stock options each month. Transaction costs would erode your profits.

Despite these drawbacks, any strategy that earned 22 percent each month (Figure 1) is worth exploring further, even if you can only capture a portion of that gain.

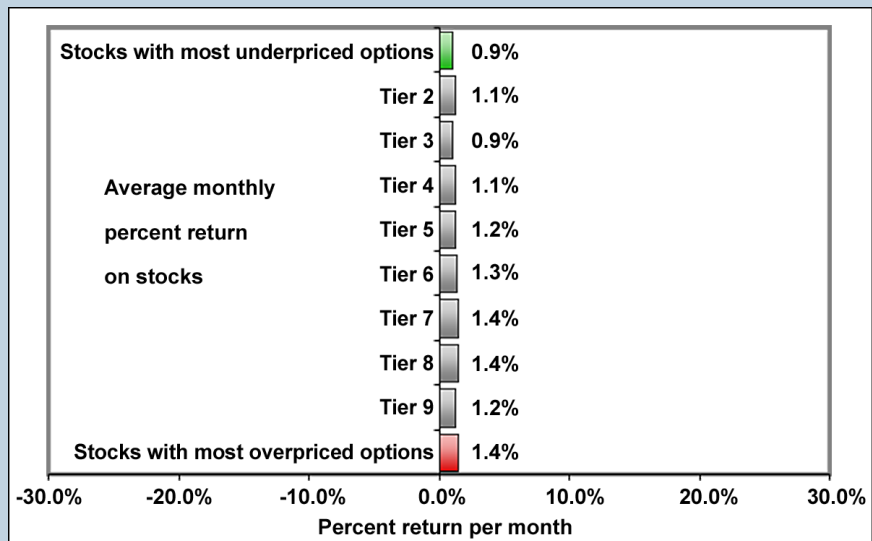
Developing a plan

The first step to accomplishing this is to reduce the study's scope from the cheapest 10 percent to perhaps only 10 of the best underpriced options each month. Also, you need to find out how to get good fills on orders in thinly traded options with wide bid-ask spreads. Finally, you need a plan to control risk.

One approach is to set up an account that will hold a mix of cash and call options. Then, study the volatility of tier-1 stocks to find a few candidates each month, buy **in-the-money** (ITM) calls that expire in four to seven months, and use a simple rule for selling those calls. A representative exit rule would be to sell after a call gains 50 percent.

FIGURE 4 — MONTHLY RETURNS FOR STOCKS

Stocks earned only 1.3 percent per month during the 10-year study, and there was little deviation among the different tiers. This implies the difference in option performances shown in Figures 1 and 2 was driven by volatility rather than the stocks' directional moves.



Source: Goyal-Saretto study

When narrowing the list of tier-1 stocks, search for those that show consistently high historical volatility. You want to find stocks with consistently large weekly price ranges (high-low). Bypass stocks whose historical volatility is dominated by one or two anomalous spikes.

Buy options with at least four months of remaining life. You must allow at least this much time for the volatility advantage to unfold. Finally, buy ITM options. **Out-of-the-money** (OTM) options sometimes don't respond to normal price action, especially when they are thinly traded.

This type of strategy will have volatile returns and works

best in bull markets. To manage risk, limit each purchase to less than 5 percent of your account value and always hold half the account's value in cash. The best way to ride out down markets is to spread your purchases out over time and diversify across market sectors.

Although this approach isn't as sophisticated as the academic study, it is based on the same underlying premise: analyzing volatility will give you an edge by leading you to cheap options that will outperform in the long run. The key is to find bargains among each month's tier-1 stocks.

When hunting for option-volatility bargains, it is helpful to first group stocks into price ranges. In January 2008, for example, there were 480 stocks trading around \$30 per share in the listed options market.

These stocks were sorted to find 48 stocks (10 percent) with the largest differences between their 100-day historical volatilities and current implied volatilities. The average 100-day historical volatility of these stocks was 54

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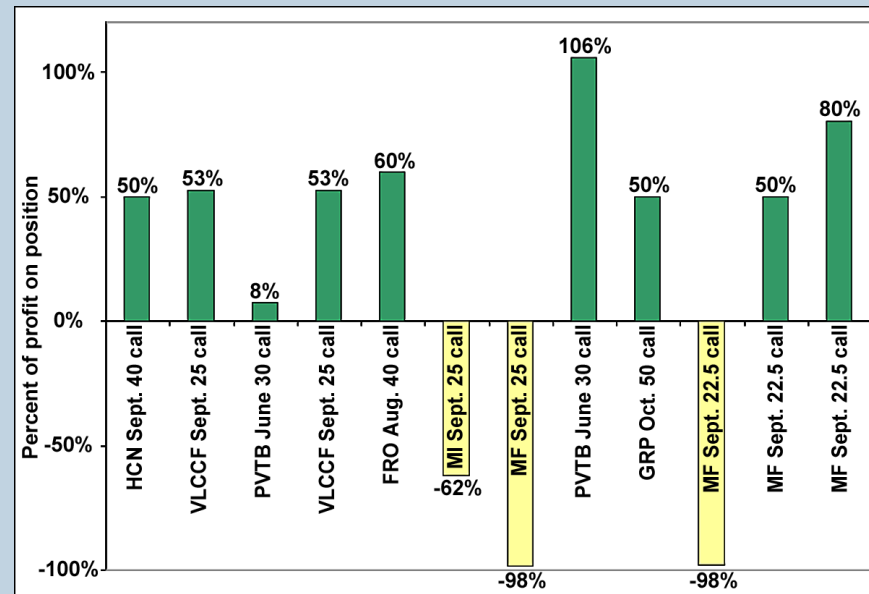
TABLE 1 — TIER 1 STOCK CANDIDATES: FEBRUARY 2008

These stocks were culled from a list of the cheapest 10 percent of stocks from different price ranges (\$20, \$30, \$40, etc).

Tier 1 stocks for February 2008	100-day historical volatility	Implied volatility
Knightsbridge Tankers Limited (VLCCF)	41	28
Privatebancorp Inc. (PVTB)	45	35
Marshall & Ilsley Corporation (MI)	59	38
MF Global Ltd (MF)	43	40
Health Care REIT Inc. (HCN)	30	25
Frontline Ltd. (FRO)	47	31
Grant Prideco Inc. (GRP)	41	23

FIGURE 5 — PERFORMANCE OF CHEAP CALLS

Nine of the 12 options trades from February 2008 were profitable. Eight of the winners gained from 50 to 100 percent, while the other one earned 8 percent. The three losses were September calls on MF Global and Marshall & Ilsley, which were still open positions as of July 18.



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FIGURE 6 — KNIGHTSBRIDGE TANKERS LTD

When Knightsbridge climbed to \$26.57 on Feb. 1, a 25-strike September call was bought for \$2.95. The position was held for 11 weeks and then sold at \$4.50 when VLCCF reached \$28.89 on April 21.

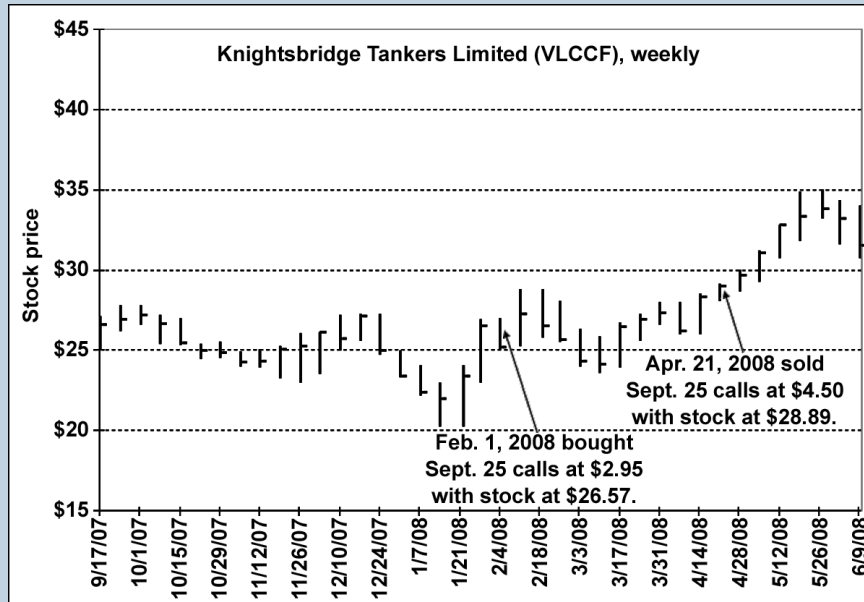
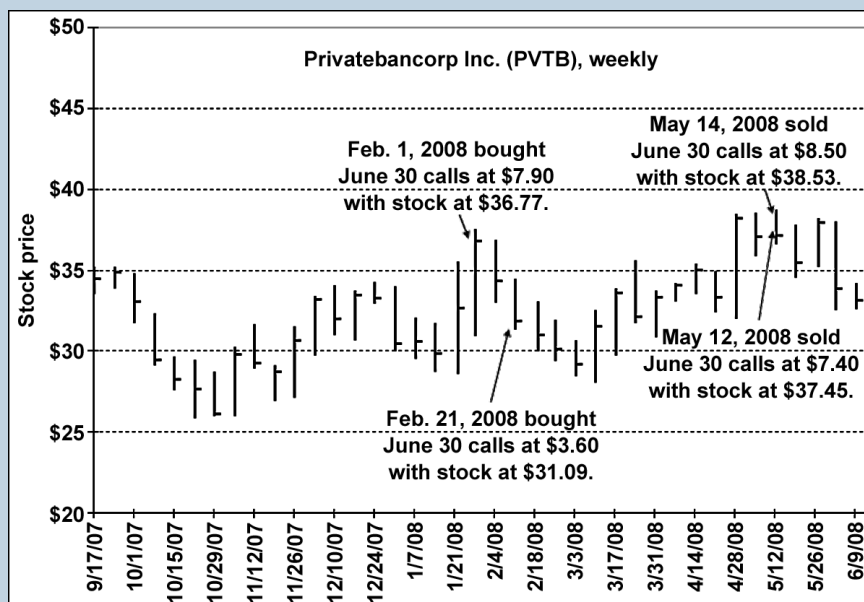


FIGURE 7 — PRIVATEBANCORP

When PVTB traded at \$36.77 on Feb. 1, an ITM June 30 call was bought for \$7.90. After Privatebancorp fell sharply, the 30 call was bought again at \$3.60, and both trades made money.



percent, and their average implied volatility was 34 percent. This difference reflects the assumed source of profit in tier-1 stocks.

The volatility patterns of these stocks were then studied

would do the trick.

Figure 7 shows a weekly chart of Privatebancorp (PVTB). When PVTB traded at \$36.77 on Feb. 1, an ITM June 30 call was bought for \$7.90. Again, there was no fat in the option

in detail, and the list was boiled down to three that were deemed most attractive for investments in February. The process was repeated for stocks in other price ranges, eventually resulting in the selection of seven stocks for option investments in February 2008 (Table 1).

Trade examples

Figure 5 shows the outcome of 12 calls that were bought in February 2008 and will expire between June and October. As of June 15, nine of the positions had been closed at a profit. Eight of those trades gained from 50 to 100 percent, while the other profitable trade — June 30-strike calls on Privatebancorp Inc. (PVTB) — earned 8 percent.

The three remaining open positions were September calls with large losses. The two calls on MF Global are likely to expire worthless in September, while the Marshall & Ilsley (MI) 25-strike call had lost 62 percent.

Overall, Figure 5's calls gained an average 21 percent. When buying calls on seven stocks in one month, expect a range of outcomes. Just because tier-1 stocks seem cheap doesn't mean their calls will be profitable. Figures 6, 7, and 8 illustrate this point for three of these stocks.

Figure 6 shows a weekly chart of Knightsbridge Tankers Limited (VLCCF). When Knightsbridge climbed to \$26.57 on Feb. 1, a 25-strike September call was bought for \$2.95. This call was ITM by \$1.60 and expired in seven months. The position was held for 11 weeks and then sold at \$4.50 when VLCCF reached \$28.89 on April 21. It only took a move of \$2.30 in this stock over 11 weeks to generate a profit of 53 percent. The call's attractive price showed there was no "fat" in its premium, so a relatively small move

premium; its **time value** was only \$1.10.

During the first two weeks, Privatebancorp fell by more than \$5, and two more 30-strike calls were purchased at \$3.60 when PVTB traded at \$31.09 on Feb. 21. By the middle of May Privatebancorp had rallied above \$38, generating a profit of 9 percent on the first trade and 106 percent on the second trade. Figures 6 and 7 show these profits came from normal fluctuations of both stocks, with no exceptional moves.

Figure 8 shows a string of losing trades on MF Global (MF). On Feb. 19 MF was trading at \$28 and September 25 calls were bought at \$5.40. Then, on Feb. 28 and 29 MF Global plunged from a high of \$29.38 on Feb 28 to a low of \$14.27, closing at \$17.55 on Feb 29. This stock delivered plenty of volatility, but in the wrong direction for call buyers.

Three additional purchases were made as MF dropped on Feb. 29. We bought September 22.5-strike calls at \$2.20, \$1.20, and \$1.00. Two of these trades were closed on the same day, both at \$1.80 as MF Global bounced off its low during a panic sell-off. Overall, the four trades yielded two profits (50 and 80 percent), and two losses (98 percent each) on options that will probably expire worthless in September.

The simplest edge

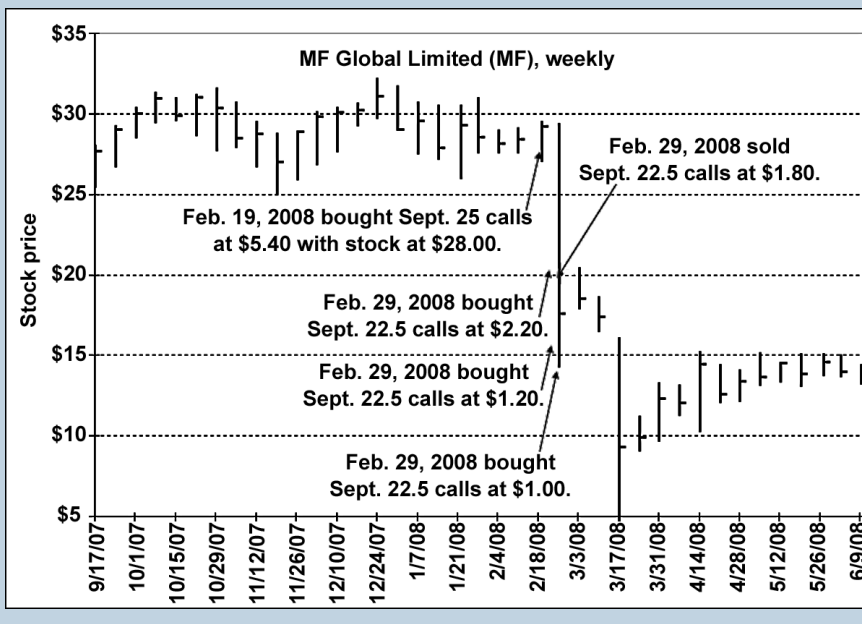
Not all options will be profitable in any given month. But if you buy cheap options, capturing 50-percent profits shouldn't be difficult from normal fluctuations in the stock.

The Goyal-Saretto study shows volatility is the key to long-term success in options trading. Regardless of your options strategy, it pays to focus on the difference between historical and implied volatilities. 📍

For information on the author see p. 6.

FIGURE 8 — MF GLOBAL

After buying the September 25 calls for at \$5.40, MF Global fell to \$14.27 on Feb. 29. However, we bought 22.5-strike calls during the decline and two of the four trades were profitable.



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George Hoekstra articles

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