TABLE 41-3.
VIX derivatives' behavior, July 2007 to August 2007.

	July 16, 2007	Aug. 16, 2007	Pct change
VIX	15.59	30.83	+98%
August futures	16.70	30.60	+83%
Sept futures	16.79	27.25	+62%
Oct futures	16.97	23.50	+38%
Nov futures	16.98	22.38	+32%
Dec futures	17.04	22.45	+32%
Feb '08 futures	17.20	22.50	+31%
May '08 futures	17.29	22.45	+30%

But in July and August 2007, a completely different picture arose. The stock market was making new highs in mid-July 2007, when a new term appeared: *subprime debt* (well, new to most). The stock market quickly suffered a sharp drop of nearly 200 SPX points in a month. *That* was certainly something new in light of the fact that the market had generally been advancing without volatility or major corrections since the 2002-2003 lows. That correction ended in mid-August. Over the course of that month, a completely different volatility term structure had emerged. Table 41-3 shows what happened over that time.

There are vast differences between the futures' reaction in Table 41-3 as compared to Table 41-2. First, notice that VIX made a much larger move—nearly doubling over the course of the month. The near-term VIX futures contract, August, matched that gain for the most part, rising 83%. Hence the futures and options traders were not predicting a quick return to lower volatility as they had been in Table 41-2. If you had owned the August contract as insurance, you would have been quite pleased with that performance. One is not going to get much closer than that—an 83% move in the derivative as compared to a 98% move in the underlying. But if instead you had hedged with a contract expiring later in the year—November, say—you'd have been sorely disappointed, for the longer-term contracts only rose 30% or so.

So, even though the financial markets were undergoing a major eruption (this was the beginning of one of the worst bear markets in history), the longer-term contracts only rose modestly in terms of implied volatility. Once again, the point is made that if one wants to simulate the performance of VIX, then he must utilize a short-term contract and keep rolling it over.

Also, notice that the term structure on July 16 had been sloping upward mildly, but a month later it was sloping downward sharply. The bull market shape had changed to a

TABLE 41-4.
VIX derivatives' behavior, September 2008 to October 2008.

	Sept. 3, 2008	Oct. 10, 2008	Pct change
VIX	21.43	69.96	+226%
Sept + Oct futures	21.64	62.00	+186%
Oct futures	23.10	56.71	+146%
Nov futures	23.42	38.30	+ 64%
Dec futures	23.20	33.78	+ 46%
Jan '09 futures	23.66	32.41	+ 37%
Feb '09 futures	23.82	31.35	+ 32%
Mar '09 futures	23.64	29.29	+ 24%

bear market shape in that time frame. This was but one more sign that the bull market had ended and a bear market had begun.

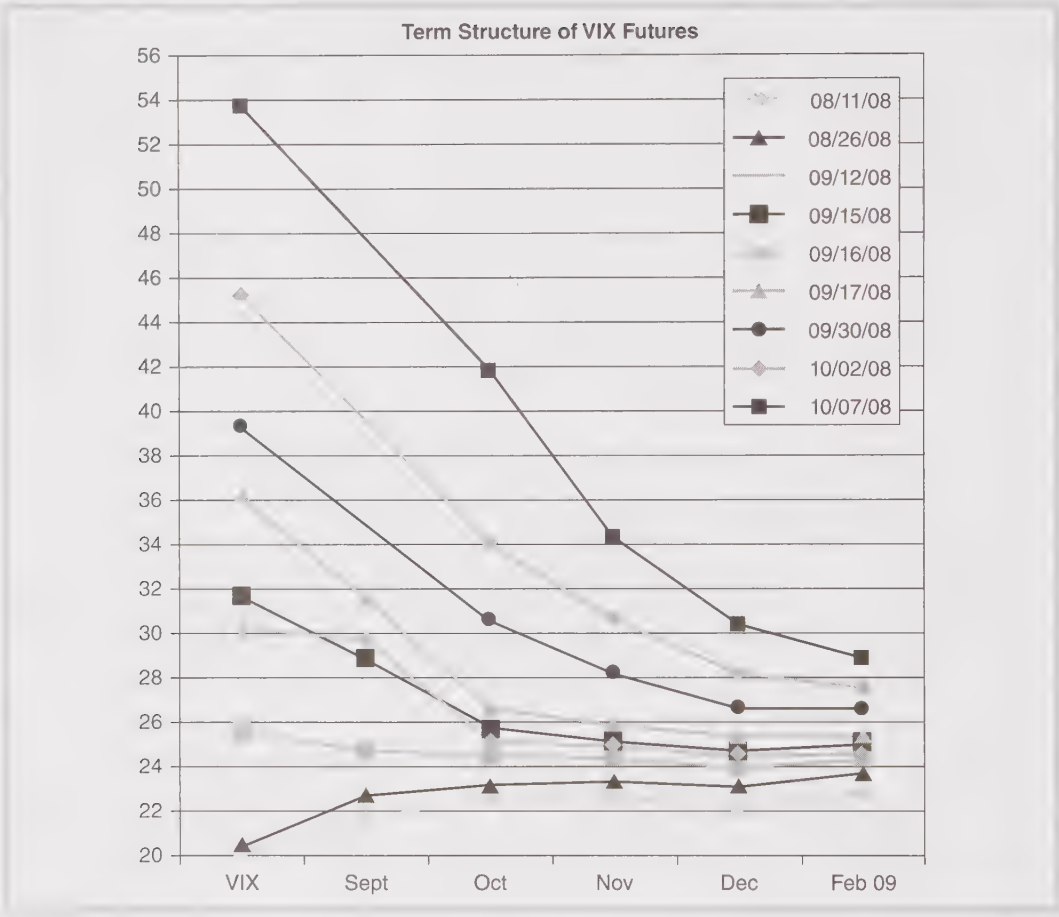
The third and final example of the VIX futures performance is presented in Table 41-4. In this instance the data encompasses the bankruptcy of Lehman Brothers, as the market went from a nervous bear market to a complete financial crisis. We will use this data in other examples later as well.

If one ever needed protection from volatility, this was the time, when one of the greatest financial disasters in history unfolded. VIX jumped by 226% (and actually went much higher, later). On September 3, 2008, the September futures were the near-term contract. If you had owned that contract and then rolled to October when the Septembers expired, you would have gained 186% with your futures positions. While once again, that's not as much as VIX, it would certainly have stood one in good stead as a hedge against falling stock prices. Even if you had owned the October contract throughout—a 146% gain—you would have at least garnered some healthy amount of protection.

But if you had been in longer-term contracts—say, those expiring in 2009—your gains would have been paltry in comparison to the rise in VIX and in comparison to the decimation that was taking place in the stock market. The March 2009 contract only rose 24% over the time period covered in Table 41-4. Clearly, the near-term contracts are the only ones that approximate what VIX is doing, even when VIX explodes in a financial crisis.

Notice the sharp, downward slope of the term structure on October 10, 2008. All of the futures were trading at *huge* discounts to VIX. As noted earlier, a sharp spike peak in VIX when all of the futures are trading at discounts is a buy signal for the stock market—but in this case, VIX didn't peak until quite some time later. So merely noting that the

FIGURE 41-3.
Term structure of VIX futures.



futures are all trading at discounts is not a reason to buy stocks, although it is a warning sign that a buy signal lies on the short-term horizon. As we will see later, there are (option) strategies that can be employed in such situations—especially the VIX/SPX hedged strategy.

Figure 41-3 displays much the same information as Table 41-4, but in graphical form. Each line on the graph depicts the term structure at a different date. On each line, the nodes show the prices of the various futures and VIX. The lowest line on the graph shows the term structure on August 11, 2008. On that date, VIX was just above 20, and the futures were trading with small premiums, extending out to the February 2009 contract, which was trading at about 23. So the term structure sloped slightly upward on that date.

Even though there was an ongoing bear market at the time, it was a rather slow-moving affair, and there wasn't any sense of urgency among the VIX derivatives. By late August 2008, the term structure hadn't changed much at all. However, as September began, there were fears and rumors that perhaps Lehman Brothers would not survive. But even on September 12, 2008, the term structure was still quite flat; VIX was just below 26, and the various futures were trading at 24 or 25.

However, by September 15, it was made clear by the U.S. government that there would not be a bailout for Lehman, and the stock market began to collapse. VIX rose sharply on September 15 through the 17th, so that by September 17, the term structure had taken on a distinctly negative slope. VIX was now trading just above 36, but the near-term contract—which, on that day, was the October contract since the Septembers had expired that morning—was trading just above 26! This was a 10-point discount on the near-term futures. The other futures were trading at slightly lower prices, all the way out to the February 2009 contract, at a price of 25. In other words, even though the stock market was plunging and VIX was exploding to the upside, the VIX *futures* were rather sanguine, trading only slightly higher than they had been in the days and weeks before. This was both unusual and, as it turned out, incorrect—incorrect in the sense that volatility went much higher. So whoever was selling future volatility at such low prices was extremely misinformed.

The last date on the graph in Figure 41-3 is October 7, 2008. By *that* time VIX was all the way up to 54, but the October futures were still much lower—at 42. The other futures were much lower: November at 34, December at 30, and February 2009 at 29. Thus the term structure now had a very steep downward slope. This is what happens in extreme bear markets. VIX continues to rise, but the futures do not keep pace. Only the near-term future has any hope at all of keeping up with VIX. Of course, by expiration day, there is a convergence between the near-term futures price and VIX, and that fact will lead to some interesting strategies in these types of situations, as we shall see.

Eventually, in that bearish cycle of October 2008, VIX rose to 88, intraday, and peaked there. That peak was coincident with a strong stock market rally near the end of October 2008.

There had been other peaks in volatility during the ongoing bear market that started in 2007. Those previous peaks weren't as extreme as the one in October 2008, but they all bore similar characteristics: *all* the VIX futures were trading at a discount, and the term structure was sloped negatively downward. Each time that VIX peaked, a strong stock market rally occurred. These took place most noticeably in August 2007, November 2007, January 2008, March 2008, and July 2008. Each time the stock market rallied. These rallies were not the end of the bear market, but they *were* quite tradeable, intermediate-term rallies of at least 100 points on the SPX Index.

However, not *every* major bottom in the stock market is signaled in this manner. For example, at the eventual bottom of that bear market in March 2009, there was *no* spike peak in VIX. VIX had only risen slightly as the stock market descended into its depths. The only clue that one had, from volatility, that the bottom had been reached was the fact that the term structure of the futures went from a negative slope to a positive slope as the market finally rallied. But even *that* didn't happen immediately. The term structure still had a negative slope until about April 13, 2009—more than a month after the actual lows had been made in the stock market.

There are many other times, of course, when these conditions exist—not just during bear markets. In fact, *most* severe drops in the stock market are accompanied by a swiftly rising VIX, and when VIX makes a spike peak, that is a buy signal for the stock market. If the VIX futures are also all trading at discounts when this spike peak occurs in VIX, it is an even more conclusive buy signal for stocks.

VARIANCE FUTURES

For completeness, we will discuss the only other listed volatility futures that the CBOE/CFE introduced in 2004: the Variance Futures. Variance is a measure of realized volatility. So these contracts measure how volatile the market *has been*. Technically, they settle at the 90-day historical volatility of SPX, once per quarter. Variance is standard deviation (or volatility, in the traditional sense) squared. In Chapter 28, in the section titled "Characteristics of the Model," the formula for variance was given. These contracts use that formula to determine the settlement value.

There are contracts expiring in March, June, September, and December. These contracts settle on the third Friday of the month, just as "regular" options do. Since they are quite volatile, a one-point move is worth only $50. As an example of their range, when volatility rose from 20 to nearly 90 in the fall of 2008, the front-month variance future rose from 400 to 8100 (squaring the ends of the volatility range). That move of 7700 points was worth $38,500 ($50 times 7,700).

The margin required for a variance futures contract is variable—depending on the initial price. If all of the futures contracts listed are trading at prices of 400 or less, then margin is $5,500 per contract. The scale slides higher, all the way to: If all the contracts are trading between 10,000 and 11,025, then the margin for one contract is $230,000. The entire table of variance futures margin is available on the CFE website (http://cfe.cboe.com).

Before continuing with the explanation of these contracts, it should be pointed out that, unlike volatility futures, these variance contracts have been a great disappointment. Even at their best, the open interest was only a few hundred contracts. More recently, there is barely any open interest at all. This is somewhat surprising because they are patterned after similar contracts that successfully traded in the over-the-counter markets.

Perhaps it is because they are quoted in variance terms, rather than volatility terms. For example, if the market-maker is making a volatility market of "20 bid, 21 offered," in variance terms that would be "400 bid, 441 offered." So the market is 41 "ticks" wide. That does not encourage liquidity.

The CBOE has some interesting calculations available with respect to these futures, due to the way that the settlement value is actually calculated. Once a contract has 90 days or less until expiration, the calculation of actual volatility begins. This is called the computation period. So the futures price "implies" a volatility for the remainder of the period.

Example: The June variance futures are exactly halfway into their "computation period"—the 90 calendar days leading up to expiration. Suppose that the variance calculation (see Chapter 28) for the 45 days thus far is 200 (a volatility of 14.1%).

Furthermore, suppose that the June variance futures contract is trading at a price of 300. Then we can infer what the marketplace is estimating for variance over the remainder of the futures' life.

If actual variance is 200, and the future is trading at 300, then the *remaining* actual variance would have to be 400 over the remaining 45 days. That is, if actual variance is 200 for the first 45 days, then is 400 for the remaining 45 days, the variance over the total 90 days would be 300.

So, the futures price is implying that the market will be quite a bit more volatile over the remainder of its life—averaging 400 (or a volatility of 20%). A trader might then be able to make an assumption or prediction about the futures price with this information in hand.

The CBOE publishes the implied variance (400 in the above example) and the realized variance (200 in the above example) daily under the symbols IUG (implied) and RUG (realized). These indices—IUG and RUG—can sometimes be useful to traders, for informational purposes, even if they are not necessarily trading the variance futures themselves.

These calculations only apply to the front-month futures contract—the one that is in the computation period. The longer-term variance futures aren't really tied to any specific data, except that one knows that *someday* they will be in the computation period and will thus have to converge on realized volatility. As a result, the contracts have traditionally traded at a rather high variance estimate. From their inception in May 2004 through the summer of 2007 (before the bear market started), it was typical for SPX actual variance to be approximately 100 (a volatility of 10%). These variance contracts would normally only trade at that low of a variance at the end of their life. In effect, they could be shorted at almost any time, and the trader would make money.

The CFE has indicated that they may, in the future, revamp this contract so that it has broader appeal. If they do, it might be interesting to trade. But, for now, the liquidity is too small for anything other than a small speculation.

OTHER LISTED VOLATILITY PRODUCTS

In this section, we will cover other volatility products, but not options—yet. Volatility options will be covered in the next section.

There are a number of volatility-based indices and data that are available publicly, but they do not necessarily have products that one can trade. For example, the S&P 500 Index (SPX) was created in 1957, although it was extrapolated backward for several decades for comparison to other indices. However, there was no way to trade the index directly until S&P futures were listed in 1982. VIX was created in 1993, but there was no way to trade it until 2004. Likewise, there are other volatility measures—most published by the CBOE—that might be useful for traders to observe, but there is no way to trade them directly at this time. In the future, though, there might well be.

The concept is expanding rapidly, and there are now volatility-related products on certain indices, ETFs, and even stocks. As mentioned earlier, in the future it may be commonplace to have calls, puts, and volatility futures and options listed on every stock that has listed options. Put options won wide acceptance shortly after their introduction in 1976. Volatility options are not as obviously useful to the general public as put options are, so their acceptance may be harder to win, but it will eventually get done.

OTHER VOLATILITY INDICES

There are other volatility indices. So this same calculation that VIX uses can be applied to any entity that has a continuous series of listed option markets, with "good" bids and offers at all times. For example, the NASDAQ-100's (NDX) volatility is tracked with a VIX-like calculation, and it is available via the symbol VXN. A competing calculation for NASDAQ, using a slightly different formula, can be found with the symbol QQV. Likewise the Russell 2000 Index (RUT) VIX volatility calculation is RVX, and the Dow-Jones 30 Industrials (DJX) VIX volatility calculation is VXD.

Certain statistics and data related to VIX include the VIX bid (symbol: VWB) and VIX ask (symbol: VWA).

Recall that VIX is a 30-day volatility estimate. The CBOE publishes a longer-term, 3-month volatility estimate, also using a VIX-like calculation, under the symbol VXV.

There are also some interesting strategy indices. One is the VPD—the Premium Strategy Index—that tracks the performance of merely selling the one-month VIX futures contract each month and rolling it over. There is a similar strategy: VPN—selling the one-month VIX future, capped by the purchase of a call option. There is also a volatility arbitrage index, VTY.

Most of the indices listed above are entities that one would glance at only occasionally, for they cannot be traded.

VOLATILITY INDICES ON STOCKS, FUTURES, AND ETFs

Of far more interest is the increasing trend of taking the VIX calculation and applying it to options on other entities. For example, GLD is the Gold ETF. Its options are very liquid and heavily traded. Thus, one could use them in a VIX calculation and come up with a "GLD VIX." In fact, the CBOE has started doing this on a number of entities, and it is a certainty that many more will follow in the future. At this time, most of these are only index calculations; there are not listed futures or options on them and thus they cannot be traded. However, they will likely be tradeable in the near future.

In this regard, the original VIX should really be known as the "SPX VIX," although that moniker may never take hold. Since the list of these products is short at this time, it is listed in Table 41-5.

TABLE 41-5.
Available VIX calculations.

Name	Symbol	VIX Calculation Symbol
ETF Volatility Indices:		
Gold ETF	GLD	GVZ
Oil ETF	USO	OVX
Euro Currency ETF	FXE	EVZ
Emerging Markets ETF	EEM	VXEEM
Silver ETF	SLV	VXSLV
China ETF	FXI	VXFXI
Gold Miners ETF	GDX	VXGDX
Energy Sector ETF	XLE	VXXLE
Equity Volatility Indices:		
Apple Computer	AAPL	VXAPL
Amazon.com	AMZN	VXAZN
Goldman Sachs	GS	VXGS
Google	GOOG	VXGOG
IBM	IBM	VXIBM

TABLE 41-6.
CME Volatility Calculations Based on *Futures* Options.

Product	Base Symbol	VIX Index Symbol	VIX *futures* symbol
Gold futures	GC	GVX	GV
Crude oil futures	CL	OIV	CV
Soybeans futures	S	SIV	Not traded
Corn futures	C	CIV	Not traded

Of this entire list, the only one that has tradeable products at this time is GLD, where there are listed futures traded on the CFE (base symbol: GV) and options traded on the CBOE (under the symbol GVZ). To date, they have not been too popular, but it is highly likely that this list and many more underlyings will one day have listed volatility futures and options.

To complete this topic, the CME Group, where futures on gold and crude oil trade—among many other things—has attempted to enter the fray as well. They have created a VIX-like index using the gold futures options and another using the crude oil futures options. Note that these options are different from GLD and USO options, although their implied volatilities are not much different—to no one's surprise. There hasn't been a lot of interest in these, either. CME has also created a VIX-like volatility calculation for soybeans and corn, but no products are listed on these at this time. While the intention to list these products is good, the actual products have not been a success. The symbols for these various CME products are in Table 41-6.

VOLATILITY ETFs AND ETNs

Once the popularity of volatility futures became evident, other entities tried to copy the product. The CBOE and CFE have certain licensing agreements in place, so that the exact same products could not be duplicated. That is, it is not possible to create another futures exchange and then start trading volatility futures in the same way. However, a number of ETFs (Exchange Traded Funds) and ETNs (Exchange Traded Notes), which *utilize* the VIX futures have been created.

The first, and the most popular and liquid of these, is the Barclays Bank creation, VXX. It is formally known as the iPath S&P 500 VIX Short-term Futures Exchange Traded Note. It was launched on January 31, 2009, and has been a way for entities that cannot trade futures and options to trade volatility. The components of this ETN are the two front-month VIX futures that trade on the CFE. Barclays rolls them daily, to keep them in the proper ratio according to the VIX formula.

There is a companion ETN, the iPath S&P 500 VIX Mid-term Futures ETN, traded under the symbol VXZ. It utilizes the VIX futures in months 4 through 7, to create a longer-term volatility product. It has been far less popular than VXX, because—as we have already shown—longer-term volatility futures do not track the short-term movements of VIX well. Even so, it has a fairly large amount of liquidity. VXX and VXZ both have listed options, which expire on the "regular" third Friday of the month.

VXX is, by far, the most active and popular of the volatility ETFs and ETNs. However, others are gaining in popularity and—due to the overall demand for volatility hedging products—there will probably continue to be more of these in the future. The following list is a brief review of the major ones that exist at this time. It should be understood that something which is not liquid now might become so in the future, through marketing efforts of the firm that created it, or from uniqueness in finding a niche that investors want filled.

There are some direct copycat products to VXX and VXZ, created by other firms. These other products utilize the VIX futures to create the end product as well. Velocityshares has a short-term ETN and a medium-term ETN, trading under symbols VIIX and VIIZ, respectively. Proshares has volatility ETFs trading under the symbols VIXY and VIXM, which are the short-term and medium-term products, respectively. I realize this starts to look like alphabet soup after a while, but these products are all being marketed to traders who want volatility protection. The liquidity of VXX is currently about 40 or 50 times that of VIXY, and as much as 200 times that of VIIX.

Some of the other creators of products have tried to get more creative. There is an *inverse* VIX ETN, created by Velocityshares, trading under the symbol XIV (which is VIX in reverse, get it?). This has begun to trade several million shares per day, as traders have come to understand how these products work. In the next section, we'll describe the foibles of some of these contracts, and why the *inverse* product has a definite profit potential to it. There is an intermediate-term *inverse* ETN as well: symbol ZIV.

Velocityshares also has created ETNs with *double* the speed of VIX: TVIX is the short-term product, and TVIZ is the intermediate-term one. TVIX has become quite popular as well, as traders looking to speculate on volatility like the extra "action" that this double-speed product produces.

There is even a product designed to reflect the steepness of the term structure (XVIX). Moreover, the CBOE produces an *index* (but no actual product that can be traded) to reflect the *skew* in the price of SPX options; it is broadcast under the symbol SKEW.

With so many of these, one might be tempted to ignore them all. However, that would not be the best approach, for some of them have definite attractions.

There will certainly be changes in the relative liquidity of these products in the future, but at the current time VXX, XIV (inverse), and TVIX (double-speed) are the most heavily traded by far.

A POTENTIAL PROBLEM WITH ETFs AND ETNs

One of the main problems with commodity-based ETFs is that they don't necessarily track the underlying commodity very well. This is mainly due to the fact that the ETF is forced to trade the futures contracts, and there are times when it isn't feasible for the ETF managers to roll from one futures contract to the next without making a "losing" trade that puts drag on the performance of the ETF vis-à-vis the spot index or commodity itself.

There have been many articles written about the US Oil Fund ETF (USO) and/or the US Natural Gas Fund ETF (UNG) as they compare to actual crude oil or natural gas prices, respectively. These funds buy the actual commodity futures, rolling them forward when they expire. The "problem" arises from the fact that—when the longer-term contracts are more expensive than the near-term contracts—the ETF pays the differential.

Example: The front-month crude oil futures are expiring, and thus are near the spot/cash price at expiration. Let's assume that price is 75. The USO ETF sells out their position in the front-month futures, and buys the next month out—at a price of 76.50, say.

A month later, assume that the cash market is still unchanged at 75. The now-expiring futures, which cost 76.50, are now trading at 75. So the ETF has a loss of 1.50 on these contracts, even though the spot/cash market is unchanged.

Over time, the cumulative effect of all these rolls forward into futures trading at higher prices puts a drag on the performance of the fund, with respect to the cash market. Furthermore, the ETF only has a limited amount of assets, and eventually, these losses could theoretically cause the ETF to run out of cash.

This same problem can sometimes affect the volatility index ETNs, VXX, VXZ, and all of the others (including XIV, which is the *reverse* ETN, which is affected in the *opposite* way). VXX utilizes the front two VIX futures contracts, while VXZ utilizes months 4 through 7. Each day, the weighting of the various contracts changes, to reflect the proper ratio of the futures.

Example: Consider the VXX ETN. Suppose that the September VIX futures have just expired, so the VXX consists of being long both the October and November VIX futures. With 19 trading days (four weeks) to go, the ratio might be 95% October and 5% November. Then tomorrow, 90%/10%, and the day after 85%/15%, and so forth. Each day, at the close, the managers of the ETN (Barclays Bank) sell some October futures and buy some November futures.

When the term structure of the VIX futures is positive, the Novembers are more expensive than the Octobers (not to mention the fact that the market-makers know these

orders are coming into the pit, and thus there is a certain additional cost to Barclays to execute trades in a market where your trades are known in advance).

However, *sometimes* the term structure slopes *downward* and the ETN actually *makes* money on the roll because the second month is lower-priced than the front-month. This typically happens in a bearish market.

Consider Figure 41-4, which shows the simple charts of VIX and VXX from their inception in January 2009 through the middle of 2010. Even without statistical verification, one can see that VXX performed far worse than VIX itself. Consider points A and B—which represent the VIX peaks of March 2009 and May 2010, respectively. In terms of VIX, point B was nearly as high as point A. But in terms of VXX, point B is *far* below point A.

The term structure of the VIX futures was positive almost continuously during this time period. As a result, the daily rolls that VXX had to perform cost money. The net effect is the poor performance of VXX vis-à-vis VIX.

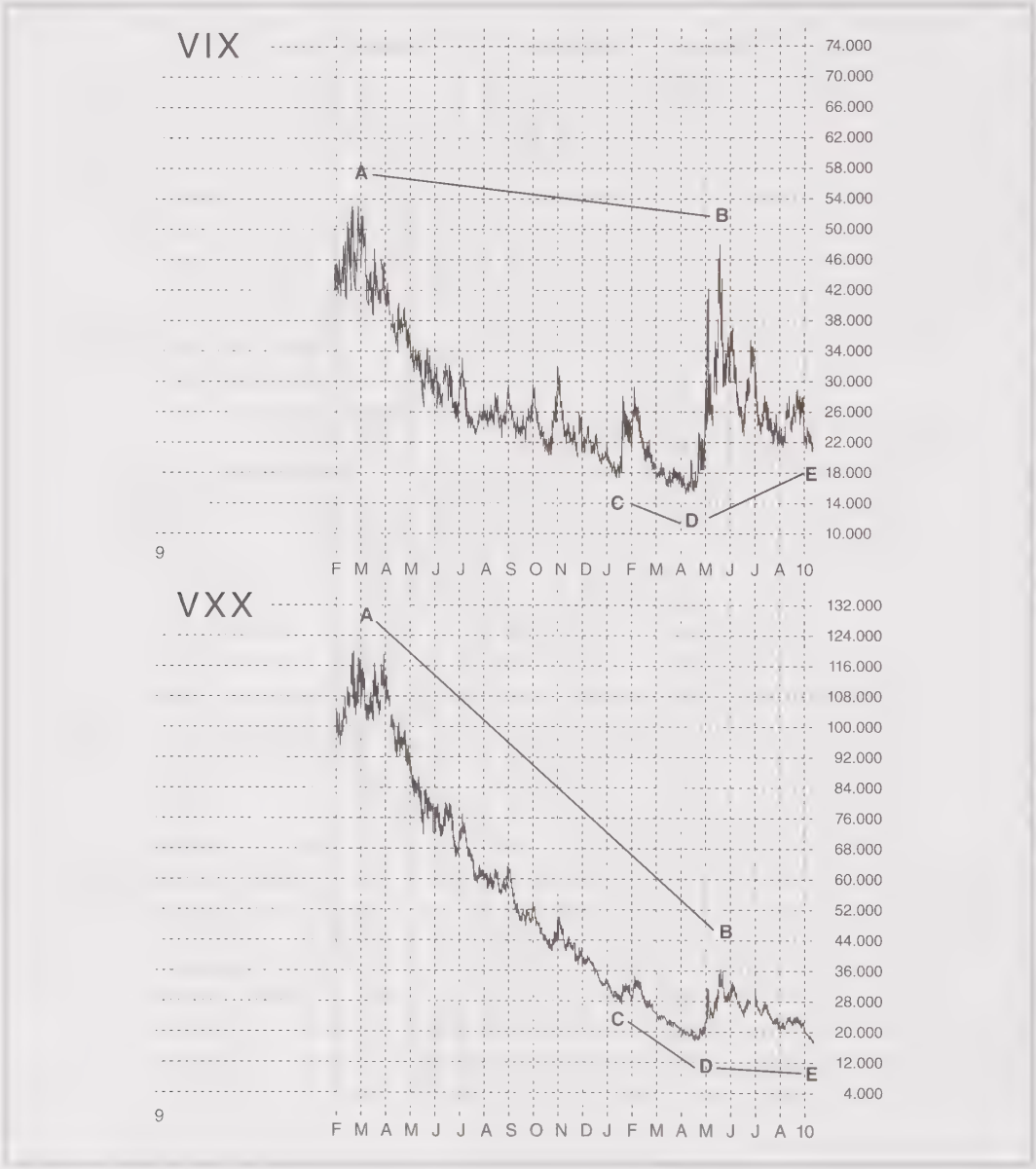
Points C, D, and E further strengthen the case. From point C to D, VXX performed nearly in line with VIX. The term structure was very flat during this time period, so the drag on VXX was minimal. From point D to B, the stock market fell, and VXX actually *gained* ground—more about that later. But as the summer wore on, the premiums on VIX futures grew huge, and the term structure steepened considerably—both of which hurt VXX performance. So by point E, VXX was at new lows, even though VIX was not.

Figure 41-4 is illustrative: when the term structure slopes upward, VXX managers—even though they only have to roll a portion of their position each day—are making losing trades every day. But when the term structure slopes downward, the Barclays traders are making money every day on the roll.

In any case, the overall point is that VXX outperforms when the term structure slopes downward (which only happens in bearish times or when VIX is at very high levels), while VXX underperforms when the term structure slopes upward (which is common during bullish times). Moreover, at times when there is great demand for protection from SPX put buyers, the term structure slopes upward even more steeply, thus putting an even greater drag on VXX.

I'm not sure anyone really buys VXX and just holds it, but VXX can be a useful tool, despite the fact that it underperforms VIX in bullish times. Note that VXX outperforms in a bearish market, and so that's when you'd want to be long VXX. Meanwhile, since VXX underperforms during a bullish market period, that's when you'd want to be *short* VXX. In fact, since there is an *inverse* ETN (XIV), rather than actually shorting VXX, one could merely buy XIV at those times. The inverse XIV takes advantage of the upward-sloping term structure. XIV was first introduced in December 2010, and one can compare its chart with that of VIX and VXX to see the relative performance since then.

FIGURE 41-4.
VIX and VXX from January 2009 inception to mid 2010.



One could make these decisions (to be long or short), based on the term structure of the VIX futures (be long VXX when futures are at a discount to VIX, and be long XIV when futures are at a premium). So, contrary to the negativism about commodity ETFs

(of which this is one), there are ways that VXX can be gainfully used. But if you just want to speculate on volatility, the VIX futures appear to be superior to VXX.

LISTED VIX OPTIONS

VIX futures were first listed in March 2004. Variance futures followed in May. But it took nearly two years before VIX *options* were listed. Initially they were scheduled to begin trading in April 2005, but that launch was aborted when it became clear that there wasn't a viable way for market-makers to hedge their positions. After some further creative work, VIX options began trading on February 24, 2006. These options have proven to be very popular, although they do have some characteristics that are different from other listed options one may be used to trading.

We noted earlier that some of the ETNs, such as VXX, have listed options. Those options are of the "normal" variety—expiring on the third Friday of the month, and settling into VXX shares if they are exercised or assigned.

But the VIX options are cash-based options, settling for cash on their expiration day—ostensibly like OEX or SPX options do. The same a.m. VIX futures settlement price that was discussed earlier is used for the VIX options settlement.

Example: A trader owns the VIX July 25 put. He does not exit the contract in the open market, but rather holds it until expiration. The settlement price (VRO) is determined to be 20.84. The July 25 put is thus 4.16 points in the money (25 minus 20.84), and after expiration the customer would receive $416 in his account, while the put contract would be removed from the account.

But nearly all other aspects of VIX option trading are *different* from other listed equity or index options, whether they be cash-based or not.

First, they are subject to the same expiration dates as VIX *futures*—30 days prior to the next listed SPX option expiration. That date is always a Wednesday, often the Wednesday *before* the third Friday, but occasionally the Wednesday after the third Friday.

But the most important thing to understand about VIX options is that they are priced off the VIX futures—not off of VIX itself. Or perhaps you would prefer to think of it *this* way: VIX options are priced off of the implied volatility of the various strips of SPX options (which is what the VIX futures represent, of course). However you want to look at it, the implied volatility—and hence the futures prices—can vary greatly from month to month. If one is discussing IBM, *October* IBM and *December* IBM, say, are the same thing—IBM's price. Same for an index, such as SPX. But *not* the same for the *implied volatility* of the options on those underlying indices.

Example: On February 24, 2006, on the first day of VIX option trading, VIX was trading at 11.46. The following were the prices of the VIX put options with a striking price of 15:

VIX Index: 11.46
VIX March 15 put: 3.00
VIX April 15 put: 2.55
VIX May 15 put: 2.00

First of all, this looks rather strange, doesn't it? The longer-term puts sell for a lower price than the near-term ones? But any option trader will always relate an option's price to parity, first of all. For a normal American-style option, parity of an in-the-money put is the striking price minus the underlying price.

If we (erroneously) assume VIX is the underlying, then we would calculate:

$$\text{Parity} = 15 - 11.46 = 3.54$$

These puts are trading well below parity, it seems. The May 15 put—trading at a price of 2.00—seems to be trading at nearly a point and a half discount to parity.

What is possibly going on here? The answer to that question lies in the fact that, for pricing purposes prior to expiration, the underlying for these VIX options is not VIX itself (at least not until the last instant of their life), but rather the VIX *futures*. Consider, then, this further piece of information, Table 41-7:

Consider the following general information about a proverbial XYZ option:

XYZ: 13.86
XYZ May 15 put: 2.00

TABLE 41-7.
VIX options *and* futures prices.

Option Contract	Option Price	Futures Price
VIX March 15 put	3.00	March: 12.10
VIX April 15 put	2.55	April: 12.76
VIX May 15 put	2.00	May: 13.86

One would not think there is anything unusual about this. XYZ stock is slightly below the striking price of 15, and it's 1.14 in the money (15 minus 13.86). The put option is trading at 2.00—well above intrinsic value.

Substitute the data for the May 15 put from Table 41-7:
May VIX futures: 13.86
VIX May 15 put: 2.00

Now the option prices in Table 41-7 make sense—if you consider that the underlying is the *futures* contract and not VIX itself. In fact, VIX may differ from the futures prices by a substantial amount, as we have seen from earlier examples. Not until the settlement process takes place does VIX *have* to converge with the near-term futures price. Hence, for nearly all of a VIX option's life, the price of VIX itself is a piece of irrelevant information! True, there may be strategies that we can employ by knowing that the near-term futures and VIX will have to eventually converge, but for the purpose of pricing the options, VIX is not needed. *VIX options are priced off of the futures contracts!*

To reinforce this point, consider the VIX option prices on one of the days during the financial crisis in 2008—October 10, 2008, the same day that we used for the futures example in Table 41-4. On that day, this information was available:

VIX: 69.96
VIX Oct 25 call: 31.70
VIX Nov 25 call: 13.70
VIX Dec 25 call: 10.00

Now, if one was not aware of the pricing structure of VIX futures and options, he would certainly think that the above list contained some misprints. How can a November call sell for so much less than an October call with the same strike? The same question applies to the December call as well. Moreover, with VIX near 70, and the striking price of all the calls at 25, parity is seemingly 45. Why are all the calls so far below parity? Surely there must be a mistake here.

But there isn't. Remember that the price of VIX is an irrelevant piece of information as far as pricing the VIX options. Rather, we need to consider the prices of the October, November, and December futures contracts. Table 41-8 incorporates the above option prices with the futures prices from Table 41-4:

The fourth column shows the call options' parity (intrinsic value) with respect to the futures contract. That is, it's the price of the futures contract minus the strike, 25. In *this*

TABLE 41-8.
VIX Options *and* Futures Prices on October 10, 2008.

Option Contract	Option Price	Futures Price	Parity (Futures)
VIX Oct 25 call	31.60	October 56.71	31.71
VIX Nov 25 call	13.70	November: 38.30	13.30
VIX Dec 25 call	10.00	December 33.78	8.78

light, the options seem quite accurately priced. The October and November 25 calls are near parity since they are so deeply in the money, and the December 25 call—while in the money also—has a little time value premium because it has a longer life remaining. Again, the price of VIX is irrelevant for pricing the options.

What is most important to understand throughout this discussion is that the individual VIX futures prices are different, and may not relate to each other in the same way at all times. Traders who are familiar with other futures contracts know, for example, that December wheat and July wheat are not the same thing. Yes, they are somewhat related, but their prices can spread apart or contract at various times. The same holds true for VIX futures.

VIX OPTION CALENDAR SPREADS

Using these same concepts, let's see how what appears to be a rather benign strategy—the call calendar spread—can actually have some unexpected results. The following examples closely replicate what actually happened in the fall of 2008, much to the chagrin of both customers and their brokerage firms.

Date: September 8, 2008
VIX: 22.64
VIX Oct 25 call: 1.75
VIX Nov 25 call: 2.15

Most brokerage option platforms at that time—and, sad to say, most still today—do not calculate VIX option Greeks and implied volatility correctly, because they are not "smart enough" to use the futures prices as the underlying. Rather they just use VIX, which we know is wrong. That contributed to the problem. Using VIX (incorrectly) as the underlying, it appears that the implied volatilities of these two options are out of line—that the October 25 call is trading with a much higher implied than the November 25 call. Thus, traders thought that a call calendar spread might make sense.

VIX Call Calendar:
Buy Nov 25 call and Sell Oct 25 call for 0.40

Now if this were IBM or an index, or anything besides the equivalent of a futures option, you know that a "regular" calendar spread risks the initial debit (0.40 in this case) and can make a limited profit, depending on where the underlying is at the time of near-term (October) expiration and what the implied volatility of the long-term (November) call is at that time. There isn't any such thing as "November IBM" and "October IBM." IBM is just IBM.

But these are *not* IBM options, and what happened was devastating to some. You have already seen these prices in the preceding tables:

Date: October 10, 2008
VIX Oct 25 call: 31.60
VIX Nov 25 call: 13.70

This VIX call calendar spread is now trading at *minus* 17.90 points. Thus, to exit the spread costs *another* $1,790! You would have to buy back the October 25 call for 17.90 more than you would get from selling out your long November 25 call. Since you already paid $40 to enter the spread, your total loss is $1,830 plus commissions.

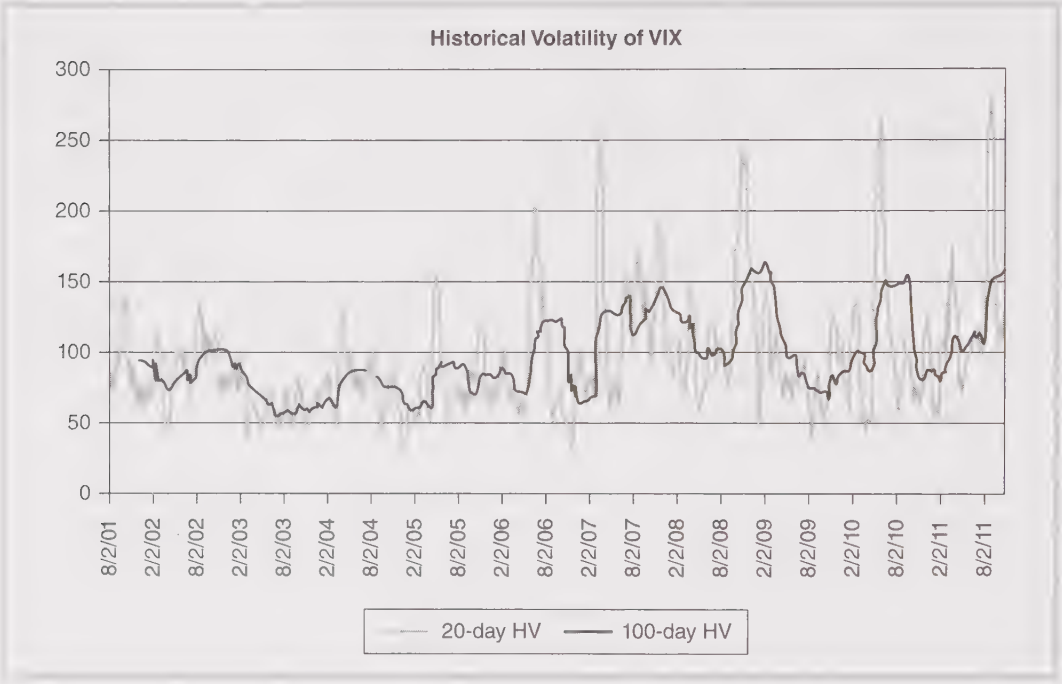
Traders who used this strategy lost a lot of money, and in many cases their brokerage firms did, too, because those brokerage firms had not properly margined the position—thinking it was a "normal" calendar spread. Now most experienced brokerage firms are asking for *naked margin* for any short options in a VIX calendar spread or diagonal spread; only vertical spreads receive the usual reduced margin requirement.

THE VOLATILITY OF VOLATILITY

Before getting into the more intricate aspects of VIX option pricing, it may be beneficial to see how volatile the underlying index, VIX, and its futures, can be. Understanding the volatility of volatility, as it were, can help in pricing the VIX options, for it is necessary to have a volatility estimate to price options. Also, knowing how volatile VIX and its derivatives can be aids one in understanding how effective they are as a hedge or speculation in times of high volatility.

Figure 41-5 shows the historical volatility of VIX over a ten-year period. This time frame encompasses both bull and bear markets. Moreover, the actual price of VIX has varied greatly over that time. It rose to 60 or so in the bear market of 2002, and then collapsed to 10 in 2006, only to explode to nearly 90 in 2008 and then return to the teens in 2011 before jumping to 50 once more.

FIGURE 41-5.
Historical volatility of VIX.



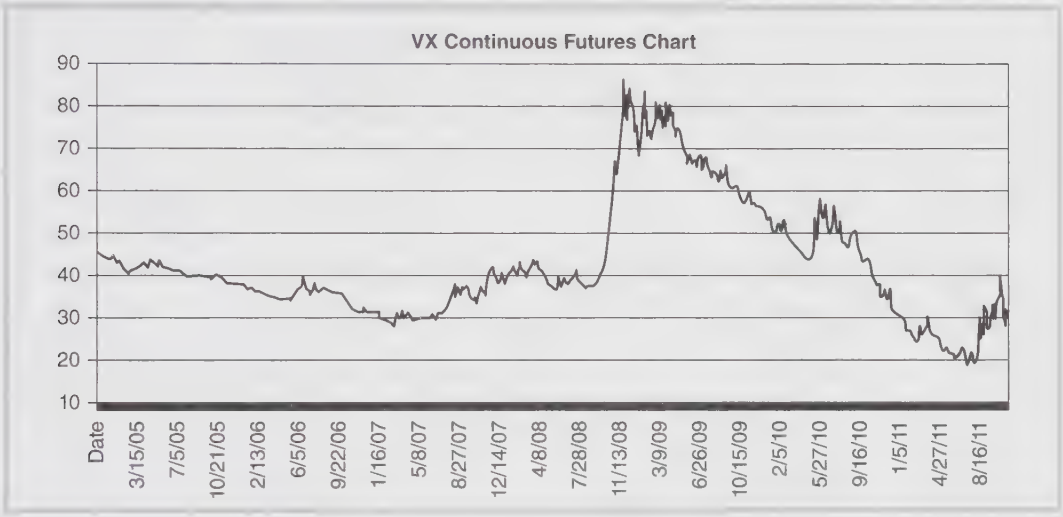
A great variance in the price of VIX is encompassed in the data. However, the one thing that stands out is that—bull market or bear, high-priced VIX or low-priced—the historical volatility of VIX remains amazingly constant, averaging about 90%.

The black, less volatile line on the chart is the 100-day historical volatility and it has generally ranged between 60% and 150%. The gray line is the 20-day historical—often the time frame of choice used by traders for a volatility estimate—and it has ranged between 40% and 270%.

The highest spikes on the chart occurred at times of significantly high VIX readings (and hence, at major market bottoms): September 2001, July 2002, May 2005, June 2006, February 2007, November 2007, November 2008, May 2010, and August 2011. It is interesting to note that VIX has been more volatile since listed VIX options began trading (February 2006). It is unclear if that is a coincidence or not.

The *median* 100-day historical volatility over the data span included in Figure 41-5 is 90%. There are no stocks that I can think of that have a 100-day historical volatility as high as 90% over any time period of any significant length—much less a *median* 100-day anywhere near that high.

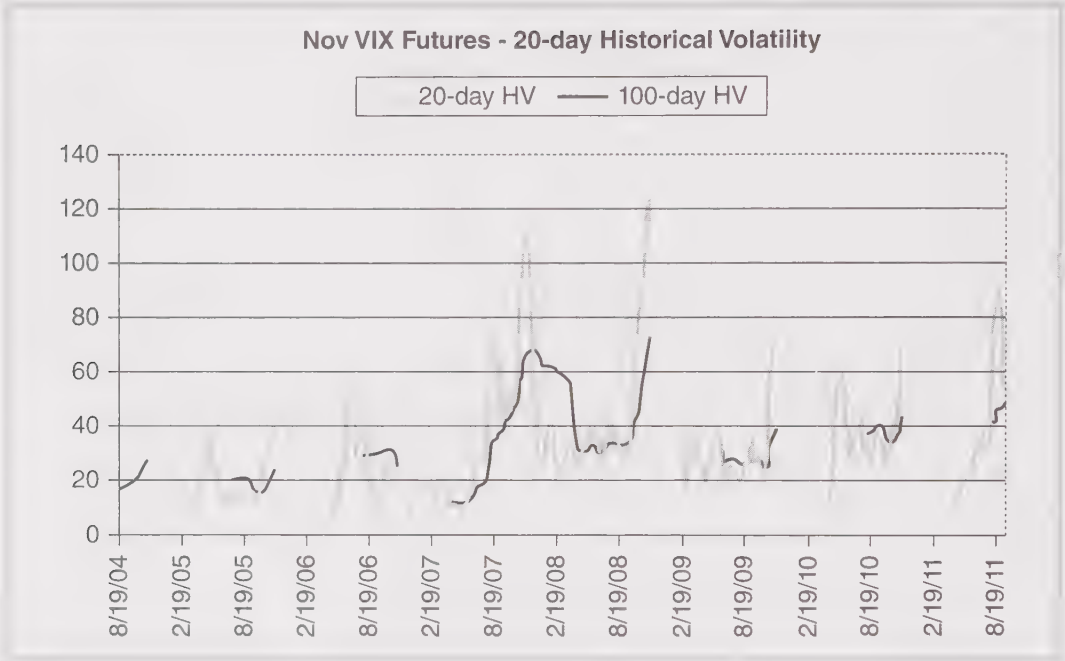
FIGURE 41-6.
VX continuous futures chart.



But one cannot trade VIX. Rather one must trade the VIX derivatives. The VIX futures are not as volatile as VIX itself, but they can be quite volatile during times of distress in the stock market. Figure 41-6 shows the long-term graph of the *continuous* VIX futures. You may recall that a *continuous* futures contract chart is constructed by "connecting" the ongoing charts of the front-month futures contract, but eliminating the gaps from one to the next. It purports to show the results a futures trader would have experienced had he continuously held a position in the front-month futures, rolling it over each time it neared expiration (or first notice day, in the case of a physical futures contract). Note: This is somewhat similar to the Barclay's VXX, except the VXX is a weighted blend of the two front-month futures, whereas the continuous chart is merely the front-month. But both have a long-term downtrend because one is more or less constantly paying a premium for the futures. That premium is then lost by expiration. The only time that the continuous chart—or VXX—gains on VIX is when a bear market is in progress, and the futures are thus trading at discounts to VIX.

Returning to the subject of actual volatility, consider a single futures contract. Figure 41-7 shows the 20- and 100-day historical volatility of the *November* futures, dating back to their inception in 2006. The November contract is a pertinent one, because it is often the one that one would be using for protection in September and October—the typical "bad" months for the stock market. You can see that volatility explodes in this contract as well—and this one *can* be traded. In 2007 and 2008, actual volatility of the November contract rose to over 100% (from below 40%) when the stock market declined.

FIGURE 41-7.
VIX futures historical volatility.



SKEWS IN VIX OPTIONS

When one observes the entire set of VIX options available for trading, he is looking as far as seven or eight months out. These option prices are based on the underlying futures contract expiring in that month. Each successive longer-term month is less volatile than its predecessor. Table 41-9 shows a typical array of VIX futures volatility (using the 20-day historical volatility). This data is a snapshot from July 22, 2010, but it is generally illustrative of how the volatilities are related. There is greater volatility in the front-month than the second, and greater volatility in the second month than in the third, and so forth.

This concept can be reinforced by once again referring to Figure 41-2—the general graph of the term structure of implied volatilities. Think of a vertical line between the two curves on the graph at each month as representing the range of possible volatility for that month. That vertical line would be longest in the front-month; then next longest in the second month, and so forth. That is exactly what Table 41-9 represents: the range of volatilities of each futures month.

Incidentally, in July 2010, volatility was decreasing from the peak it had reached in May and June (the "flash crash") and perhaps the futures were anticipating that decrease

TABLE 41-9.
20-day Historical Volatility (HV) of VIX futures on July 22, 2010.

Entity	20-Day HV
VIX	100%
August futures	56%
September futures	45%
October futures	41%
November futures	39%
December futures	37%
January futures	36%
February futures	35%

continuing (as it did). Thus there might be more of a discrepancy between VIX's historical volatility and the futures' historical volatility than there normally would be. In any case, VIX is generally more volatile than the futures.

The data in Table 41-9 is illustrative for the purpose of pricing VIX options because it shows that option VIX August options should trade with a higher implied volatility than that of a later month. Also, September VIX options should trade with a higher implied volatility than any later month, and so on. This means that there will always be a *horizontal skew* in VIX options. The near-term options will always be trading with a higher implied volatility than later months.

Unlike an individual stock, though, this does not necessarily present a volatility trading opportunity. In the case of an individual stock, if near-term options are expensive with respect to longer-term options, a calendar spread might be an appropriate strategy (although, even there, there might be a justifiable reason why such a skew is correct—an upcoming event in the form of an earnings announcement, for example). But with VIX options, this is the norm, because spreading August options against October options, say, involves two *different* underlyings, not just one—as would be the case for stock options—and the nearer-term underlying is more volatile than the other one.

In addition to the horizontal skew that is present in VIX options, there is also a vertical skew. There are a couple of ways to justify why this skew exists. One is that the downside is limited in VIX, while it can be very explosive to the upside. Hence lower strikes should sell with a lower implied volatility than higher strikes.

Another way to look at the same thing involves using SPX options. We have demonstrated in an earlier chapter that index options have a negative skew in their pricing—a skew that has existed since the Crash of '87. Out-of-the-money puts on SPX are quite

expensive in terms of implied volatility, when compared with at-the-moneys, or when compared with out-of-the-money calls. Thus, the lower strikes have higher implied volatilities than the higher strikes. VIX is the inverse of SPX (when one goes up, the other goes down), so it would stand to reason that VIX options should display mirrored characteristics to SPX options. Thus, for VIX, higher strikes should have higher implied volatilities than lower strikes.

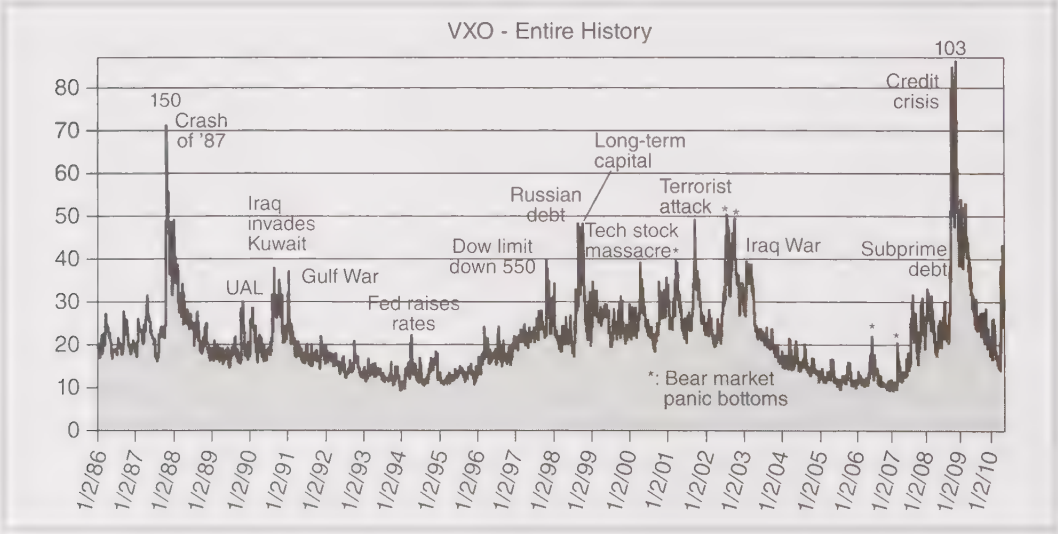
Both arguments are valid ways of explaining the skews.

TRADING STRATEGIES: DIRECTIONAL SIGNALS

Now that we have the definitions in place and the reader is familiar with the mechanics of listed volatility futures and options, we can discuss some strategies. Initially, we will look at using VIX and derivatives data to aid in market prediction.

Let's begin by looking at a long-term chart of VXO—the "original" VIX—in Figure 41-8. We use this because, when the CBOE first introduced VIX in 1993, they backdated the data to 1986, so as to theoretically include the Crash of '87. As you may recall, that "original" VIX changed its symbol to VXO when the new VIX was introduced in 2003. So it is VXO that has the longest (theoretical) history.

FIGURE 41-8.
VXO history.



A number of general observations about volatility and its performance during certain market periods are evident in this chart. First and foremost is the fact that spike peaks in volatility accompany market crises and are eventually indicators of market bottoms.

The actual level of VXO at the time of the peak is not particularly important, either, although it *does* measure the magnitude of the crisis that occurred to produce the spike peak in the first place. For example, the spike peak in 1994 after the Fed surprisingly raised interest rates was just as valid of a "buy" as many other signals, even though VXO barely rose to 20 at that time.

Most of the signals occurred as the result of some specific event—war, financial crisis, terrorist attack, etc. However, some were merely the result of a falling market that developed its own sense of panic, pushing VIX and VXO sharply higher. The two highest peaks were the Crash of '87 and the financial crisis of 2008. Recall that all data prior to 1993 is theoretical (backtested) data, so it is only an estimate that VIX—had it existed—would have exploded to 150 in 1987. On the other hand, we *do* know that VXO traded at 103 in 2008.

We have previously discussed how a spike peak in VIX or VXO is often coincident with a solid trading low in the stock market. Such a spike peak is ideally set up by a swift rise in volatility during a sharply declining stock market. Then, when VIX spikes up to its highs and reverses quickly downward, that is usually an intermediate-term trading low for the stock market.

What is actually happening in such cases is that traders are panicking to own SPX puts as the market is dropping. As one might expect, those puts can get quite expensive in the midst of a crashing stock market. It's akin to trying to buy fire insurance for your house when it's already on fire—it's going to be very expensive.

In this sense, the spike peak in VIX is a contrary indicator. When the "last" trader has paid top dollar for the "last" put, then all the players have thrown in the towel, and then the stock market turns and rallies.

Figure 41-8 shows other important data as well. For example, VIX and VXO rarely fall below 10, and so we could say there is a floor of sorts at that level. In a following section, there will be a further discussion of the meaning of VIX trading at 10, but suffice it to say that it has *not* spiked down to 10 and popped right back up. Rather, VIX takes a good long time making rounding bottoms near the 10 level on its chart. Eventually this leads to a much higher level of volatility.

In this sense, many analysts say that VIX is "mean-reverting." That means that it won't trend up or down forever, like the market or a stock might. Rather, it remains in the general range of 10 to 50, say, and after reaching either extreme, eventually finds its way back toward the center of that range.

In general, statistics show that VIX moves opposite to the market about 75% or 80% of the time. That is on a daily basis. On a longer-term basis, the movements are negatively correlated at a slightly higher rate. Simply stated, when the market goes down, VIX goes up—and vice versa. This is clearly evident on the chart and is why owning volatility is good protection for a portfolio of stocks.

THE TREND OF VOLATIILITY

The trend of volatility is important, too. VIX tends to trend lower over the course of a bull market, and to trend higher during a bear market. While Figure 41-8 doesn't show the stock market—only VXO— some larger trends are evident. For example, the bull market of 2003 to 2007 was accompanied by VIX trending lower and lower, until it eventually reached 10. In retrospect, it was subsequently made known that the Fed was manipulating interest rates, trying to engineer a "perfect" environment for owning financial instruments and real estate (and as a by-product, crushing volatility). However, that all fell apart in the financial crisis of 2007-2008.

Another interesting trend was an *increase* in volatility over the 1995-2000 period, pretty much all during the bull market of that time frame. It is unusual to see VIX rising while the market is rising, but that was a very volatile bull market. Recall that volatility is the standard deviation of daily price changes. For volatility to increase during a bull market, there needs to be a lot of counter-trend, volatile, back-and-forth movement, but within a general rising price trend.

The trend of VIX can be used as a confirming indicator on a shorter-term basis, as well. For example, if the market is declining, but VIX is *not* rising, then one might conclude that the market decline is temporary in nature. However, if the market is declining and VIX is rising, then that is a bearish combination that should be respected as identifying an ongoing bearish market phase.

The converse holds true for rising markets. If the market is rising and VIX is falling, then that's a bullish confirmation. However, if the market is rising and VIX is rising as well, the uptrend may be suspect.

VIX Measures the Cost of Protection. This might be a good place to point out a general description of VIX: it is a measure of the cost of insurance. Of course, VIX is more than that, but this is a useful description—one that would help many novices understand how and why VIX sometimes rises and sometimes remains docile. So when the market is plunging and traders are scrambling to buy SPX puts, the cost of protection is high and so is VIX.

As was pointed out, not every low in the stock market is marked by a spike peak in VIX. There are certain times when the stock market declines, yet VIX does not move

sharply higher. There can be various reasons for this, but they basically all center on the same fact: either traders don't feel the need to buy protection in such cases, or protection is being supplied readily.

Recall that we previously said that, at the bottom of the large 2007-2009 bear market, when SPX traced out the last leg into the March 2009 lows, VIX was not rising rapidly. Knowledgeable traders felt that most people already had protection in place by that late date in the bear market, and thus there wasn't much demand for protection. VIX was relatively high—slightly above 50—but it wasn't spiking.

In general, when one sees a declining market, but VIX is not rising, then one can assume protection is cheap. Sometimes it's cheap because traders who previously had the foresight to buy protection before the market started to decline are now selling out their protection to take profits. This increases the supply of protection and holds the cost down, even though the stock market is falling. It has the same effect as would be the case if no one wanted to buy protection. A lack of demand or a preponderance of supply can both hold the cost of protection down—and keep VIX relatively low and/or stable.

Just because protection is cheap doesn't mean that the people who are eschewing protection are smart—in fact, just the opposite was true in August 2011, as VIX was quite cheap when that market first began to decline. VIX was still in the low 20s even after SPX had fallen by nearly 100 points. Shortly after, however, SPX plunged and VIX exploded—doubling in a matter of days. By *that* time, demand for protection had skyrocketed.

This same concept of sharply rising implied volatility coincident with a trading low in the underlying is equally true for individual stocks, futures, ETFs, and so forth. Most of these don't have a VIX calculation at this time, but that isn't a problem. One merely needs to look at a chart of the composite implied volatility of the options on the entity to observe the spike peak in volatility.

Extreme Lows in VIX. If a spike peak in VIX is a buy signal for stocks, is an extreme low a sell signal? It can be, but it's sometimes better to consider in a broad sense what low volatility means. If traders aren't willing to pay much for options, then the consensus opinion is that the underlying isn't going to be volatile—it isn't going to change much in price. Looking at this from a contrarian viewpoint, if "everyone" thinks the underlying is going to remain stable, then it's quite likely that the opposite will be true, and the underlying will explode in price. That explosion can be on the upside or the downside. Hence, in the general sense, extremely low volatility is a sign to buy volatility—perhaps in the form of long straddles if volatility is not directly tradeable on the entity in question.

At the very least, when VIX is low, one should consider buying VIX calls or SPX puts as protection for a stock portfolio. If the market explodes on the upside, one's portfolio would profit. Conversely, if the market plunges, the cheap protection is sure to serve a useful purpose.

It should be pointed out, though, that volatility can remain low for long, long periods of time. Conversely, volatility tends to spike up to extreme highs and then fall back rather quickly. Stated in another way, VIX makes rounding bottoms and spike tops. Since the stock market moves in the opposite way to VIX, that is akin to saying that SPX makes rounding tops and spike bottoms—a fact that any experienced trader knows is true.

Having said that, there is evidence that extremely low VIX often precedes a sharp market decline. The "modern" VIX has backdated data to 1993; the "old" VIX—now called VXO—was backdated to 1986. In the entire history of these two volatility indices, VIX has only fallen below 10 a few times. When it has, a sharp market decline has usually followed.

It turns out that VIX and VXO have only closed below 10 at nine different "periods" throughout their histories (a "period" might contain multiple *days* with VIX or VXO below 10, but those days are all close together). In recent years, VXO has generally traded at lower prices than VIX most of the time. So VXO tends to drop below 10 first. In fact, VIX doesn't always follow along completely. For example, on February 1, 2007, VXO closed below 10, but VIX never actually closed below 10—making its low at 10.08—on February 2. After that, SPX went sideways for a week before eventually dropping 10 points.

There were two other occasions where VXO closed below 10 but VIX didn't. So one might say that these two indices are "too low" when VXO is below 10, and VIX is below 10.30, for example. Using that as the entry criteria, Table 41-10 shows the results of SPX movement. The first column, "entry date," is the date on which this "too low" criterion was first met. The second column shows how many trading days later SPX went into a sharp decline. The size of that SPX decline is shown in the third column, both in terms of SPX points as well as the percentage drop. Finally, the fourth and last column shows how big a draw down one would have had—i.e., how far, in points, SPX rose during the waiting period as defined by the second column.

Overall, this is a pretty good system for finding a spot where a sharp (about 1 percent) SPX decline in a day or two is about to take place. That is a sizeable decline in such a low volatility market. That decline always took place within about a week, and sometimes as soon as the next day. Moreover, the draw downs while one waited were quite small.

The worst signal was the first one, in 1993 (perhaps traders didn't really understand what a VXO below 10 exactly meant in those days—VIX was new, having just been introduced earlier that year). The draw down in 1993 was large in comparison to the eventual drop in SPX.

So the requirement for VXO to be below 10 and for VIX to be below 10.30 appears to be a good entry criterion. But if one is treating this like a trading system, an exit point would be necessary as well. In most of the occurrences shown in Table 41-10, the bulk of

TABLE 41-10.
Market Declines after a "Low" VIX.

Entry Date	Days until SPX Drop	Size of SPX Drop: Points (%)	Draw down while waiting (Points)
2/14/07	8	–50.3 (3.3%)	4.3
2/2/07	5	–10.3 (0.7%)	1.7
1/24/07	1	–16.2 (1.1%)	0.0
12/14/06	5	–12.8* (1.0%)	1.6
11/20/06	4	–19.0 (1.3%)	5.5
12/22/05	2	–12.1 (0.9%)	0.5
7/20/05	1	–8.2 (0.7%)	0.0
1/28/94	5	–10.9 (1.9%)	3.3
12/22/93	5	–4.1* (0.9%)	4.7

* Total of 2-day decline.

the decline came in the one or two days noted in the third column. Hence one would be encouraged to take profits on the first big SPX drop, or at least to use a tight trailing stop for any shorts that may have been established. The main exception to that was the signal in January 1994, which was a predecessor to a more serious decline. The Fed raised rates on February 1, 1994, and knocked the market for a loop. Many small-cap indices and individual stocks dropped sharply that year. In fact, most small cap investors count 1994 as a bear market year, even though SPX and OEX were mostly sideways. Hence, 1994 is sometimes known as the stealth bear market.

In summary, it is extremely rare to see VIX at or below 10, but it is noteworthy when it happens.

USING VIX FUTURES INFORMATION

The VIX futures can help one decide on strategies and sometimes on market direction. It is their relationship to VIX and to each other (the term structure) that can provide these insights.

EXTREME PREMIUMS OR DISCOUNTS ON VIX FUTURES

The relationship of the front-month VIX futures contract to VIX is important for traders and observers of volatility. When VIX derivatives first started trading in 2004, VIX was

low-priced, as volatility was dormant during an ongoing bull market. In fact, VIX traded mostly between 10 and 16—with one brief exception in the summer of 2006—until early 2007. All during that time, VIX futures traded with fairly large premiums, but that wasn't so much that traders felt volatility was going to increase but rather because they knew it couldn't go much lower, so there was an *outside chance* that it might increase. In any case, that period of time is not considered as useful data for determining if the VIX futures premium has any predictive or strategic value.

However, when VIX is higher-priced, and the front-month futures trade at a large premium, that is usually a sign that "smart money" is expecting a sharp increase in volatility—which, by inference, means a sharp decline in the stock market. Although, as will be shown, this phenomenon was far more effective in the bear market than in the ensuing bull market. One of the first times that this came to light was in late 2007.

Example: In 2007, the stock market had tumbled for the first time in years, with SPX dropping 180 points in July, only to recover to new all-time highs by mid-October, 2007. Then another decline started, taking SPX down 170 points by Thanksgiving 2007. At that point, a large rally ensued, leading into the Christmas holiday. SPX rallied 110 points between the two holidays, and the Dow-Jones 30 Industrials gained about 1000 points.

Table 41-11 shows the prices of VIX, the January VIX futures, and SPX, along with the futures premium on the days leading up to the end of the year, 2007.

First, note the rally in SPX from 1445 to 1497, dating from December 17 to December 26. Then note the accompanying decrease in VIX over that same time frame, from 24.52 to 18.66. That is typical behavior: VIX decreases as the market rallies.

However, *now* look at the price of the January VIX futures. They dropped a *little* over that time frame, but not nearly as far as VIX. The difference between the January VIX futures price and VIX is shown as the "Futures Premium." In all the cases in this table, the January futures were trading at a premium. When the premium is less than 1.00, that isn't too unusual, but when it grows to 4.63, as it did at the close of trading on December 21, or remains above 3.00 as it did from December 20th through December 26th, that *is* noteworthy.

In effect, VIX futures were "saying" that VIX was going to remain high—that VIX was going to have to rise to catch up to the futures price. When VIX rises, the market falls. In fact, that was a major sell signal, as SPX dropped 230 points in less than a month!

Even to this day, it is rare to see the front-month VIX futures premium above 4.00.

From our earlier description of how VIX is calculated and what comprises the VIX futures, we know what is behind this large discrepancy. In the above example, in late December, VIX was comprised of two strips of SPX options—those expiring in January

TABLE 41-11.
January VIX Futures vs. VIX, December, 2007.

Date	Jan Futures	VIX	Futures Premium	SPX
12/17/07	25.45	24.52	0.93	1445.9
12/18/07	24.57	22.64	**1.93**	1454.9
12/19/07	24.42	21.68	**2.74**	1453.0
12/20/07	24.17	20.58	**3.59**	1460.1
12/21/07	23.10	18.47	**4.63**	1484.4
12/24/07	22.17	18.60	**3.57**	1496.4
12/26/07	22.01	18.66	**3.35**	1497.6
12/27/07	22.72	20.26	**2.46**	1476.2
12/28/07	22.80	20.74	**2.06**	1478.4
12/31/07	23.11	22.50	0.61	1468.3

2008, and those expiring in February 2008. The weighting between those two strips changes daily, but in late December they were about equally weighted, more or less. The January VIX *futures* price, however, is based on only *one* strip of options—the February 2008 SPX options. Hence, what was really happening was that traders were selling down the price of January options, thus lowering VIX, but were not selling February options with the same aplomb. It could have been the converse, of course: traders were *buying* February protection in SPX, but *not* January protection. In either case, the SPX option activity derived from the fact that there were large expectations from professional and retail investors alike that the end of the year was going to be positive and it would continue on into 2008. Thus, the large VIX futures premium was something of a contrary indicator.

As it turned out, the reality of the situation was that traders began to sell as soon as the new year began, and that selling was exacerbated by the discovery of a rogue trader at Societe Generale that caused that bank to liquidate a massive long position right in the midst of an already serious market decline in mid-January 2008.

There are other instances of the premium on the front-month futures being a useful sell signal when the premium gets extremely high. For example, in May of 2008, a similar set of large premiums appeared on the VIX futures, shortly before SPX collapsed 240 points in two months.

The effectiveness of this technique was greatly reduced during the large bull market rally that took place after March 2009. As that rally progressed into the late summer of 2009, traders began to heavily buy SPX options at relatively expensive prices, forcing up

the price of the VIX futures. This included not only the near-term VIX futures but the next few months as well. No serious market decline ever developed, leading volatility analysts to seek answers as to what had changed. One theory is that VIX derivatives were a relatively new product in 2007 and early 2008 and were therefore mostly the purview of "smart money"—professional traders. But by the middle of 2009, the benefits of protection had become well-known in the wake of the bear market that had taken place, and so the public and unsophisticated mutual fund and hedge managers were now buying protection as the bull market continued in 2009. They expected some sort of market correction in the fall of 2009 that never materialized.

But rather than trying to affix labels such as "smart" (or "dumb") to groups of traders, this phenomenon can be explained in another way. Recall once again, Figure 41-2, which shows how the term structure looks in general. In a bull market, volatility is low and the term structure follows the lower curve in Figure 41-2. That is, it is normal for the futures to have premium over VIX. In a bear market, volatility is high, and the term structure follows the *upper* curve on the graph. That is, the term structure slopes downward, and the futures tend to trade at discounts to VIX.

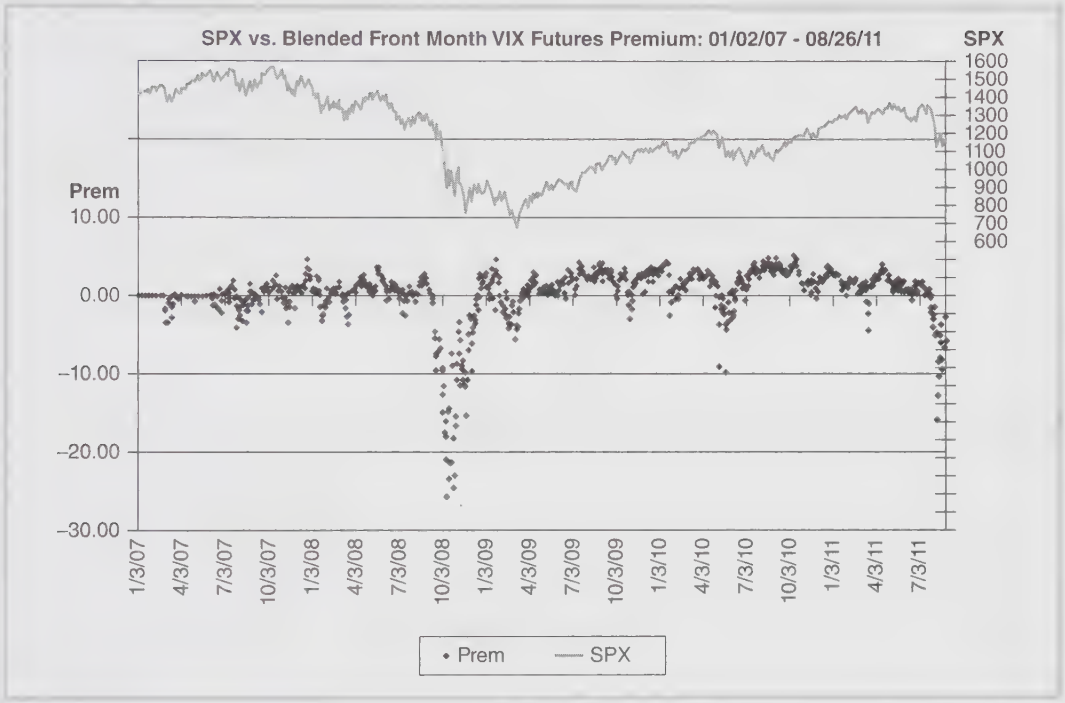
So, during the bull market that began in 2009, it was natural for the futures to gain premium and keep it. Hence, large premiums were not sell signals, but were just reflections of the ongoing bull market. But in the bear market of 2007-2009, premiums were rare, and so when they appeared, they were sell signals. It would seem that in the next bear market (and in others that will assuredly follow) large premiums on the front-month futures can be interpreted as sell signals. But during an ongoing bull market, large premiums on the front-month futures are not a signal of anything in particular.

Extreme *discounts* on the VIX futures have often been a buy signal for the broad stock market. That is, traders panic to buy short-term SPX protection, forcing up the price of VIX. But the implied volatility of the *next* month SPX options, which are reflected as the price of the near-term VIX *futures* are not as much in demand. Hence the futures lag below the price of VIX. When that discount expands to large levels and then begins to contract sharply, that is usually a sign that the stock market is ready to rally. This, too, is a bit of a contrarian indicator. When "everyone" has panicked into buying the near-term SPX puts, the market then rallies.

During the financial crisis of October 2008, the discount reached an astounding 25 points on the front-month futures. During the "flash crash" of May 2010, the discount reached 10 points, and during the August 2011 bear raid, the discount reached 16 points. In each case, the market rallied thereafter.

Figure 41-9 is a scatter diagram of the daily blended front-month futures premium overlaid with a line chart of SPX. Notice the deep discounts at market lows, and—in the first two years—large premiums just before major market declines.

FIGURE 41-9.
SPX vs. blended front month VIX futures premium.



However, one must make some adjustments before determining what the near-term discount or premium is. One cannot merely subtract VIX from the shortest-term VIX futures contract, because that gives a biased statistic near the expiration of the VIX futures contract.

You will note that this chart has the word *blended* in its title. It is necessary to use the prices of the *two* front-month futures to create a "blended" futures price and premium, weighting the two front-month futures. The advantage of doing this is that there isn't a big jump in the blended futures price on the day that the actual near-term contract expires. This *blended* futures price computation was described earlier. The weights decrease by 5% per day in months with 20 trading days between expirations, or by 4% per day in months with 25 trading days between expirations. If there are trading holidays involved, then one would adjust the blending factor for those (24 trading, or 19 trading days, etc.; this can be significant in January when there are usually three holidays between VIX expiration dates).

Example: On the first day after July VIX expiration—the following prices exist:

August VIX futures: 28.00
September VIX futures: 30.75
Weighting factors: 95%/5%

$$\text{Weighted (blended) futures price} = 0.95 \times 28.00 + 0.05 \times 30.75 = 28.14$$

Assume that VIX is at 24.38, and so the blended futures premium is

$$28.14 - 24.38 = 3.76.$$

USING AND TRADING THE TERM STRUCTURE

As was noted earlier, in a bull market the term structure slopes upward. The various futures are all at a premium to VIX, and each futures contract trades at a higher price than its predecessor. In futures market lingo, this upward-sloping term structure is also referred to as forwardation, which is the same as contango.

During bear markets, the term structure slopes downward. The VIX futures are at *discounts* to VIX, and each successive futures contract trades at a price *lower* than its predecessor. In futures markets, this is knows as backwardation.

Since most equity option traders and volatility traders are not necessarily experienced futures traders, in this text we refer to the term structure as upward-sloping (or having a positive slope) and downward-sloping (or having a negative slope), as opposed to using the futures terms. It is just much easier to visualize what is taking shape without having to constantly refer to the definition of forwardation, backwardation, or contango.

Sometimes the term structure is not completely sloping upward or downward. That is a condition that usually takes place in a transition from bullish to bearish markets, and vice versa.

One way that the term structure can be useful is to compare its shape with market action. This is especially useful when one is uncertain as to what type of market is in existence. For example, if the term structure is downward-sloping—reflective of a bear market—and it maintains that shape during a market rally, then one can infer that the rally will be a short-lived, bear market rally, and not a change of direction from bear market to bull market.

The term structure can be traded via futures (calendar) spreads. This is a highly leveraged way to trade, and as such can be a very interesting way to either speculate on

market direction or to sometimes take advantage of a large premium or discount in the front-month futures as expiration nears. Note that in this section, we are *not* referring to a *blended* front-month premium. Rather, the front-month futures contract is the price of the shortest-term VIX futures contract.

The CBOE Futures Exchange (CFE) imposes minimum margin requirements. They are quite low for a calendar spread involving two futures contracts in the first three listed months. When the VIX futures were first listed, that spread margin was $100. It has since been raised to $625, but it is still quite low. Recall that the VIX futures movements are worth $1,000 per point. So, a spread can make or lose large percentages.

Example: Assume that the following prices exist:

VIX: 36
Sept VIX futures: 32
Oct VIX futures: 30

Since September is the front-month, the 4-point differential between September VIX futures (32) and VIX (36) will have to disappear by September expiration. Hence, one might consider buying the September VIX futures and simultaneously selling the October VIX futures, for a two-point differential:

Buy Sept and Sell Oct VIX futures: 2.00 points (Sept over Oct)
Suppose that later, September *is* drawn toward VIX, and the following prices exist:

VIX: 38
Sept VIX futures: 35
Oct VIX futures: 32

So the spread has widened to 3.00 points (35–32).

If the spread trader exits the position, he will have a profit of $1,000—a large return for a short period of time, since the margin required is only $625. The details of the trade are shown below:

Initial Trade	Exiting Trade	Profit/Loss
Buy Sept @ 32	Sell Sept at 35	+$3,000
Sell Oct @ 30	Buy Oct @ 32	–$2,000
Total Trade: Bought @ 2.00	Sold @ 3.00	+$,1000

MARKET SPECULATION WITH TERM STRUCTURE SPREADS

The futures spread can be used for market speculation. Some traders prefer the spread to an outright ETF or long index call position, because the spread has large leverage. During a bullish market move the term structure will tend to steepen. That is, the second month futures contract will rise in relationship to the front-month futures. So if one has a buy signal via his trusted indicators on the stock market in general, it may be worth his while to establish the futures spread.

Conversely, if the market makes a bearish move, the term structure will likely flatten or even invert. In that case, one would want to own the nearest-term VIX futures and sell the second or third month.

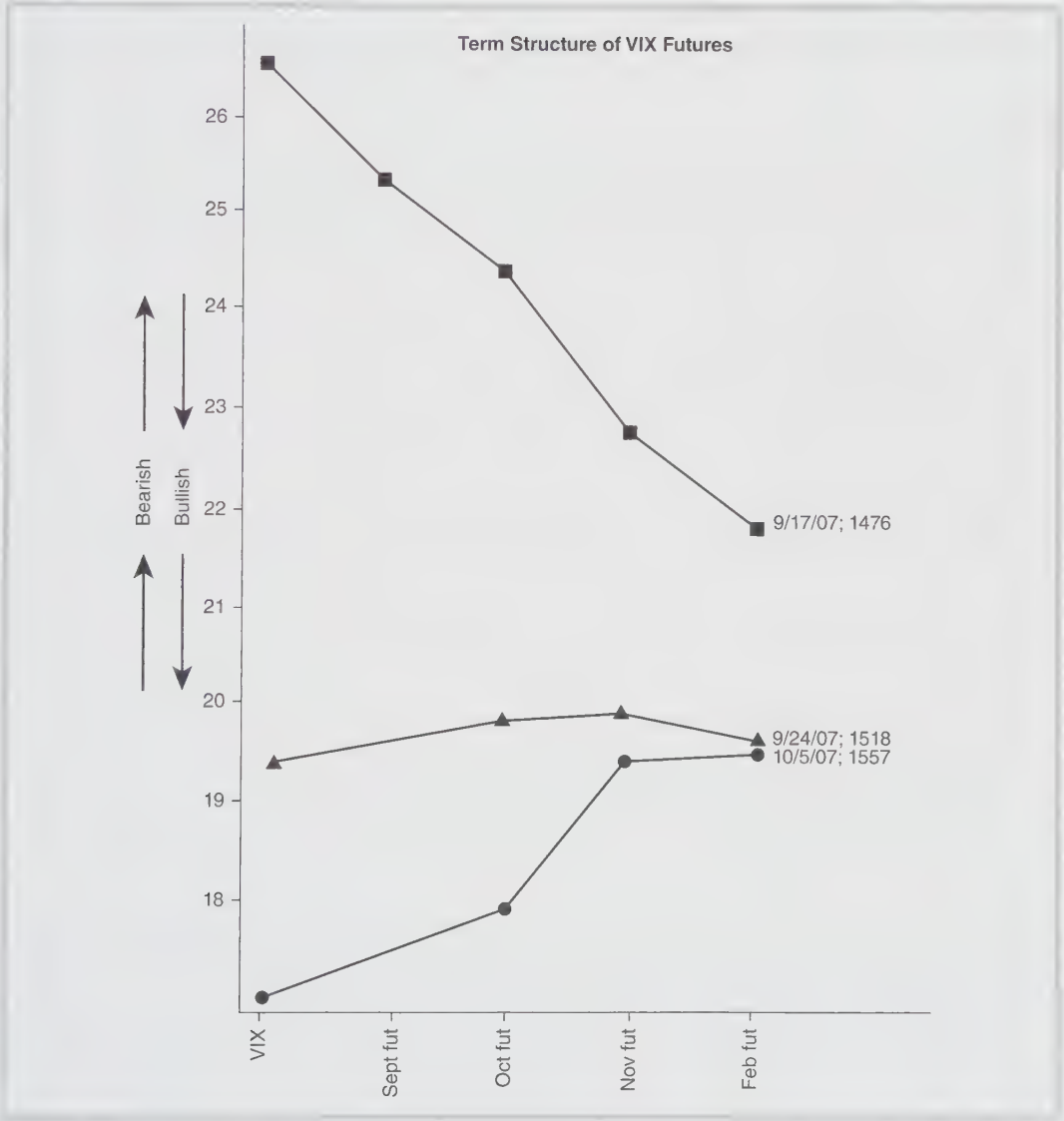
To Summarize:
VIX Futures Spreads As Market Speculation:
If bullish, buy the second month VIX futures and sell the front-month VIX futures.
If bearish, buy the front-month VIX futures and sell the second month VIX futures.

There is no guarantee that the VIX futures spread will indeed move as hoped for. In theory it will, and it does more than 75% of the time, but there *are* occasions where the stock market makes a move but the futures spread does not follow. Also, it should be noted that professional traders who use the futures calendar for this purpose also sometimes take an offsetting position in SPY or SPX options, as a hedge against risk. For example, suppose you are bullish on the market and thus buy the second month and sell the front-month. You might also buy some SPY puts in case the stock market falls instead, and the spread thus moves against you. If using this approach, it is wise to be careful not to over-hedge, for buying too many SPY puts could significantly harm the spread's profit potential if the stock market does indeed rise.

The steepness of the term structure itself might also be a clue as to general market direction. For example, if the term structure slopes downward, that is the result of a bearish stock market move. But if it slopes downward too steeply, then the market can be considered oversold. In that case, one would expect a stock market rally, which would cause the term structure to flatten somewhat. Thus a VIX futures spreader could sell the front-month and buy the second month, expecting them to converge somewhat during a stock market rally.

Figure 41-10 shows an example of this. In August 2007, when the financial markets had first begun to hear of the problems that might arise from "subprime debt" and other mortgage issues, the stock market had declined sharply. That threw the term structure into a downward-sloping (inverted) state. It remained like that throughout a market-stabilizing rally in September 2007.

FIGURE 41-10.
Term structure of VIX futures.



By September 17, 2007, the term structure was quite steep ("oversold") as shown by the highest line in Figure 41-10. SPX was at 1476 at that time.

A trader who thought that the term structure might flatten—either because he thought it was too steep at this time, or because he was bullish on the stock market might have executed this spread:

Buy Nov futures: 22.83
Sell Oct futures: 24.33
Spread differential: –1.50

The margin at the time was only $100 to establish this spread. Currently, it would cost $625.

Shortly thereafter, Ben Bernanke significantly eased monetary policy, and the stock market had a huge rally. By September 24 (middle line in Figure 41-10), SPX had rallied to 1518, and the term structure had flattened almost completely. The prices at that time were:

Nov futures: 19.91
Oct futures: 19.70
Spread differential: +0.21

The spreader has made 1.71 at this point. There are two ways to see this:

1. The spread that was bought for –1.50 and can now be sold for +0.21, or a gain of 1.71

Or

2. One can verify it by computing the gains or losses on the individual futures contracts:

   November: Bought at 22.83, sold at 19.91—a loss of 2.92 points
   October: Sold at 24.33, bought at 19.70—a gain of 4.63
   So a gain of 4.63, minus a loss of 2.92, is once again an overall gain of 1.71

This is a profit of $1,710, since a one point move is worth $1,000 on an investment of $625 in one week. Clearly this is high leverage and is why some traders prefer to trade the futures spread rather than the actual SPX or stock market equivalent.

Finally, note that if one stayed on until October 5, the lower line in Figure 41-10, the spread widened further as the term structure actually began to attain a positive slope.

TRADING THE TERM STRUCTURE WHEN LARGE DISCOUNTS OR PREMIUMS EXIST

Another time when one might want to use the futures spread as a speculative trade is when there is a large discount or premium on the VIX futures. However, one must be

certain that the "pull" of VIX will be greatest on the contract he is setting up in the spread. Consider these prices, taken from Table 41-3, on October 10, 2008:

Example: The following prices existed at the close of trading on October 10, 2008:

VIX: 69.96
Oct VIX futures: 56.71
Nov VIX futures: 38.30
Dec VIX futures: 33.78

The October futures were set to expire on October 22, meaning there were only seven trading days remaining until October expiration. Therefore, the 13.25 discount on the October futures was going to have to shrink to zero by that date. So one consideration would be to buy October and sell November—not because one is bearish on the market, but rather because the "pull" of VIX on the October futures will be heavily asserting itself over the next seven trading days.

The problem with that spread, though, is that the November futures are also at a tremendous discount to VIX: 31.66 points! As the October futures near expiration, there will be a "pull" on the November futures, upward toward VIX. In fact, paying 18.41 for the spread between the two front-months is just so large that one would have to be leery about establishing it.

But the November–December spread might be more viable. Since the December contract is the third month out, it will not experience as much of a "pull" from VIX in the near term. Hence the better spread to establish, looking for VIX to "pull" the near-term contracts higher is to:

Buy November and sell December for a differential of 4.52 (Nov over Dec)

That spread began to widen immediately, and by October expiration had widened to 8.62 points, a profit of $4,100. It never really marked down at all. The spread continued to widen—reaching 14.00 points at one time—before the December contract itself began to feel the "pull" of VIX.

Note: As an alternative, the spread of buying October and selling December is also viable. That spread was about 23 points, using the above prices. It, too, qualifies for the lower margin requirement since both contracts are in the first three available months. That spread was much more volatile though. First it dropped to 17 points or so, before later widening to 28. It is highly unlikely that anyone would enjoy a $6,000 markdown on a spread with a $625 initial

margin requirement, so the November-December spread was the better spread by far.

Similar situations exist when there is a large *premium* on the VIX near-term futures. Consider the following example of contracts trading at a large premium to VIX.

Example: The following prices existed at the close of trading on October 11, 2010:

VIX: 18.96
Oct VIX futures: 21.30
Nov VIX futures: 25.10
Dec VIX futures: 27.05

In this example, October futures—which are due to expire soon and have only six trading days remaining—have a premium of 2.34 that is going to have to disappear by the expiration date of the October futures. Thus, VIX will assert a "downward" pull on those October futures.

The November futures are also trading with a fairly large premium (6.14), considering that they will become the front-month contract in six trading days, and therefore VIX will begin to exert a downward "pull" on them as well.

The December contract is unlikely to feel any "pull" downward from VIX in the near term.

In this case, there are two spreads to consider once again:

Buy November, sell October at 3.80 (Nov over Oct)
Or
Buy December, sell October at 5.75 (Dec over Oct)
Or
Buy December, sell November at 1.95 (Dec over Nov)

The November-October spread never really widened, and then it collapsed on the last trading day of October, so it was not a successful spread. Likewise, the December-October spread didn't really widen either.

Only the November-December spread widened. It reached 2.50 by the time October arrived (in six trading days), and widened to 2.90 or so in the week after that.

So in both of these examples, the pull of VIX was about equal on both of the front two months. That was the case because the front-month was so close to expiration. If there had been a longer time (say three weeks or more) remaining until the front-month expired,

then the "pull" of VIX might have been isolated to just the front-month futures contract. As it was, the pull on the second month (November), with about five weeks of life remaining, was greater than that on the third month (December) in both examples.

So in these situations where the front-month is close to expiration, the better spread is to trade the *second* and *third* months.

In any case, this is another viable use of the futures calendar spread. Note that calendar spreads can also be traded on variance futures, but the margin is huge ($25,000 for a calendar spread) because the same principles do not apply. With variance futures, the near-term contract is pegged to realized volatility, while the next contract can fluctuate wildly until it reaches the "computation period."

Some final comments should be kept in mind. First, there is tremendously high leverage in trading the calendar spread with futures. If one were to attempt to trade the term structure with either calendar spreads in VIX options or ETNs or ETN options, the leverage would no longer apply—at least not to any great extent.

Speculating on Volatility Itself. We have already shown that one cannot actually trade VIX, but must instead trade one of the derivatives. However many traders try to predict volatility and take speculative positions in the VIX derivatives.

Some of the time, volatility can be predicted. For example, when VIX falls to 10, we know that it isn't going any lower. We just don't know when it's going higher. Conversely, when VIX is quite high-priced—near 50, say—we are fairly confident that it will decline in price relatively soon. But those statements are too vague to actually use in a trading system.

Some traders actually attempt to chart VIX with technical indicators—just as one might do with a stock. This author is not a fan of such attempts. Using Bollinger Bands, MACD, or even put-call ratios on VIX and its options does not produce steady or significant results. To further demonstrate this, consider the put-call ratio. There is always a much higher volume in the VIX calls than in the puts—because the vehicle is mainly used as a hedging tool by professional traders. As we know, put-call ratios (and other sentiment or contrarian indicators) lose their effectiveness when hedging activity is heavy, for that activity bears no relationship to what actual investors are thinking about the market in question.

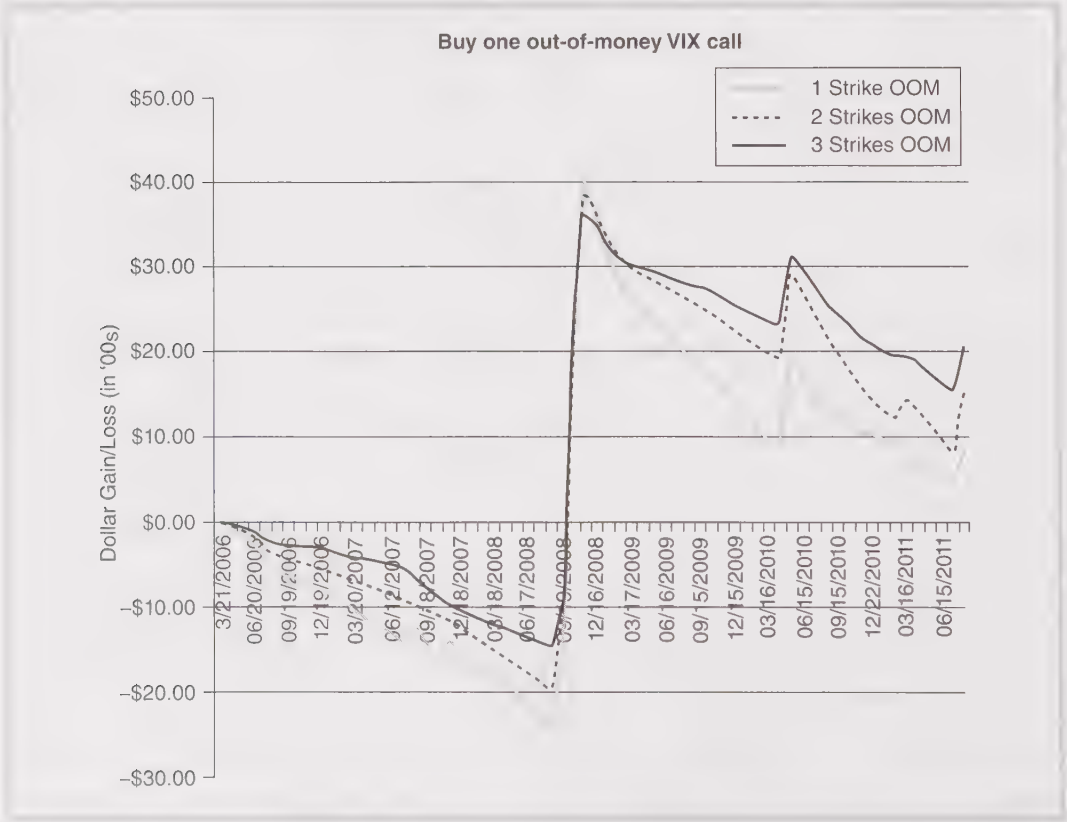
What we *do* know is that when volatility explodes, it does so with extreme ferocity. VIX and VIX futures' 20-day historical volatility jumps by multiples of 4, 5, or more when extreme stock market disruptions occur. Thus, buying calls on volatility can be a profitable strategy. In fact, there is a strategy that is named the "perpetual VIX call buy," in which one is constantly long out-of-the-money VIX calls.

Such a strategy would not work with stock options. For example, 10-year studies were conducted in which IBM calls were bought, one full strike out of the money each month on expiration day, and rolling them over at the next expiration. Despite the large

bull market in 2003-2007, the call buying only showed a small profit by early 2008. Since then it has lost a considerable amount of money, despite IBM's recovery, since calls have remained fairly expensive. Put buyers didn't fare much better. The large stock market decline in late 2008 briefly made the put buyers profitable, but with the losses in the next bull market, they are large net losers as well.

Consider Figure 41-11, which is the result of buying VIX calls one, two, or three strikes out of the money, holding to the last trading day, and rolling to the next month. For the purposes of this study, a strike is 2.5 points if VIX is below 30, and is 5 points if VIX is above 30. So if the August VIX futures were trading at 18, and you want to buy August calls three strikes out of the money, you would buy the 25 strike. Or if, in another month, September VIX futures were at 35, then you would buy Sept 50 calls if you wanted to buy three strikes out of the money. By buying this far out of the money, the monthly cost is not too great.

FIGURE 41-11.
Out-of-money VIX call.



Concentrate on the black line, which is the result of buying VIX calls monthly, three strikes out of the money. You can see that this has been a profitable strategy over the 5-plus years since VIX options first started trading. Not only were profits generated in the large market decline in the fall of 2008, but also in 2010 when VIX again leaped higher in the May-June broad market decline, and then again in the late summer of 2011.

Of course, there were losses from inception through the fall of 2008, as the market was moving higher, and volatility was subdued (you can see some upward blips on the gray line, reflecting the first temporary VIX rise in the summer of 2007). At the worst, this strategy had a loss of about $1,300 by August of 2008 (black line). But then the profit kicked in and, through August of 2011, buying one contract each month has resulted in a total profit to date of about $2,000 (black line, before commissions).

Perhaps in the fullness of time—ten or twelve years, say—this strategy of buying VIX calls three strikes out of the money will not hold its gains. But as long as there are bear markets, it seems to be reasonable to expect that the strategy *will* profit.

One reason that this is feasible is that the volatility of VIX itself explodes during sharp market declines. Meanwhile in stock bull markets, VIX declines, but it doesn't behave like a stock would in a bear market. Rather, it flattens out in the low teens (rarely trading below 10), and its volatility *declines*. These are the main differences between how VIX behaves and how a stock—or even an index, such as SPX—behaves. The strategy of perpetual call buying wouldn't work with a double- or triple-speed ETF, either, since those reset daily.

One might try to refine the technique by only buying calls when VIX is "cheap," but then one gets into the problem of deciding what's cheap. In 2010, VIX got down to 16 or so before exploding to 48. In 2008, VIX was around 20 before the Lehman-driven market calamity which saw VIX rise to 89. In 2011, VIX got down to 15 before rising to 48. So, based on that data, you'd want to be "in" the strategy if VIX was below 20.

But earlier, in 2006 and 2007, VIX just kept falling, down to the 10-12 area and just stayed there for months on end. Even in late 2007 and the first three quarters of 2008, when the bear market had already begun, VIX was below 20 many times, with several spikes above 30—none of which produced much of a profit for the call buyer (perhaps there was an intra-month profit, but not by expiration day, which was the basis for our study).

So, what is "cheap"? Before you answer, perhaps you need one more data point. On the last trading day before VIX expiration in September 2008, VIX was at 36. If you had decided VIX was too expensive to buy calls on at that time, you would have missed the move to 69, at October VIX expiration, and then 80 by November.

If you are using this strategy for speculation, or for protecting a stock portfolio (to be addressed later), it is best to continually buy the VIX calls three strikes out of the money, without fail. Then one does not have the leeway to make a mistake.

PROTECTING A STOCK PORTFOLIO WITH VOLATILITY DERIVATIVES

Many portfolio managers—even if they are merely managing their own portfolio—are concerned about protecting the gains of a bull market, or protecting against losses if a bear market should emerge. However, most portfolio managers are reluctant to give away the upside. That is, they don't want to move to a large cash position or to sell short against their position.

This is where derivatives strategies can be quite useful. One is able to buy "insurance" in case the market declines. The cost of such insurance can be adjusted to fit the needs of the individual portfolio manager. Moreover, with new products, such as volatility futures and options, even better hedges are available to the forward-thinking portfolio manager.

There are many ways that a portfolio can be protected without actually selling out the stocks. One can take a "macro" approach and use broad-based index options to hedge broad market risk (such as the S&P 500, the NASDAQ 100, or VIX). This approach is usually the most efficient in terms of cost, but might not meet one's needs in other areas. For example, if the individual portfolio does not really track the S&P 500 very well, then a hedge using S&P 500 options may not work properly.

The "micro" approach is more work. It generally involves hedging individual stocks with options on *that* stock. This approach gives the best hedge, of course, since the hedging vehicles pertain exactly to the individual stocks. However, it can be quite costly, both in terms of "insurance dollars" and in terms of time spent managing the positions.

MACRO APPROACHES

Those managers utilizing the macro approach feel that their portfolio resembles a major index average closely enough, so that futures or options on that index can be used to hedge the portfolio. Unless one is running an index fund, he is likely to have some *tracking error* between his actual portfolio and that of the index derivatives used as a hedge. However, in most cases, the portfolio manager does not mind a small tracking error, as long as he knows that the protection is in place, guarding against a swift or severe market decline. Macro strategies include:

1. Buying broad-based **index puts.** This is probably the most popular form of protection using broad-based index options (that doesn't necessarily mean it's the *best* form of protection, though). One generally buys puts whose protective features don't engage immediately. That is, the cost of insurance is lower if one only needs the insurance in

seriously declining markets. The difference between the current portfolio price and the level at which the puts' insurance becomes effective can be thought of as a "deductible," in insurance terms. Specifically, one buys puts whose striking prices are somewhat below the current market price by 5%, 10%, or possibly even 15% (i.e., they are *out-of-the-money* puts). The manager figures that he will risk that much of a loss in the market. But then, if the market falls any more than that, he wants essentially full protection for his portfolio.

While the cost of this form of insurance varies greatly with market prices and market conditions, on average, SPX puts that are 10% out of the money cost between 2% and 3% on an annual basis as insurance.

2. Broad-based index **put spreads.** To mitigate the cost of insurance, some portfolio managers will buy out-of-the-money puts, but then will also *sell* puts that are even *farther* out of the money in order to bring in some dollars to reduce the cost of the insurance. The risk in using this strategy is that one puts a "cap" on his protection. For example, if he buys puts that are 10% out of the money and spreads them by simultaneously selling puts that are 15% out of the money, then he will effectively only have insurance if the market falls between 10% and 15%. If it falls farther than that, his insurance benefits are limited. For this reason, this author does not recommend the put spread approach to protection.

3. Selling broad-based **index calls.** This is not a particularly popular strategy among those needing or wanting "disaster" insurance, but it *is* popular among managers who feel that the sale of a wasting asset (a call option) will provide superior returns if applied continuously over long market cycles. The drawback is that the sale of the calls cuts off the upside potential of the portfolio above the striking price of the calls that were sold. Mitigating that, though, is the fact that this form of insurance actually costs *nothing* in dollar terms (its costs are in lost opportunity to the upside). The CBOE has created several index-based covered call writing benchmark indices that theoretically track this approach, the primary one of which can be quoted with the symbol BXM.

4. **Collars.** This strategy combines numbers 1 and 3 above: It is the purchase of an out-of-the-money put *and* the sale of an out-of-the-money call. The sale of the call reduces the cost of the put—thereby reducing the cost of insurance overall. One application of this strategy is the "zero-cost" collar, in which the price of the call is greater than or equal to the price of the put (not always feasible in every situation). For that benefit, however, once again the portfolio manager runs the risk of cutting off upside profit potential by the fact that he has sold call options. So he reduces the *cash* cost of the insurance in exchange for *opportunity costs* in potential lost profits on the upside.

5. **Futures.** One *could* conceivably sell broad-based index futures against his stock portfolio. These might be S&P 500 futures, NASDAQ-100 futures, or a few others. This approach is generally not very popular because even though the sale of futures protects the downside, it also removes any potential profits in a rising market. Even if only a small percentage of the portfolio is hedged with short futures, most managers find the prospect of giving away the upside to be too much of a burden. Moreover, this was the strategy that was widely blamed for the Crash of '87, and thus has a negative aura associated with it.

6. **Volatility Derivatives.** This is a different tack. Volatility generally rises when the market falls. So, as a portfolio hedge, one would buy volatility futures or, preferably, call options on volatility. Figure 41-8 showed how VIX rises (dramatically) when the stock market falls sharply. Thus being "long" volatility is a valid form of protection—perhaps the best one.
    a. **Volatility futures.** Shortly before the volatility futures were listed in 2004, an analysis performed by Merrill Lynch showed that a 10% volatility hedge was sufficient to protect a broad-based stock portfolio. In other words, if 90% of the assets were invested in stocks that behaved similar to SPX and 10% were invested in "VIX," the resulting portfolio outperformed SPX in both bull and bear markets. In actual practice, this theory proved to be unworkable due mainly to the high premium cost of buying VIX futures. In later years, other studies have shown that a 20% hedge is more appropriate, but the principle is valuable, if only to show that one need only hedge a small percentage of his portfolio's notional net asset value with volatility futures.

        Using volatility futures to hedge does not have the same disadvantage as using SPX futures does, although there are still some disadvantages. Mainly, if the stock market rises, volatility futures are likely to lose money until they get to a very low level (in the 10 to 15 area, say). Thus, they could present a large drag on portfolio performance during a bull market. Not as big a drag as being short S&P futures, but still potentially large.
    b. **Call Options on VIX.** A portfolio hedge can be constructed by buying out-of-the-money *call* options on VIX. Since VIX increases sharply when the stock market falls, these calls would profit and therefore act as a hedge against losses in an equity portfolio.

        This is a similar strategy to buying *put* options on SPX as "insurance"—the purchase of an option with limited risk and large, open-ended profit potential if needed as a hedge. However, VIX calls are much more efficient as an equity portfolio hedge than SPX put options are.

VIX CALLS ARE A BETTER PORTFOLIO HEDGE THAN SPX PUTS

The simple reason that VIX calls are a better hedge for a broad-based equity portfolio is that they provide *dynamic* protection, whereas SPX puts do not. To demonstrate this, consider the following:

Example: In June, with SPX at 1530, a portfolio manager decides that he wants to buy SPX puts as a hedge. He chooses the December 1400 puts—approximately 8% out of the money. After the protection is purchased, suppose that the stock market has a strong summer rally. By early September, SPX has reached 1700. The puts that were bought for protection are now 300 points out of the money at perhaps the time they are most needed—entering the fall of the year (traditionally a rough time for stocks). The problem is that the put strike was fixed and, when the market rose, the protection became less and less valuable. At this point, one would have to either buy *more* protection at a more reasonable distance out of the money (8%–10%) or forsake the protection altogether.

It is for the reason shown in this example, that many portfolio managers eschew buying puts as protection, for they lose their protective ability when the market rallies.

The same thing does *not* occur with VIX options. Consider the same portfolio manager in the following example, but now he decides to buy VIX call options as protection.

Example: In June, with SPX at 1530, and with VIX trading near 15, a portfolio manager decides to buy VIX calls as a hedge. He chooses the December 20 calls. That is, they will provide protection if VIX climbs above 20 by expiration. This is only likely to happen in a sharp market decline, but VIX normally spikes into the mid-30s and higher during a sharp market decline—even when it starts from such a low level.

As in the previous example, SPX rallies throughout the summer, reaching 1700 by early September. At that time, VIX is likely to be trading lower, perhaps near 12. But even though VIX has declined, it doesn't really matter much. For if the market drops sharply from 1700, VIX will shoot up into the 30s and the VIX long calls will provide protection even though the stock market is much higher than it originally was.

This example shows how VIX calls are *dynamic protection*. They don't lose their protective ability when the broad market rallies. This is especially true when VIX is relatively low to begin with.

IMPLEMENTING MACRO PROTECTION BY BUYING SPX PUTS

The equity portfolio manager is most concerned with the cost of his protection. It will vary according to market conditions, of course. If volatility is high—particularly during an already-declining market—SPX puts and VIX calls will be more expensive.

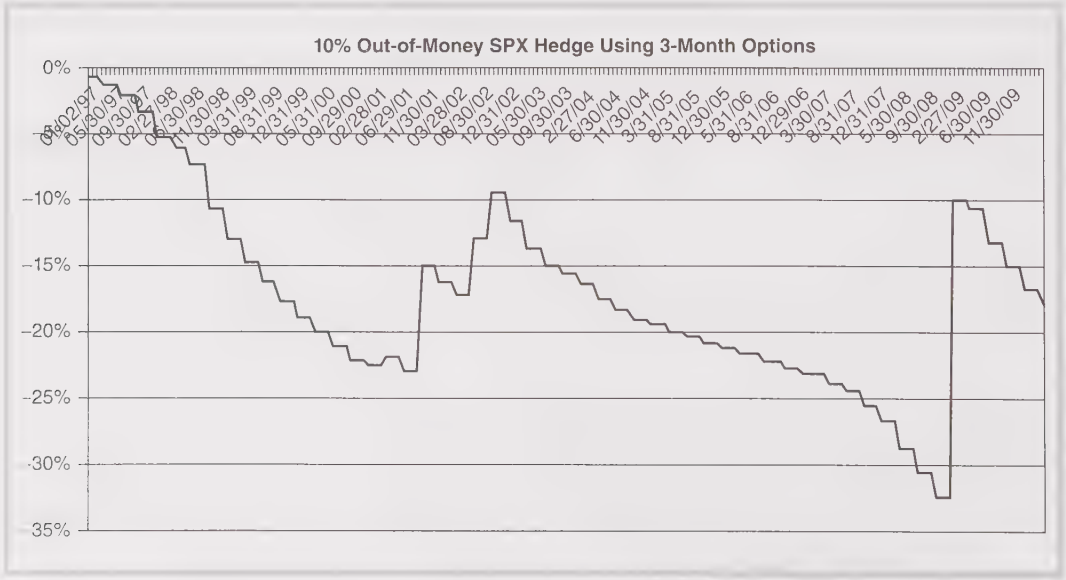
In order to estimate the cost of this protection, some simulations were run, using actual prices. The net cost of the protection was then estimated.

As an example, Figure 41-12 shows the net cost of buying three-month SPX puts 10% out of the money. Furthermore, it was assumed that the protection was held all the way to expiration—collecting the intrinsic value if the put expired in the money, or expiring worthless otherwise. Then, a new 3-month put, 10% out of the money was bought. This was done each quarter—using actual SPX put prices. Puts were bought on expiration days in March, June, September, and December.

The data in Figure 41-12 began in January 1997, so it encompasses a full 13-year period. This graph shows only the cost of protection, expressed as a cumulative percentage of the price of SPX (left scale). In other words, at the end point, in the summer of 2010, note that the graph is at about –0.18, or minus 18 percent. In other words, the cumulative cost of the protection over the 13+ years was 18% of the SPX value (or, 18% of the portfolio value, if you prefer). On average, that's a less than 2% annual cost for the protection.

Even at its lowest point, in the late summer of 2008, the graph is at about minus 32 percent. In other words, the cumulative cost of the protection over the 11+ years to that date was 32% of the portfolio value. On average, that's a little less than 3% annual cost for the protection.

FIGURE 41-12.
10% Out-of-money spx hedge using 3-month options.



Note that the protection worked at two specific times—during the bear market of 2001–2002 and again in the fourth quarter of 2008. The graph rises during those periods, indicating that the puts were making money in those quarters. However, *prior to* as well as *after* that period, the protection lost money in nearly *every* quarter. Note the downward stair-step pattern of the graph outside of the bear market time frames. That indicates losses on the puts purchased for protection.

It should also be noted that *during* some of these quarters, the puts were profitable, but then lost their value by the end of the quarter. This was true, for example, in the 3rd quarter of 2007—when the term "subprime debt" first reared its ugly head. There was a sharp market decline during July and August during which time the protective puts were trading at profits, but then a strong Fed-induced rally in September caused the protection to expire worthless.

When the stair steps are tall, that is a time when put protection was very expensive. That is, the implied volatility of the options was high. This has been true, in general, since mid-2008. Notice how small the stair steps were in 2006, when VIX was hovering at low levels, near 10.

Overall, the loss on the puts over the 13 years of hedging was about 18% of the portfolio, or a rather acceptable 1.4% per year (not compounded).

Other studies were conducted with SPX options, using a different deductible and/or buying longer-term options, but they did not offer an improvement on the statistics shown above.

With an SPX hedge, one would buy enough puts to fully hedge the adjusted value of his portfolio at the striking price.

Example: Suppose one has a portfolio that behaves exactly like SPX. Moreover, the net asset value of his portfolio is $3 million. He decides to hedge by buying SPX June 1500 puts. Then he would buy this quantity:

$$\text{Portfolio Value}/(100 \times \text{Strike}) = 3{,}000{,}000/(100 \times 1500) = 20 \text{ puts}$$

(This assumes that the options are worth $100 per point of movement; that's where the 100 comes from in the formula.)

If one's portfolio does not exactly mirror SPX, then he must adjust the portfolio to conform to SPX before he buys the protection. This process is similar to what was described in Chapter 30 under "Simulating an Index."

Without going into an extreme amount of detail, here are some salient points that one should consider when determining an "equivalent futures position." First, each stock in one's portfolio should be volatility-adjusted in dollar terms. That is, the dollar value of

each holding should be adjusted by its comparative volatility (some might say Beta). If one has stocks in his portfolio with negative Beta (for example, gold stocks), they should probably be excluded from the macro calculations.

Example: One has a small portfolio of three diverse stocks. He would like to hedge it with SPX put options. The price of each stock is shown in Table 41-12. Its volatility is shown as well. Furthermore, the "adjusted volatility" is shown, which is merely the stock's volatility divided by SPX volatility. One *could* substitute Beta for adjusted volatility, but Beta is such a long-term measure that it can give inaccurate hedging calculations. Finally, the dollar amount of each stock is multiplied by the adjusted volatility. The sum of the adjusted volatilities is thus the gross dollar amount of SPX to hedge.

The total dollar value of this portfolio, adjusted for SPX volatility is the sum of the three numbers in the right-hand column of Table 41-12, or $550,000. Note that this is quite different from the actual net asset value of the three stocks, which is $300,000. In other words, these stocks are all more volatile than SPX, so one needs to buy $550,000 worth of SPX protection in order to hedge the $300,000 value of this small portfolio. The number of puts to buy is:

$$\#\text{ of SPX puts} = (\text{Volatility} - \text{adjusted value})/(100 \times \text{SPX Striking Price})$$

So if one were going to buy SPX puts with a striking price of 1100 to hedge this portfolio, he would buy $(550{,}000)/(100 \times 1100) = 5$ puts. Note: The 100 in the denominator of the formula is the trading unit of the puts; they are worth $100 per point of movement. For example, if one had a portfolio of technology stocks, he might want to use QQQ as the hedging index. The same steps as in the above example would apply, except that one would use the volatility of QQQ, not SPX, when calculating the volatility-adjusted dollar value of each stock.

TABLE 41-12.
Portfolio value, volatility-adjusted (SPX vty = 16%).

Stock	Stock Price	Stock Volatility	Adjusted Volatility	Adjusted Dollars
1000 IBM	160	24%	1.50	240,000
500 GS	120	40%	2.50	150,000
200 AAPL	400	32%	2.00	160,000
			Sum:	**$550,000**

IMPLEMENTING MACRO PROTECTION BY BUYING VIX CALLS

If the equity portfolio manager desires to use VIX calls as protection, he must decide two things. The first is similar to the decision that must be made when buying SPX puts: How far out of the money should the protection be? This is the "deductible" portion of the insurance. With a portfolio that is similar in nature to SPX, one can easily determine his risk ("deductible")—5%, 10%, etc. However, with VIX calls, it's not quite so easy. VIX doesn't necessarily rise 10% if SPX falls 10%. In fact, it usually rises much more than that. So, the VIX calls can be bought somewhat farther out-of-the-money—thereby saving some cost of the initial insurance premium.

The second question is "How *much* protection to buy?" With SPX puts and a portfolio that relates well to SPX, that question can easily be answered merely by converting the portfolio's net asset value into an SPX "equivalent," as in the previous example. However, with VIX calls, there is no such direct measure. Therefore, we rely upon the original Merrill Lynch study for this answer—preferring to buy enough VIX calls to hedge 10% to 20% of the portfolio's value.

Example: Suppose SPX is trading at 1530 and VIX is at 15. The hedger decides to buy the VIX Dec 20 calls. Suppose he has a portfolio worth $10 million, volatility adjusted for SPX. Then, citing the Merrill study, he decides to buy protection on 10% of portfolio value, equal to $1 million. Since his protection will engage if VIX is above 20, we use that striking price to determine the quantity of VIX calls to buy:

$$\begin{aligned}\text{Quantity} &= 10\% \times \text{NAV}/(100 \times \text{Strike price}) \\ &= 10\% \times \$10{,}000{,}000/(100 \times 20) \\ &= \$1{,}000{,}000/2000 \\ &= 500 \text{ calls}\end{aligned}$$

This is not a large quantity as far as VIX calls go, since it is one of the more liquid contracts.

Assuming that one-month calls are being purchased (for they will track most closely with VIX if that index rises sharply), then the cost of these calls can be expected to be less than 1.00 per contract ($100). Hence 500 of them would cost less than $50,000—or slightly less than one half of one percent of the portfolio's actual net asset value. If one had decided instead to hedge 20% of adjusted value, he would buy 1,000 calls.

Note this formula is not exactly correct, because it would imply that one should buy fewer calls if a higher strike were used. Rather, as will be shown shortly, we prefer to buy calls

at a relatively fixed distance from the current VIX futures price. Also, one may prefer to use a number up to 20% where 10% is located in the above formula, because the more recent studies—based on expansion of the original Merrill study—indicate that the proper hedge may be closer to 20% of the portfolio's asset value.

How much protection will these calls provide? Recall that it was stated that VIX uses only the two nearest-term series of options on SPX. Thus, longer-term SPX options may be trading at substantially different implied volatilities and may not necessarily track well with VIX itself.

In the case of VIX, even the nearest-term futures and options do not necessarily have to track VIX exactly. Continuing with the above example, suppose that the VIX calls were bought for 1.00 apiece. Furthermore, suppose that the stock market dropped sharply and VIX shot up to 27. It is unlikely that the VIX calls would immediately reflect the full value of being 7 points in the money (due to the term structure of options)—but they might easily be trading at 5. Thus, the profit would be $400 per contract, or $222,000 – 2.2% of the NAV of the portfolio.

If a severe market shock were registered, VIX would trade even higher and the calls would provide more protection. In addition, the level of protection can be increased by buying VIX calls with a lower strike, but that increases the cost of the insurance to begin with.

Figure 41-13 shows the actual results, since VIX options began trading in 2006, of buying one-month VIX calls three strikes out of the money and rolling them over. (Note: Three strikes means at least 7.5 points out of the money when VIX is below 30 and 15 points out of the money when VIX is above 30.) Also, note that the *out-of-the-money* status is based on the price of the corresponding VIX *futures* contract, and not VIX itself.

The y-axis shows a percentage gain or loss, assuming that one bought enough VIX calls to hedge 10% of the notional net asset value of a portfolio (SPX, in this case).

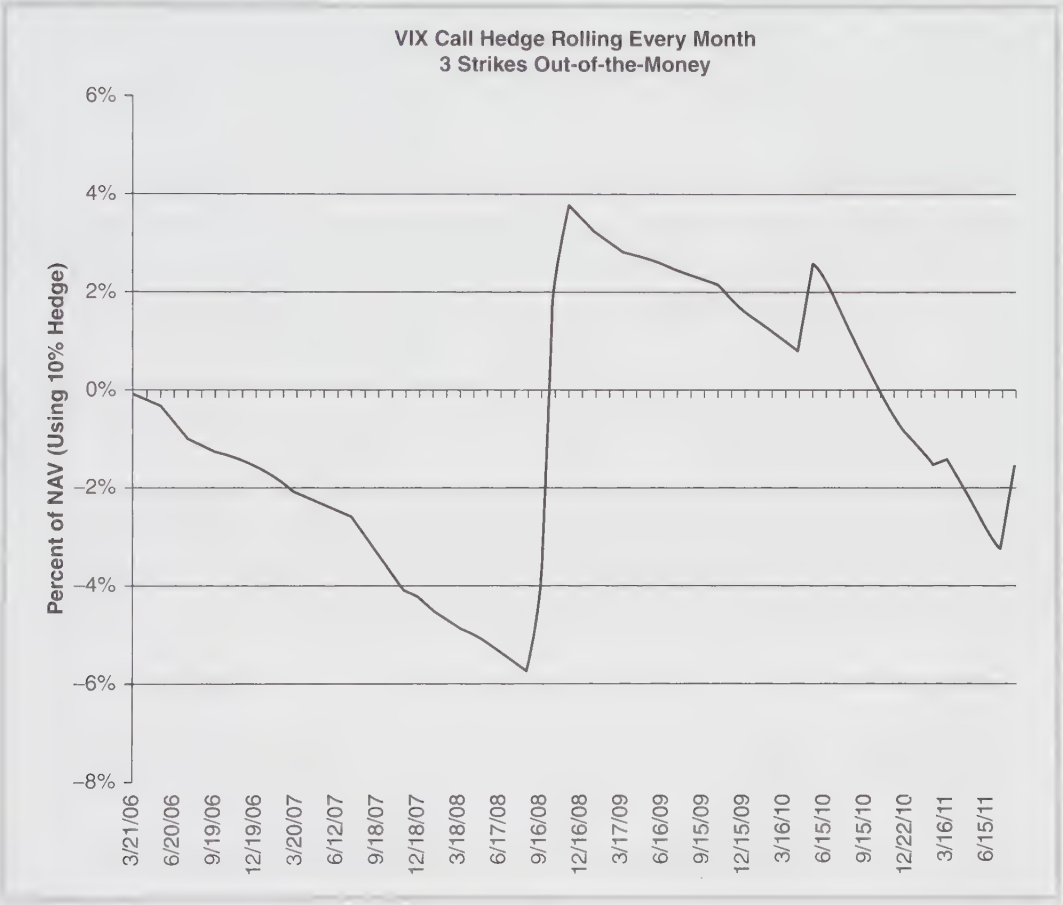
You can certainly see the effectiveness of owning VIX calls when a true crisis arises. VIX calls registered large profits in October 2008, and smaller profits in May 2010 and August 2011.

Just to quantify things a bit, the historical volatility of VIX is routinely above 50% and sometimes reaches 100%, whereas the volatility of SPX averages 15% in the long run and has been much lower than that during long bull markets. Hence, one can statistically justify buying farther out-of-the-money VIX calls, as compared to the distance out-of-the-money for SPX puts, due to the much higher actual volatility of VIX.

We have already stated that VIX is a 30-day measure of volatility. Therefore, there is no reason to buy longer-term VIX options.

Taking all of this into account, a better answer to how many VIX calls to buy could be expressed this way, based on the average VIX move in past market declines:

FIGURE 41-13.
Call hedge rolling.



1. Convert your portfolio into a "volatility-adjusted" value, basis SPX.
2. Buy VIX calls three strikes out-of-the-money as designated above.
3. Calls to buy per $100,000 of volatility-adjusted value = percentage × 0.35 where percentage is the percentage of your adjusted value that you want to hedge (between 10 and 20, according to the Merrill studies). So if percentage = 20, you would buy 7 VIX calls per $100,000 of volatility-adjusted value. In my opinion, percentage should be 20, or perhaps even higher, if one is not near a VIX expiration date.

OTHER MACRO STRATEGIES

At the beginning of this section on portfolio protection, several other strategies were outlined—all variations of the simple purchase of options for protection. I am not in favor of the spread strategies, but the collar is something that many traders find useful.

THE SPX COLLAR

In addition to buying SPX puts as protection, one could reduce the expense of those puts by simultaneously selling out-of-the-money calls on SPX. If the calls are sold for a price equal to or greater than that of the puts, the resulting position is called a "no-cost" collar.

There is an opportunity cost, of course—in the loss of upside profit potential beyond the striking price of the written call. Even so, certain investors find the collar to be a desirable strategy.

The no-cost collar is usually best approached with long-term options, and best used when dividend yields are low, and volatility is high. One might not find all of those components at once, but here is an example from 2007, near the end of the last bull market, when all of those conditions existed:

June 2007:
SPX: 1517
Dec ('09) SPX 1450 put: 107.6
Dec ('09) SPX 1700 call: 118.8

In June of 2007, dividends were low, and while volatility wasn't all that high, it was off its lows. Using the options that expired 2.5 years hence, one was able to set up a no-cost collar that limited losses below 1450 (less than 5% below current market prices) and allowed for appreciation all the way up to 1700, well above the all-time highs for SPX. This was therefore a very attractive collar, especially in light of what eventually happened in 2007 and 2008.

ADJUSTING THE COLLAR

What does one do with the collar once it's in place? One *could* just leave it alone—planning on accepting the consequences, whatever they may be. That may not be the best approach.

Many investors will adjust the collar if the underlying declines in price. Continuing with the example above, suppose that after a while, SPX drops to 1300. The put in the

collar is then deeply in the money and will be selling for quite a bit more than the (then) deeply out-of-the-money call. Hence the existing collar could be removed for a nice credit.

What should one then do with the money? There are several choices: (1) Establish a new collar with lower strikes. If another "no-cost" collar is established, the upside strike will be lower than before, so a strong rally by SPX might be limited by that short call. Most traders are reluctant to do this unless they're fairly certain that the stock market is headed lower (in which case, it would have been best to leave the original collar in place). (2) Use the credits to buy some out-of-the-money puts. These puts will act as protection against further erosion in the stock price, while at the same time the upside is no longer limited. (3) Do nothing, leaving the stock "naked" long in the portfolio. This would normally be done only if one is fairly certain that a market bottom has been made.

On the other hand, if the underlying *rallies* after the collar has been established, the investor does not have an attractive array of choices. The call will have increased in price and the put will have decreased, so that it would require a debit to remove the collar. Of course, the stock portfolio will have increased as well, so overall the investor is ahead, just by not as much as he might have been had he *not* established the collar in the first place. Usually, a trader would only remove the collar during a rally if he is fairly certain that the worst was over, and the underlying was heading higher.

THE VIX COLLAR

One can establish a collar with VIX options but in this case, one would sell *VIX puts* against the VIX calls that are owned as protection.

Example: With VIX at a price of 23.50, one might establish the following VIX protective collar:

Buy VIX Nov 30 calls at a price of 0.90
Sell VIX Nov 20 puts at a price of 1.00

The VIX collar has a few different characteristics from an SPX collar. First, one does not really limit his portfolio's profits as much as with an SPX collar. Yes, if the market rallies, VIX will fall, and may well fall below the striking price of the written put. However, VIX can't really go below 10, so there is a limit to the "drag" that the written VIX put can have on the upside profit potential of one's portfolio. A written SPX call, however, is a continuing limitation on upside profits in a rising market.

In the above example, the collar is a no-cost collar. But in order to do this, the written VIX put is quite close to the price of VIX. That means that only a modest stock market

rally would likely force the price of VIX below 20, and might cause losses against the rising stock portfolio.

In a more practical sense, one would probably sell VIX puts farther out-of-the-money. However, in that case it is unlikely that a no-cost collar could be established, but the sale of the put would still reduce the cost of the VIX call protection somewhat.

ANOTHER STRATEGY FOR VOLATILITY PROTECTION

Institutional traders are constantly on the lookout for protective strategies that don't cost anything on an ongoing basis. That's why the no-cost collar is so attractive. If one has that protection in place, but doesn't need it or use it, then it doesn't really cost him anything. The "cost" is an opportunity cost that there will be a cap on profits if the underlying rises far enough in price (i.e., rises above the striking price of the written SPX call or falls below the striking price of the written VIX put).

In that vein, a VIX call backspread strategy has been designed to take the loss out of using VIX options for protection or speculation. This strategy purports to be better because it allows you to exit before much, if any, loss occurs. As all thinking traders know, however, there is no free lunch. If there's really no risk, then something else has to give.

The strategy is based on a 2x1 call backspread, such as this example:

Example: Of a 2-by-1 VIX call backspread.

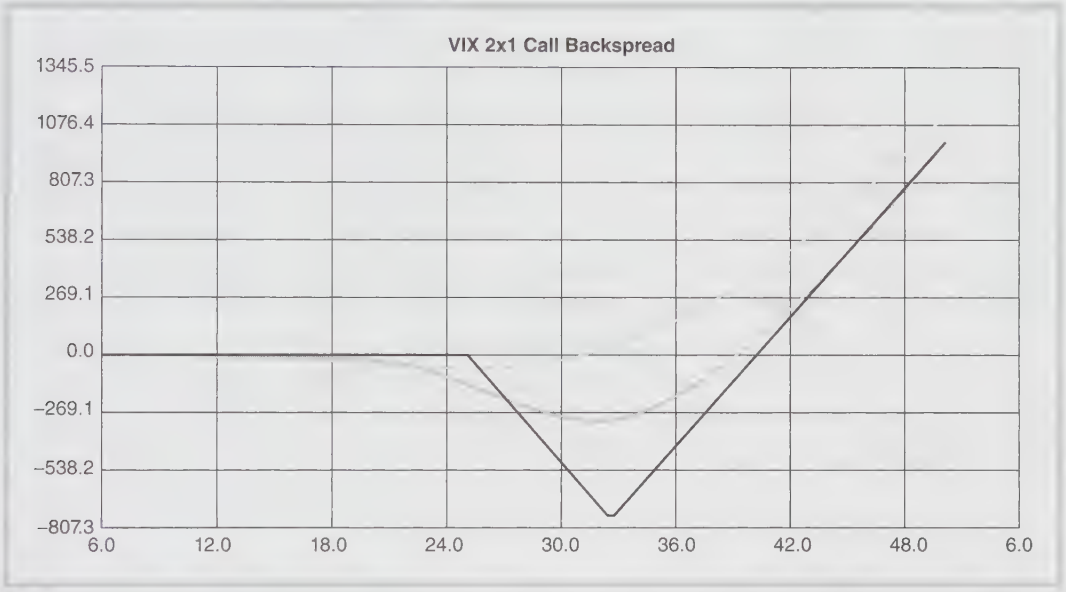
Date: mid-May at expiration of the May VIX derivatives contracts
VIX: 17
July VIX future: 20.25
Buy 2 VIX July 32.5 calls @ 0.80
and Sell 1 VIX July 25 call @ 1.60
Outlay: $0

On the May VIX derivatives' expiration date, a VIX call backspread is established in *July* options: selling one out-of-the-money call and buying two *further* out-of-the-money calls, where the price of the one being sold is approximately twice that of the one being bought. Note that the options expire two months hence, not one. If one has to pay a small debit for the spread—say, up to 15 or 20 cents—that would work nearly as well.

The main idea behind using this position is that—at least for a while—a 2x1 call backspread acts just like a long call, until the position gets too close to expiration, in which case the losses near the higher strike can become large.

Figure 41-14 shows the profit graph of such a spread. There are three lines in Figure 41-14. The straight black lines show what would happen if the position were held all the

FIGURE 41-14.
VIX 2x1 call backspread.



way to July expiration: there is no gain or loss (except commissions) below 25. Between 25 and 32.5, losses begin to grow, reaching their maximum of 7.5 points ($750) at 32.5 at expiration. Above 32.5, losses diminish until the upside break-even point is hit at 40. Above there, unlimited gains are possible.

There is nothing particularly attractive about the dark gray line itself. The *curved* dark gray line shows how the position would perform ten days prior to expiration. Again, relatively large losses of $300 or so are possible near 32. That isn't very attractive, either.

The true attractiveness of this position is the gray line. It shows how the position would behave on the last trading day of the *June* VIX derivatives (or about one month before the July derivatives expire). With this much time left until expiration, the gray line barely dips into negative territory at all. The worst point is a small loss of about $60 near 25, with a month to go. Yet, it has plenty of upside profit potential (as do all three lines) because two calls are owned in this spread, and only one has been sold.

If you just look at the gray line alone, it looks very much like the profit graph of owning a long call at some point prior to expiration. The gray line turns sharply upward at a price of about 31 or 32, so July VIX futures would have to rise to there or above in order for this position to start generating profits with a month to go.

This backspread could thus theoretically be used for strategies where one would normally buy VIX calls—mainly, as either protection for a stock portfolio, or as outright speculation on a large increase in volatility.

So, is this 2x1 backspread really better than buying a short-term call? It might not be. The crux of the strategy is simple: one establishes the 2x1 backspread and then rolls to the next expiration before losses start to set in. Simplistically, this means that the position is established two months before expiration and then rolled one month before expiration.

On the surface, the backspread strategy seems very attractive. Perhaps if one is merely looking to speculate on volatility, it might be appropriate, but there are two major flaws in this strategy. One flaw has to do with the term structure of VIX futures. As we know, the options trade off the *futures* and not VIX. Furthermore, in a severe bear market, when VIX explodes to the upside, the term structure turns negative (i.e., all the futures trade at a discount to VIX). When that happens, the backspread strategy—since it is the second month and not the front-month—may not produce the desired gains.

The simplest way to illustrate this is to once again look at the worst bear market since VIX derivatives have been listed—that of October 2010. At one point, the following prices existed, roughly:

VIX: 70 on 10/10/2010
Oct VIX future: 56
Nov VIX future: 38

The long October VIX call was 18 points farther in the money than a November 2x1 call backspread! As October expiration approached, VIX stayed near 70, and so the October futures sucked right up to 70. Meanwhile, November futures rose only into the mid-40s. This is the hazard of owning protection in the second month and not the near-term month.

A counterargument would be to buy *more* of the November 2x1 backspreads as opposed to outright long October calls. That's fine, but there is also a big difference in the margin required.

The margin for a backspread is the difference in the strikes, plus any debit incurred in establishing the spread. Obviously, the only requirement for an outright long call is merely to pay for the call. Even if the 2x1 backspread is using strikes 5 points apart (not always possible, if one wants to pay only a small debit for the spread), this is how the comparison would look vs. an outright long call at 0.60:

Requirement Comparison
2x1 Call Backspread for $0 debit: $500
Outright Long Call for 0.60: $60

So it might be easy to say "do more backspreads," but it's more costly to do so, in terms of investment requirements. This could be significant, say, if one were trading long

stocks fully margined, or selling naked index or equity puts with the full equity in the account. In that case, one would likely have to close down some of the account's "main" strategy in order to fund the backspreads.

Term structure is important. But perhaps the major flaw is where the profit potential arises. From Figure 41-14 one can see that, using the backspread, the profit potential kicks in at just below the level of the higher strike in the backspread (31 or 32 in the example). That is likely to be much farther out of the money than the "three strikes" we are recommending for our long call purchases.

In the example for Figure 41-14, VIX was at 17, and the July futures were 20.25. The June futures would have been trading near 18.50 or so. If one were merely buying long VIX calls for protection, he would have bought the June 25 call. The outright June 25 call would start making profits well before the backspread does.

In summary, the 2x1 call backspread strategy has a certain appeal because losses are minimal if the position is rolled well before expiration. However, in the direst crisis, the strategy will not perform nearly as well as a front-month call purchase does. For those looking for disaster protection, that makes all the difference in the world. If one pays the small amount for the outright long call, he thus has protection that "kicks in" at a lower volatility level and more closely adheres to movements in VIX on the upside.

PORTFOLIO PROTECTION SUMMARY

VIX call options offer a superior, more dynamic hedge than SPX put options do. This is due to two main facts: (1) whatever strike is purchased for VIX will prove useful in a true crisis, for VIX will blast higher easily, and (2) the volatility of VIX is so much greater than that of SPX that it only takes a small number of calls to hedge a whole portfolio, compared to the number of SPX puts that would have to be purchased for protection.

Perhaps the VIX hedge is more of a crisis hedge, but that is generally what protection is all about. Normally, one would not be using protection to capture a small market decline—the cost of doing that would eventually prove to be too great.

HEDGED STRATEGIES USING VOLATILITY DERIVATIVES

Up to this point, we have mainly concentrated on using VIX and its derivatives as direct purchases for speculation or protection. However, there are also hedged strategies that are useful. One such strategy is the calendar spread, which we *have* discussed to a certain extent.

It was shown that the calendar spread between two futures months can be a proxy for trading the stock market, or it can be used when one expects a change in the term

structure of the VIX futures. This is a highly leveraged strategy since the margin for a futures spread involving the first three months is only $625.

We also previously saw that a calendar spread using VIX options does not behave at all like a calendar spread in a stock. That's because there are two underlying entities for the two VIX options in a calendar (or diagonal) spread—not just one as there would be for a simple stock, like IBM or Apple.

VIX CALENDAR COMBINATION

In either of the above VIX derivatives strategies, there is a great deal of risk—theoretically unlimited. But many traders would like to be able to trade the calendar spread with fixed, limited risk. This *can* be done, although one no longer has the heavy leverage of the futures spread if he does so. Instead of using futures to trade the calendar, one can create a similar position by using in-the-money options.

It has been pointed out elsewhere in this book that any intermarket spread can be established with in-the-money options, often for a superior position. For the option position can make money in two ways: (1) if the intermarket spread actually converges or diverges as one had planned for it to do, or (2) if both underlyings are extremely volatile; in this latter case, one option will make large profits while the other option has limited risk. Thus in the second case, it is possible to profit even if the intermarket spread itself does not "behave."

Example: A trader wants to be short October VIX and long November VIX. He *could* merely buy November VIX futures and sell October VIX futures. But if the spread moves against him sharply, as that very spread did in the fall of 2008, he could suffer huge losses. Rather, a position consisting of a long November VIX call and a long October VIX put—both in-the-money—could be a good substitute for the futures calendar spread.

The following prices existed on September 8th:

Date: September 8, 2008
VIX: 22.64
Oct VIX futures: 23.39
Nov VIX futures: 23.63

Suppose that one had established the futures calendar, buying November and selling October. As we saw earlier, in Table 41-7, things quickly went awry.

Date: October 10, 2008
VIX: 69.96

Oct VIX futures: 56.71
Nov VIX futures: 38.30

The spread was established for 24 cents (November over October) and now is marking at 18.41 (October over November), so the total loss on the futures trade would be 18.65 (0.24 + 18.41) points, or $18,650. But what would have happened had an option combo originally been purchased instead?

Date: September 8, 2008
Buy VIX Nov 20 call: 5.00
Buy VIX Oct 27.5 put: 4.30
Combo cost: 9.30 points

The maximum risk on this spread is the initial investment of $930. For that to happen November VIX futures would have to fall below 20, while October VIX futures rose above 27.5—an almost impossible scenario for such low values of VIX.

Instead, as we know, VIX exploded but October outpaced November by a good deal. Even so, this combo makes money under the second scenario described above—a volatile move by both underlyings. These were the prices on October 10, 2008:

Date: October 10, 2008
Long VIX Nov 20 call: 17.70
Long VIX Oct 27.5 put: 0.00

So the spread is showing a *profit* of 8.40 points ($840 per combo). That's a return of 90% on the initial investment of $930 (not including commissions)—perhaps not as great as the leverage available in a futures spread, but a much superior result.

THE VIX/SPY HEDGED POSITION

Earlier, when it was first shown that VIX futures can sometimes trade at large discounts to VIX (and large premiums, as well), it was mentioned that one strategy to take advantage of that was the VIX/SPX hedge. This section will describe the strategy in detail—discussing its basic concepts, determining how many options to trade on each side of the hedge, and finally how to handle follow-up strategies.

The hedged portion of the trade derives from the fact that, in general, VIX goes up when the stock market goes down (and vice versa). Hence a purchase of similar options (puts or calls) in both instruments is a hedged trade. For example, in theory if one owns

calls on VIX *and* also owns calls on SPX (or more likely, on S&P SPDRS [SPY]), they hedge each other. Similarly, if one owns *puts* on both, it is a hedged position.

Furthermore, as was shown in the previous section, hedges in which *options* are used have two chances to make money: (1) if the hedge converges, or (2) if prices of the underlyings move a great distance. For example, suppose the hedge is established by buying calls on both SPY and VIX. On one side, the call can only lose a fixed amount, while on the other side, the call can profit handsomely.

THE BASIC CONCEPT

The relationship between VIX and the front-month VIX *futures* is the key as to when this strategy is applicable. When that differential is too great—either too much of a premium or too much of a discount—the trade is viable.

In calm times, the strategy can be established when that differential reaches 2.0 points or more—either a 2-point discount or a 2-point premium. In more extreme times—especially in sharply declining bearish markets—extremely large discounts can exist (as we've seen in several previous examples in this chapter). Those are even more attractive times to establish the hedge. So, as a general rule, we want to establish the strategy when there is a large difference between VIX and its front-month futures contract. Eventually that differential must disappear—certainly by expiration, if not before.

Let's look at a quick conceptual example:

Example of discount: Suppose the following prices exist:

VIX: 31
VIX front-month futures: 25 (6-point discount)
SPX: 1200
(These roughly correspond to prices on 9/15/08.)

Scenario 1: If the VIX futures are "correct," then VIX will fall to meet their price, and SPX should correspondingly rise as VIX falls.

Scenario 2: But what if the opposite occurred? What if VIX is "correct"? Then the futures will rise to meet it. In *that* case, VIX might be unchanged, so SPX might be unchanged as well.

So what strategy would work for these scenarios? *Buying calls on both*, since VIX options are priced off the *futures* as their underlying, not off VIX itself. We would want to stay in the "front-month" calls because that is where the greatest moves are.

In Scenario 1 above, the VIX futures remain unchanged, and SPX rises. So VIX calls

might lose a little bit of time value premium, but SPY calls would profit nicely on the upward movement of SPX.

In Scenario 2, SPX remains relatively unchanged, while VIX futures rise in price. Thus SPY calls would lose a little time value premium, while VIX calls would gain in value since the futures rise in price.

Now let's consider an example of the opposite situation, after VIX futures have risen to a *premium* to VIX. If a hedged trader wanted to use this VIX/SPX strategy in this case, he would buy *puts on both* VIX and SPX.

Example of premium:

VIX: 18

VIX front-month futures: 22 (a 4-point premium)

SPX: 1400

Scenario 1: The futures are "correct," so VIX rises and SPX falls. SPY puts would profit.

Scenario 2: VIX is "correct," so the futures decline to meet VIX, while SPX and VIX remain relatively unchanged. VIX puts would profit, since VIX *futures* decline.

HOW MANY OPTIONS TO BUY?

There is a generic formula for determining a proper hedge when dealing with two different underlying instruments.

$$\text{Ratio} = \frac{V_1 \times P_1 \times U_1 \times D_1}{V_2 \times P_2 \times U_2 \times D_2}$$

where

V_i = volatility

P_i = underlying price

U_i = unit of trading

D_i = delta of options

Typically U_i is 100 shares per contract if stock or index options are involved, but if you are hedging futures options against stock, ETF, or index options, it could be something different.

Volatility is typically the 20-day historical volatility, although in extreme times, one may want to take a broader view of volatility.

In general, the delta of the options is important only if you are, in fact, using options in the trade. If you are hedging futures against ETFs, for example, then there is no delta component.

Regarding the VIX/SPX hedge, as a rule of thumb, historically, this formula generally tells one to buy about twice as many VIX options as SPY options. However, each market situation can produce some outlying volatilities for VIX futures or for SPX itself, so the formula should be applied each time the hedge is established. Do not merely rely on the 2-to-1 ratio.

The two previous examples will be continued here, in order to show how one would set these ratios. If one is trading VIX options vs. SPY options, the variable U is equal for both (100). Furthermore make the assumption that options with similar deltas will be bought. Thus, only price and volatility determine the ratio (HV is Historical Volatility):

Example of discount (continued):

	Price	20-day HV
SPY:	120	28
VIX Oct futs:	25	49

Ratio: = (120 × 28) / (26 × 49) = 2.63

That is roughly 5-to-2, meaning one would buy 5 VIX calls and 2 SPY calls (or 10 VIX vs. 4 SPY, and so forth).

Example of premium (continued): This is the continuation of the second example from above. Stock market volatility was much lower in this case:

	Price	20-day HV
SPY:	140	15
VIX June futs:	22	48

Ratio: = (140 × 15) / (22 × 48) = 1.99

So 2 VIX puts would be bought against every 1 SPY put in this case.
Remember that these ratios need to be adjusted if one buys options with widely different deltas.

EXITING/ADJUSTING THE HEDGE

Once the position is in place, one would want to remove it if VIX and the front-month futures returned to a "normal" state in which they trade at more or less the same price. That would be convergence. However, there is another way to make money in this spread, and that's if the underlyings move swiftly and sharply in one direction or another. Consider this example:

Example:

VIX: 45
Oct VIX futures: 34 (11-point discount)
Determine the ratio:

	Price	20-day HV
SPY:	112	50
VIX Oct futs:	34	82

Ratio: $= (112 \times 50) / (34 \times 82) = 2.01$

That is a 2-to-1 ratio: buy 2 VIX calls for each SPY call purchased.

To actually implement the trade, buy slightly in-the-money calls on each of VIX and SPY (so that they have similar deltas):

Buy 10 VIX Oct 32.5 calls @ 3.70
Buy 5 SPY Oct 111 calls @ 5.90
Total debit, excluding commissions: $6,650

Furthermore, assume that a week later, the stock market has taken a big tumble, and the following prices existed:

VIX: 64
VIX Oct futures: 52
VIX Oct 32.5 call: 20.50
SPY: 90.75
SPY Oct 111 call: 0.00 (worthless)

The spread had *not* converged (the discount on the October futures has grown from 11 to 12 points), but it was very profitable because of the large move that had occurred (VIX rose, SPY fell).

Profit/Loss on trade:
10 VIX calls (bought at 3.70, now worth 20.50): +$16,800
5 SPY calls (bought at 5.90, now worthless): -$2,950
Total gain on position: +$13,850

So this hedged position produced a large profit because the underlying instruments

moved in such a volatile manner—not because there was a convergence between VIX and futures, as had been expected. In general, convergence will result in relatively small profits, while the second way to profit—volatile moves—will result in much larger profits. The second scenario is, of course, rarer than the first.

In either scenario, when profits build up, one should take partial profits. If the futures remain at a significant differential from VIX, the entire position could be "re-centered" to remove any extreme delta from one side of the position or the other.

WHAT CAN GO WRONG?

No strategy is infallible. In this hedged strategy, the entire debit is at risk if VIX and SPY "diverge" and yet they don't make a volatile move. That is unlikely over a sustained time period, but it can happen in the short term.

For example, if VIX futures are at a large discount, the strategy dictates buying calls on both VIX and SPY. If the stock market then rallies, implied volatility will usually decline. Hence VIX falls, and the VIX futures fall as well, causing a loss in the long VIX calls. Moreover, declining volatility is a drag on the price of the SPY calls that are owned. Hence, it is possible that *both* sides of the hedge could lose in that case. It would be unlikely for that situation to persist, but in theory anything can happen.

The effect of declining VIX is less detrimental when puts are owned on both, for the VIX puts would be making some money in that case, even as the declining VIX is something of a problem for the long SPY puts.

Another potential source for error is in the adjustment process. If a large delta builds up on one side of the position or the other, one needs to either re-center the position or take partial profits, or at least use a trailing stop on the profitable side of the trade. To fail to do so exposes the built-up profits if there should be a sharp reversal in the market.

GENERAL OBSERVATIONS

If one steps back and thinks about it, this strategy should work whether one owns calls on both *or* puts on both, as long as the market is volatile. Hence the strategy might be employable at almost any time. In fact, owning this hedge is very similar to owning a straddle on "the market." That would include either buying straddles on SPY (or SPX) or on VIX itself. The "edge" in the *hedged* trade comes from the fact that there is a significant discount or premium on the VIX futures, and that differential has to disappear by the time the futures expire.

There is a second condition to success in this general strategy, as well: it will only

TABLE 41-13.
Implied volatilities of VIX options. On July 15, assume that VIX is at 21.

Months: Strikes	August	September	October	November
At-money –1	76%	76%	65%	60%
At-money	86%	84%	71%	63%
At-money +1	97%	89%	75%	67%
At-money +2	104%	94%	80%	70%
At-money +3	113%	98%	83%	72%
Futures	20.60	21.92	22.59	22.80
20-day HV	53%	43%	38%	34%

work as long as the general relationship between SPY and VIX remains in effect. That is, it works as long as volatility and the stock market move in opposite directions at roughly the same speed. Without *this* component, the hedge doesn't work.

Since there is no absolute relationship between VIX and SPY, we cannot always tell how the hedge will behave. That's something one doesn't have to worry about in the case of buying straddles on either VIX or SPY. In actual practice, there will surely be times when a SPY or VIX straddle buy might outperform the hedged position, but—especially if one waits until there is an "edge" in the VIX futures—the vast majority of times, the hedged position will outperform.

SUMMARY

In summary, this hedged strategy is an excellent way to trade volatility. That is, the position sets up when the VIX futures are trading at a significant distance from VIX. By using options, the profits are open-ended and can be made with either a convergence of VIX and VIX futures or with a volatile market move in either direction.

RATIO SPREADS WITH VIX OPTIONS

In the discussion surrounding Table 41-8, it was shown why VIX options trade with both a horizontal and a vertical skew. Table 41-13 shows what might be a typical array of VIX option implied volatilities:

Notice the distinct horizontal skew (near-term options are more expensive than longer-term options). This is based on the similar skew in the futures (last line of Table

41-13, where HV stands for "historical volatility"). Also, note that the VIX options are quite a bit more expensive than the recent historical volatility of the individual futures contracts. That is because VIX futures always have the potential to explode, and so the options are priced with a forward-looking volatility rather than a historical one.

Also, there is a vertical skew. The first column shows five striking prices, all with respect to "at the money," which can be a different striking price for different futures contracts. The designation of strikes above (+1, +2, +3) and below (–1) the "at the money" strike are 2.50 points apart. The options with lower strikes have lower implied volatilities than do the options with higher strikes. This linear skew bears certain similarities to the skew in SPX options (but in the opposite direction) and is conducive to ratio spreads and backspreads, using options in the same expiration month. The VIX option vertical skew is a forward or positive skew, while the SPX option vertical skew is a reverse or negative skew.

However, calendar spreads and diagonal spreads—using options in different months—are not necessarily at an advantage, even though there is a horizontal skew in the options. The apparent horizontal skew *should* be there, since the underlying futures have *actual* volatilities that are highest for the near-term futures, and then decline for each successive longer-term month.

Ratio call spreads have a theoretical advantage in that one is buying an option with a lower implied volatility than the one being sold.

Example:

VIX: 22.73
July VIX futures: 21.95

Option	Price	Implied Volatility
July 22.5 call	2.30	97%
July 25 call	1.75	108%
July 27.5 call	1.35	116%
July 30 call	1.05	122%

Sample Call Ratio Spread:
Buy 1 July 25 call @ 1.75
Sell 2 July 30 calls @ 1.05
Net Credit: 0.35
Upside Break-even: 35.35

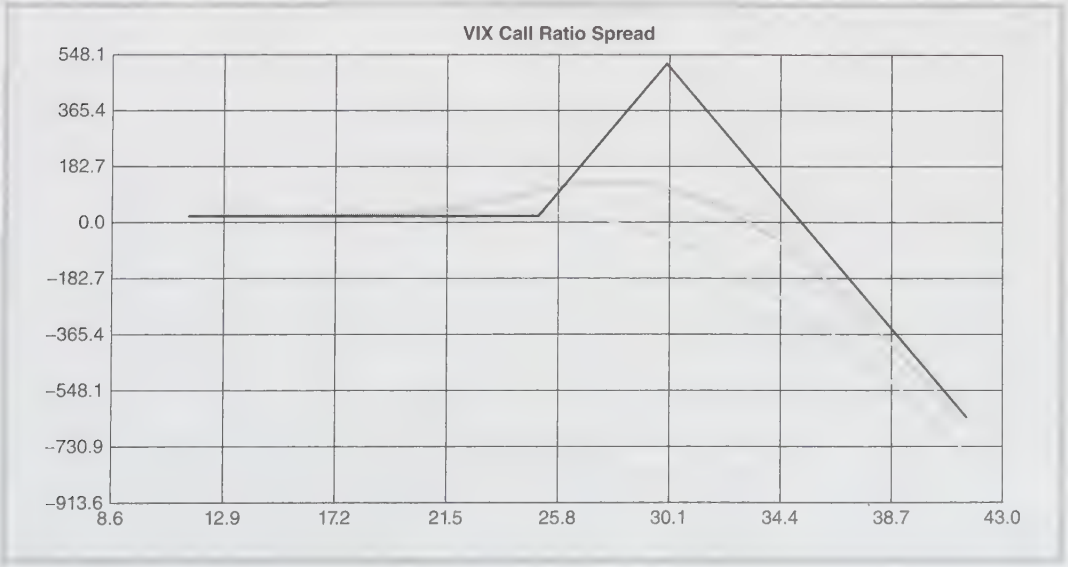
The spreader must collateralize the one naked call, according to the usual margin requirement for naked index calls (this is *not* considered to be a broad-based index).

The profit graph of this ratio spread is shown in Figure 41-15. The theoretical advantage of the call ratio spread in this example comes from the fact that options with an implied volatility of 108% are being bought, while options with an implied volatility of 122% are being sold.

The spread will make money as long as VIX is not above 35.35 at expiration. Below 25, the profit is merely the 35-cent credit for which the spread was established. But between 25 and 35, larger profits are attainable, with the maximum profit of 5.35 being reached if VIX were at exactly 30 at expiration. Prior to expiration, of course, the spread could have losses if the July futures rally too much and/or the implied volatility of the options expands. The gray lines in Figure 41-15 show results prior to expiration.

These characteristics are very similar to those of an SPX or SPY put ratio spread. Traders who favor the SPX put ratio spread strategy will also likely consider the VIX call ratio spread strategy as a viable one. Both are subject to swift losses if the market suddenly plunges. When that happens, implied volatility explodes and so does the volatility of volatility.

FIGURE 41-15.
VIX call ratio spread.



It seems to be a fair question to ask which is "safer." As an unhedged strategy, that is a difficult question to answer because both are subject to the aforementioned dangerous volatility increases. However, if one is managing a portfolio of SPY or SPX put ratio spreads, he can buy some out-of-the-money VIX calls as a hedge against a market collapse. But the VIX call ratio spreader is unlikely to do the same, because that would turn his ratio spread into a butterfly spread, and the butterfly probably wouldn't have the desired characteristics of profitability.

VIX PUT RATIO SPREADS

Certain institutional traders seem to like VIX put spreads, even though there is a theoretical *disadvantage* to the strategy. The disadvantage arises because one is buying options that are more expensive than the ones he is selling, in terms of implied volatility.

Example: Suppose a trader thinks VIX will decline, but he is not certain about it. He might buy VIX puts, but that would be a losing strategy if volatility does not drop within the time frame of the options he is buying. He might consider using a bear spread or even a put ratio spread to offset some of the risk of owning VIX puts, while he waits for the market to decline.

VIX: 22.73
July VIX futures: 21.95

Option	Price	Implied Volatility
July 20 put	1.30	85%
July 18 put	0.50	74%
July 16 put	0.10	64%

Sample Put Ratio Spread:

Buy 1 July 20 put @ 1.30
Sell 2 July 18 puts @ 0.50
Net Debit: 0.30
Downside Break-even: 16.30

One would have to put up margin for the one naked put in this position.

Out-of-the-money put prices drop sharply in VIX options, because of the decrease in implied volatility at lower strikes. If one had merely bought the July 20 put for 1.30, he

would make money if July futures fell at any time, and specifically if they were below 18.70 at expiration.

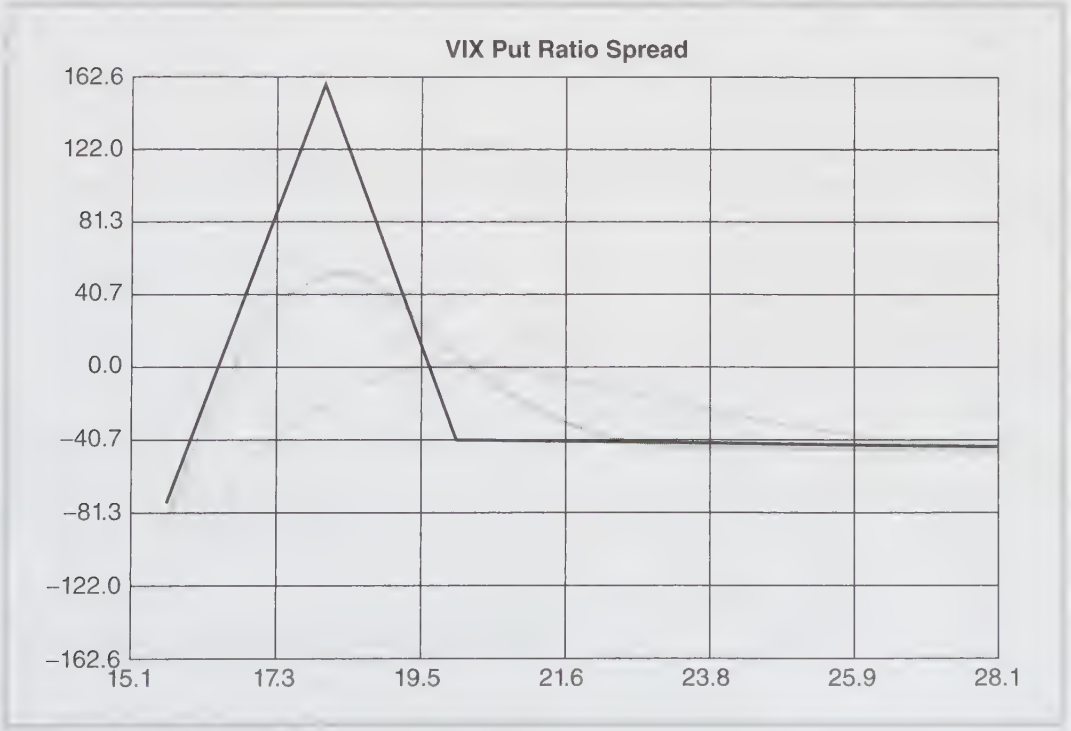
Figure 41-16 shows the profit graph for this put ratio spread. With the put ratio spread, he only risks 30 cents if VIX doesn't fall, but won't make much money if July VIX futures drop right away, because the short options will weigh *against* the position (the curved lines of Figure 41-16). Eventually, at expiration, he makes money if VIX is between 16.30 and 19.70, but can lose considerable amounts if VIX falls well below 16.50.

So this strategy really only makes sense if one is expecting a modest decrease in the price of VIX—something that is not that easy to predict.

VIX PUT BACKSPREADS

However, there *is* a put strategy that *does* take advantage of the skew in the options, and that is the put backspread. This strategy would typically be used if one thought VIX were

FIGURE 41-16.
VIX put ratio spread.



going to make a sizeable move, with a downward move being more likely than an upward move. So usually it is established with VIX at or above 30.

Example: After a market drop, VIX has risen substantially and is trading near 38. A trader feels that a market rally is likely, and that VIX will thus fall in price. However, there is always the chance that the market collapses again and VIX explodes even further to the upside.

VIX: 37.81
Nov VIX futures: 36.30

Option	Price	Implied Volatility
Nov 45 put	10.70	99%
Nov 37.5 put	4.80	85%

Sample Put Backspread:
Buy 2 Nov 37.5 puts @ 4.80
Sell 1 Nov 45 put @ 10.70
Net Credit: 1.10
Downside Break-even: 31.10

There are no naked puts in this position. Rather the margin is equal to the maximum risk, which is the difference in the striking prices (7.50) minus the initial credit (1.10), or $640 margin for the 2x1 spread.

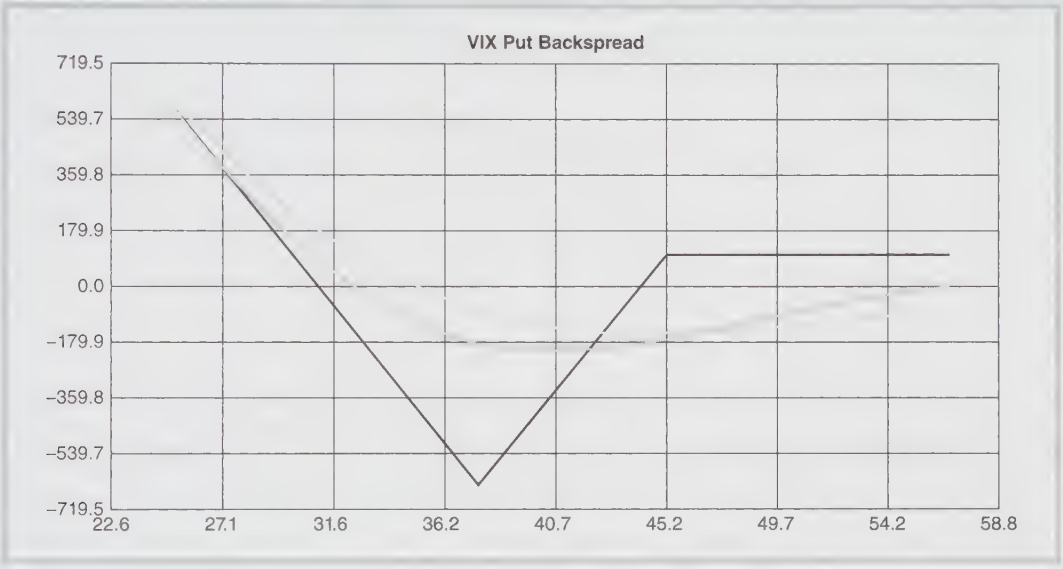
The profit graph for this backspread is shown in Figure 41-17. In this strategy, one has established the backspread for a credit (which is what a strategist normally wants to do in a backspread). Moreover, the options being bought are trading with a substantially lower implied volatility than those being sold, so the spread has a theoretical edge.

If VIX explodes to the upside, and all the puts expire worthless, the spreader will keep the 1.10 initial credit as his profit. Conversely, if VIX drops sharply (in a rising market, say), then he will have profits at expiration as long as VIX is below 31.10. In fact, since the strategy has one net long put, rather substantial profits can be made if VIX falls well below the break-even.

The worst result would occur if VIX were exactly at the long strike, 37.5, at expiration, where the maximum loss of $640 would be realized. Clearly, this spread is most attractive if VIX moves away from its initial price by a great deal.

One does not have to wait until expiration, however, to realize profits. If VIX makes a move right away, there will be profits if the move is large enough. The spreader can

FIGURE 41-17.
VIX put backspread.



make adjustments to lock in some of those profits, or take partial profits, or even close out the whole spread if he desires. However, if VIX does *not* move, then one would probably want to exit this spread by November 1st or so, for the losses at that time would be along the darker gray line in Figure 41-17. Waiting much longer would expose the position to the maximum losses as shown on the solid black line on the profit graph.

SUMMARY

Ratio spreads and backspreads in VIX options can be useful and theoretically attractive. The call backspread, described earlier, is useful as a protection strategy or for upside speculation with small risk. The put backspread is theoretically advantageous for downside speculation in VIX. Call ratio spreads are attractive from the viewpoint of the forward skew. Only the put ratio spread seems to lack much of a useful purpose, but even it is popular with some traders.

VOLATILITY DERIVATIVES SUMMARY

The introduction of listed derivatives on the volatility asset class is one of the most significant developments in the history of listed options and futures. In the future, more

individual stocks, indices, and futures contracts will have listed volatility derivatives also. Volatility has always been the most difficult variable to hedge and control, but now it can be done directly via these new products. While their primary use should be the hedging of volatility risk in equity portfolios, they make excellent speculative and strategic vehicles as well.

CHAPTER 42

Taxes

In this chapter, the basic tax treatment of listed options will be outlined and several tax strategies will be presented. The reader should be aware of the fact that tax laws change, and therefore should consult tax counsel before actually implementing any tax-oriented strategy. The interpretation of certain tax strategies by the Internal Revenue Service is subject to reclarification or change, as well.

An option is a capital asset and any gains or losses are capital gains or losses. Differing tax consequences apply, depending on whether the option trade is a complete transaction by itself, or whether it becomes part of a stock transaction via exercise or assignment. Listed option transactions that are closed out in the options market or are allowed to expire worthless are capital transactions. The holding period for option transactions to qualify as long-term is always the same as for stocks (currently, it's one year). Gains from option purchases could possibly be long-term gains if the holding period of the option exceeds the long-term capital gains holding period.

Gains from the sale of options are short-term capital gains. In addition, the tax treatment of futures options and index options and other listed nonequity options may differ from that of equity options. We will review these points individually.

HISTORY

In the short life of listed option trading, there have been several major changes in the tax rules. When options were first listed in 1973, the tax laws treated the gains and losses from writing options as ordinary income. That is, the thinking was that only professionals or those people in the business actually wrote over-the-counter options, and thus their gains and losses represented their ordinary income, or means of making a living. This

rule presented some interesting strategies involving spreads, because the long side of the spread could be treated as long-term gain (if held for more than 6 months, which was the required holding period for a long-term gain at that time), and the short side of the spread could be ordinary loss. Of course, the stock would have had to move in the desired direction in order to obtain this result.

In 1976, the tax laws changed. The major changes affecting option traders were that the long-term holding period was extended to one year and also that gains or losses from writing options were considered to be capital gains. The extension of the long-term period essentially removed all possibilities of listed option holders ever obtaining a long-term gain, because the listed option market's longest-term options had only 9 months of life.

All through this period there were a wide array of tax strategies that were available, legally, to allow investors to defer capital gains from one year to the next, thereby avoiding payment of taxes. Essentially, one would enter into a spread involving deep in-the-money options that would expire in the next calendar year. Perhaps the spread would be established during October, using January options. Then one would wait for the underlying stock to move. Once a move had taken place, the spread would have a profit on one side and a loss on the other. The loss would be realized by rolling the losing option into another deep in-the-money option. The realized loss could thus be claimed on that year's taxes. The remaining spread—now an unrealized profit—would be left in place until expiration, in the next calendar year. At that time, the spread would be removed and the gain would be realized. Thus, the gain was moved from one year to the next. Then, later in that year, the gain would again be rolled to the next calendar year, and so on.

These practices were effectively stopped by the new tax ruling issued in 1984. Two sweeping changes were made. First, the new rules stated that, in any spread position involving offsetting options—as the two deep in-the-money options in the previous example—the losses can be taken only to the extent that they exceed the unrealized gain on the other side of the spread. (The tax literature insists on calling these positions "straddles" after the old commodity term, but for options purposes they are really spreads or covered writes.) As a by-product of this rule, the holding period of stock can be terminated or eliminated by writing options that are too deeply in-the-money. Second, the new rules required that all positions in nonequity options and all futures be marked to market at the end of the tax year, and that taxes be paid on realized and unrealized gains alike. The tax rate for nonequity options was lowered from that of equity options. Then, in 1986, the long-term and short-term capital gains rates were made equal to the lowest ordinary rate. All of these points will be covered in detail.

BASIC TAX TREATMENT

Listed options that are exercised or assigned fall into a different category for tax purposes. The original premium of the option transaction is combined into the stock transaction. There is no tax liability on this stock position until the stock position itself is closed out. There are four different combinations of exercising or assigning puts or calls. Table 42-1 summarizes the method of applying the option premium to the stock cost or sale price.

Examples of how to treat these various transactions are given in the following sections. In addition to examples explaining the basic tax treatment, some supplementary strategies are included as well.

CALL BUYER

If a call holder subsequently sells the call or allows it to expire worthless, he has a capital gain or loss. For equity options, the holding period of the option determines whether the gain or loss is long-term or short-term. As mentioned previously, a long-term gain would be possible if held for more than one year. For tax purposes, an option that expires worthless is considered to have been sold at zero dollars on the expiration date.

Example: An investor purchases an XYZ October 50 call for 5 points on July 1. He sells the call for 9 points on September 1. That is, he realizes a capital gain via a closing transaction. His taxable gain would be computed as shown in Table 42-1, assuming that a $25 commission was paid on both the purchase and the sale.

TABLE 42-1.
Applying the option premium to the stock cost or sale price.

Action	Tax Treatment	
Call buyer exercises	Add call premium to stock cost	
Put buyer exercises	Subtract put premium from stock sale price	
Call writer assigned	Add call premium to stock sale price	
Put writer assigned	Subtract put premium from stock cost	
Net proceeds of sale ($900 – $25)		$875
Net cost ($500 + $25)		–525
Short-term gain:		$350

Alternatively, if the stock had fallen in price by October expiration and the October 50 call had expired worthless, the call buyer would have lost $525—his entire net cost. If he had held the call until it expired worthless, he would have a short-term capital loss of $525 to report among his taxable transactions.

PUT BUYER

The holder of a put has much the same tax consequences as the holder of a call, provided that he is not also long the underlying stock. This initial discussion of tax consequences to the put holder will assume that he does not simultaneously own the underlying stock. If the put holder sells his put in the option market or allows it to expire worthless, the gain or loss is treated as capital gain, long-term for equity puts held more than one year. Historically, the purchase of a put was viewed as perhaps the only way an investor could attain a long-term gain in a declining market.

Example: An investor buys an XYZ April 40 put for 2 points with the stock at 43. Later, the stock drops in price and the put is sold for 5 points. The commissions were $25 on each option trade, so the tax consequences would be:

Net sale proceeds ($500—$25)	$475
Net cost ($200 + $25)	–225
Short-term capital gain:	$250

Alternatively, if he had sold the put at a loss, perhaps in a rising market, he would have a short-term capital loss. Furthermore, if he allowed the put to expire totally worthless, his short-term loss would be equal to the entire net cost of $225.

CALL WRITER

Written calls that are bought back in the listed option market or are allowed to expire worthless are short-term capital gains. A written call cannot produce a long-term gain, regardless of the holding period. This treatment of a written call holds true even if the investor simultaneously owned the underlying stock (that is, he had a covered write). As long as the call is bought back or allowed to expire worthless, the gain or loss on the call is treated separately from the underlying stock for tax purposes.

Example: A trader sells naked an XYZ July 30 call for 3 points and buys it back three months later at a price of 1. The commissions were $25 for each trade, so the tax gain would be:

Net sale proceeds ($300 – $25)	$275
Net cost ($100 + $25)	–125
Short-term gain:	$150

If the investor had not bought the call back, but had been fortunate enough to be able to allow it to expire worthless, his gain for tax purposes would have been the entire $275, representing his net sale proceeds. The purchase cost is considered to be zero for an option that expires worthless.

PUT WRITER

The tax treatment of written puts is quite similar to that of written calls. If the put is bought back in the open market or is allowed to expire worthless, the transaction is a short-term capital item.

Example: An investor writes an XYZ July 40 put for 4 points, and later buys it back for 2 points after a rally by the underlying stock. The commissions were $25 on each option trade, so the tax situation would be:

Net put sale price ($400 – $25)	$375
Net put cost ($100 + $25)	–125
Short-term gain:	$250

If the put were allowed to expire worthless, the investor would have a net gain of $375, and this gain would be short-term.

THE 60/40 RULE

As mentioned earlier, *nonequity option positions and future positions must be marked to market at the end of the tax year and taxes paid on both the unrealized and realized gains and losses.* This same rule applies to futures positions. The tax rate on these gains and losses is lower than the equity options rate. *Regardless of the actual holding period of the positions, one treats 60% of his tax liability as long-term and 40% as short-term.* This ruling means that even gains made from extremely short-term activity such as day-trading can qualify partially as long-term gains.

Since 1986, long-term and short-term capital gains rates have been equal. If long-term rates should drop, then the rule would again be more meaningful.

Example: A trader in nonequity options has made three trades during the tax year. It is now the end of the tax year and he must compute his taxes. First, he bought S&P 500 calls for $1,500 and sold them 6 weeks later for $3,500. Second, he bought an OEX January 160 call for 3.25 seven months ago and still holds it. It currently is trading at 11.50. Finally, he sold 5 SPX February 250 puts for 1.50 three days ago. They are currently trading at 2. The net gain from these transactions should be computed without regard to holding period.

Nonequity Contract	Original Price	Current Price	Cost	Proceeds	Gain/ Loss	
S&P calls	–	–	$1,500	$3,500	+$2,000	realized
OEX January 160	3.25	11.50	$ 325	$ 1,150	+ 825	unrealized
SPX February 250	1.50	2.00	$1,000	$ 750	– 250	unrealized
Total capital gains					+ $2,575	

The total taxable amount is $2,575, regardless of holding period and regardless of whether the item is realized or unrealized. Of this total taxable amount, 60% ($1,545) is subject to long-term treatment and 40% ($1,030) is subject to short-term treatment.

In practice, one computes these figures on a separate form (Section 1256) and merely enters the two final figures—$1,545 and $1,030—on the tax schedule for capital gains and losses. Note that if one loses money in nonequity options, he actually has a tax disadvantage in comparison to equity options, because he must take some of his loss as a long-term loss, while the equity option trader can take all of his loss as short-term.

EXERCISE AND ASSIGNMENT

Except for a specified situation that we will discuss later, exercise and assignment do not have any tax effect for nonequity options because everything is marked to market at the end of the year. However, since equity options are subject to holding period considerations, the following discussion pertains to them.

CALL EXERCISE

An equity call holder who has an in-the-money call might decide to exercise the call rather than sell it in the options market. If he does this, there are no tax consequences on the option trade itself. Rather, the cost of the stock is increased by the net cost of the original call option. Moreover, the holding period begins on the day the stock is

purchased (the day after the call was exercised). The option's holding period has no bearing on the stock position that resulted from the exercise.

Example: An XYZ October 50 call was bought for 5 points on July 1. The stock had risen by October expiration, and the call holder decided to exercise the call on October 20th. The option commission was $25 and the stock commission was $85. The cost basis for the stock would be computed as follows:

Buy 100 XYZ at 50 via exercise ($5,000 plus $85 commission)	$5,085
Original call cost ($500 plus $25)	525
Total tax basis of stock	$5,610
Holding period of stock begins on October 21.	

When this stock is eventually sold, it will be a gain or a loss, depending on the stock's sale price as compared to the tax basis of $5,610 for the stock. Furthermore, it will be a short-term transaction unless the stock is held until October 21st of the following year.

CALL ASSIGNMENT

If a written call is not closed out, but is instead assigned, the call's net sale proceeds are added to the sale proceeds of the underlying stock. The call's holding period is lost, and the stock position is considered to have been sold on the date of the assignment.

Example: A naked writer sells an XYZ July 30 call for 3 points, and is later assigned rather than buying back the option when it was in-the-money near expiration. The stock commission is $75. His net sale proceeds for the stock would be computed as follows:

Net call sale proceeds ($300 – $25)	$ 275
Net stock proceeds from assignment of 100 shares at 30 ($3,000 – $75)	2,925
Net stock sale proceeds	$3,200

In the case in which the investor writes a naked, or uncovered, call, he sells stock short upon assignment. He may, of course, cover the short sale by purchasing stock in the open market for delivery. Such a short sale of stock is governed by the applicable tax rules

pertaining to short sales—that any gains or losses from the short sale of stock are short-term gains or losses.

Tax Treatment for the Covered Writer. If, on the other hand, the investor was assigned on a covered call—that is, he was operating the covered writing strategy—and he elects to deliver the stock that he owns against the assignment notice, he has a complete stock transaction. The net cost of the stock was determined by its purchase price at an earlier date and the net sale proceeds are, of course, determined by the assignment in accordance with the preceding example.

Determining the proceeds from the stock purchase and sale is easy, but determining the tax status of the transaction is not. In order to prevent stockholders from using deeply in-the-money calls to protect their stock while letting it become a long-term item, some complicated tax rules have been passed. They can be summarized as follows:

1. If the equity option was out-of-the-money when first written, it has no effect on the holding period of the stock.
2. If the equity option was too deeply in-the-money when first written *and the stock was not yet held long-term*, then the holding period of the stock is *eliminated*.
3. If the equity option was in-the-money, but not too deeply, then the holding period of the stock is suspended while the call is in place.

These rules are complicated and merit further explanation. The first rule merely says that one can write out-of-the-money calls without any problem. If the stock later rises and is called away, the sale proceeds for the stock include the option premium, and the transaction is long-term or short-term depending on the holding period of the stock.

Example: Assume that on September 1st of a particular year, an investor buys 100 XYZ at 35. He holds the stock for a while, and then on July 15th of the following year—after the stock has risen to 43—he sells an October 45 call for 3 points.

Net call sale proceeds ($300 – $25)	$ 275	
Net stock proceeds from assignment ($4,500 – $75)	$4,425	
Net stock sale proceeds	$4,700	$4,700
Net stock cost ($3,500 + $75)		$3,575
Net long-term gain		+$1,125

Thus, this covered writer has a net gain of $1,125 and it is a long-term gain because the stock was held for more than one year (from September 1st of the year in which he bought it, to October expiration of the next year, when the stock was called away).

Note that in a similar situation in which the stock had been held for less than one year before being called away, the gain would be short-term.

Let us now look at the other two rules. They are related in that their differentiation relies on the definition of "too deeply in-the-money." They come into play only if the stock was not already held long-term when the call was written. If the written call is too deeply in-the-money, it can eliminate the holding period of short-term stock. Otherwise, it can suspend it. If the call is in-the-money, but not too deeply in-the-money, it is referred to as a qualified covered call. There are several rules regarding the determination of whether an in-the-money call is qualified or not. Before actually getting to that definition, which is complicated, let us look at two examples to show the effect of the call being qualified or not qualified.

Example: Qualified Covered Write: On March 1st, an investor buys 100 XYZ at 35. He holds the stock for 3½ months, and, on July 15th, the stock has risen to 43. This time he sells an in-the-money call, the October 40 call for 6. By October expiration, the stock has declined and the call expires worthless.

He would now have the following situation: a $575 short-term gain from the sale of the call, plus he is long 100 XYZ with a holding period of only 3½ months. Thus, the sale of the October call suspended his holding period, but did not eliminate it.

He could now hold the stock for another 8½ months and then sell it as a long-term item.

If the stock in this example had stayed above 40 and been called away, the net result would have been that the option proceeds would have been added to the stock sale price as in previous examples, and the entire net gain would have been short-term due to the fact that the writing of the qualified covered call had suspended the holding period of the stock at 3½ months.

That example was one of writing a call which was not too deeply in-the-money. If, however, one writes a call on stock that is not yet held long-term and the call is too deeply in-the-money, then the holding period of the stock is *eliminated*. That is, if the call is subsequently bought back or expires worthless, the stock must then be held for another year in order to qualify as a long-term investment. This rule can work to an investor's advantage. If one buys stock and it goes down and he is in jeopardy of having a long-term loss, but he really does not want to sell the stock, he can sell a call that is too deeply in-the-money (if one exists), and eliminate the holding period on the stock.

Qualified Covered Call. The preceding examples and discussion summarize the covered writing rules. Let us now look at what is a qualified covered call. The following rules are the literal interpretation. Most investors work from tables that are built from these rules. Such a table may be found in Appendix E. (Be aware that these rules may change, and consult a tax advisor for the latest figures.) A covered call is qualified if:

1. the option has more than 30 days of life remaining when it is written, and
2. the strike of the written call is not lower than the following benchmarks:
   a. First determine the applicable stock price (ASP). That is normally the closing price of the stock on the previous day. However, if the stock opens more than 110% higher than its previous close, then the applicable stock price is that higher opening.
   b. If the ASP is less than $25, then the benchmark strike is 85% of ASP. So any call written with a strike lower than 85% of ASP would not be qualified. (For example, if the stock was at 12 and one wrote a call with a striking price of 10, it would not be qualified—it is too deeply in-the-money.)
   c. If the ASP is between 25.01 and 50, then the benchmark is the next lowest strike. Thus, if the stock were at 39 and striking prices were spaced at 5-point intervals and one wrote a call with a strike of 35, it would be qualified.
   d. If the ASP is greater than 50 and not higher than 150, and the call has more than 90 days of life remaining, the benchmark is two strikes below the ASP. There is a further condition here that the benchmark cannot be more than 10 points lower than the ASP. Thus, if a stock is trading at 90, one could write a call with a strike of 80 as long as the call had more than 90 days remaining until expiration, and still be qualified.
   e. If the ASP is greater than 150 and the call has more than 90 days of life remaining, the benchmark is two strikes below the ASP. Thus, if there are 10-point striking price intervals, then one could write a call that was 20 points in-the-money and still be qualified. Of course, if there are 5-point intervals, then one could not write a call deeper than 10 points in-the-money and still be qualified.

Note that in cases where a stock has striking prices that are one point apart, the writer can barely write any in-the-money call, lest it not be qualified. These rules are complicated. That is why they are summarized in Appendix E. In addition, they are always subject to change, so if an investor is considering writing an in-the-money covered call against stock that is still short-term in nature, he should check with his tax advisor and/or broker to determine whether the in-the-money call is qualified or not.

There is one further rule in connection with qualified calls. Recall that we stated

that the above rules apply only if the stock is not yet held long-term when the call is written. If the stock is already long-term when the call is written, then it is considered long-term when called away, regardless of the position of the striking price when the call was written. However, if one sells an in-the-money call on stock already held long-term, and then subsequently buys that call back at a loss, *the loss on the call must be taken as a long-term loss* because the stock was long-term.

Overall, a rising market is the best, taxwise, for the covered call writer. If he writes out-of-the-money calls and the stock rises, he could have a short-term loss on the calls plus a long-term gain on the stock.

Example: On January 2nd of a particular year, an investor bought 100 shares of XYZ at 32, paying $75 in commissions, and simultaneously wrote a July 35 call for 2 points. The July 35 expired worthless, and the investor then wrote an October 35 call for 3 points. In October, with XYZ at 39, the investor bought back the October 35 call for 6 points (it was in-the-money) and sold a January 40 call for 4 points. In January, on the expiration day, the stock was called away at 40. The investor would have a long-term capital gain on his stock, because he had held it for more than one year. He would also have two short-term capital transactions from the July 35 and October 35 calls. Tables 42-2 and 42-3 show his net tax treatment from operating this covered writing strategy. The option commission on each trade was $25.

Things have indeed worked out quite well, both profit-wise and tax-wise, for this covered call writer. Not only has he made a net profit of $850 from his transactions on the stock and options over the period of one year, but he has received very favorable tax treatment. He can take a short-term loss of $175 from the combined July and October option transactions, and is able to take the $1,025 gain as a long-term gain.

TABLE 42-2.
Summary of trades.

January 2	Bought 100 XYZ at 32
July	Sold 1 July 35 call at 2
	July call expired worthless (XYZ at 32)
	Sold 1 October 35 call at 3
October	Bought back October 35 call for 6 points (XYZ at 39)
	Sold 1 January 40 call for 4 points
	(of the following year)
January	100 XYZ called away at 40

TABLE 42-3.
Tax treatment of trades.

Short-term capital items:		
July 35 call:	Net proceeds ($200 – $25)	$175
	Net cost (expired worthless)	0
	Short-term capital gain	$175
October 35 call:	Net proceeds ($300 – $25)	$275
	Net cost ($600 + $25)	– 625
	Short-term capital loss	($350)
Long-term capital item:		
100 shares XYZ:	Purchased January 2 of one year and sold at January expiration of the following year. Therefore, held for more than one year, qualifying for long-term treatment.	
	Net sale proceeds of stock (assigned call):	
	January 40 call sale proceeds ($400 – $25)	$375
	Sold 100 XYZ at 40 strike ($4,000 – $75)	+ 3,925
	Net cost of stock (January 2 trade):	$4,300
	Bought 100 at 32 ($3,200 + $75)	– 3,275
	Long-term capital gain	$1,025

This example demonstrates an important tax consequence for the covered call writer: His optimum scenario tax-wise is a rising market, for he may be able to achieve a long-term gain on the underlying stock if he holds it for at least one year, while simultaneously subtracting short-term losses from written calls that were closed out at higher prices. Unfortunately, in a declining market, the opposite result could occur: short-term option gains coupled with the possibility of a long-term loss on the underlying stock. There are ways to avoid long-term stock losses, such as buying a put (discussed later in the chapter) or going short against the box before the stock becomes long-term. However, these maneuvers would interrupt the covered writing strategy, which may not be a wise tactic.

In summary, then, the covered call writer who finds himself with an in-the-money call written and expiration date drawing near may have several alternatives open to him. If the stock is not yet held long-term, he might elect to buy back the written call and to write another call whose expiration date is beyond the date required for a long-term holding period on the stock. This is apparently what the hypothetical investor in the preceding

example did with his October 35 call. Since that call was in-the-money, he could have elected to let the call be assigned and to take his profit on the position at that time. However, this would have produced a short-term gain, since the stock had not yet been held for one year, so he elected instead to terminate the October 35 call through a closing purchase transaction and to simultaneously write a call whose expiration date exceeded the one year period required to make the stock a long-term item. He thus wrote the January 40 call, expiring in the next year. Note that this investor not only decided to hold the stock for a long-term gain, but also decided to try for more potential profits: He rolled the call up to a higher striking price. This lets the holding period continue. An in-the-money write would have suspended it.

DELIVERING "NEW" STOCK TO AVOID A LARGE LONG-TERM GAIN

Some covered call writers may not want to deliver the stock that they are using to cover the written call, if that call is assigned. For example, if a covered writer were writing against stock that had an extremely low cost basis, he might not be willing to take the tax consequences of selling that particular stock holding. Thus, the writer of a call that is assigned may sometimes wish to buy stock in the open market to deliver against his assignment, rather than deliver the stock he already owns. Recall that it is completely in accordance with the Options Clearing Corporation rules for a call writer to buy stock in the open market to deliver against an assignment. For tax purposes, the confirmation that the investor receives from his broker for the sale of the stock via assignment should clearly specify which particular shares of stock are being sold. This is usually accomplished by having the confirmation read "Versus Purchase" and listing the purchase date of the stock being sold. This is done to clearly identify that the "new" stock, and not the older long-term stock, is being delivered against the assignment. The investor must give these instructions to his broker, so that the brokerage firm puts the proper notation on the confirmation itself. If the investor realizes that his stock might be in danger of being called away and he wants to avail himself of this procedure, he should discuss it with his broker beforehand, so that the proper procedures can be enacted when the stock is actually called away.

Example: An investor owns 100 shares of XYZ and his cost basis, after multiple stock splits and stock dividends over the years, is $2 per share. With XYZ at 50, this investor decides to sell an XYZ July 50 call for 5 points to bring in some income to his portfolio. Subsequently, the call is assigned, but the investor does not want to deliver his XYZ, which he owns at a cost basis of $2 per share, because he would have to pay capital gains on a large profit. He may go into the open market and buy another 100 shares of XYZ at its current market price for delivery against the assignment notice. Suppose he does this on July 20th, the day he receives the assignment notice on his XYZ July 50 call. The confirmation that

he receives from his broker for the sale of 100 XYZ at 50—that is, the confirmation for the call assignment—should be marked "Versus Purchase July 20th." The year of the sale date should be noted on the confirmation as well. This long-term holder of XYZ stock must, of course, pay for the additional XYZ bought in the open market for delivery against the assignment notice. Thus, it is imperative that such an investor have a reserve of funds that he can fall back on if he thinks that he must ever implement this sort of strategy to avoid the tax consequences of selling his low-cost-basis stock.

PUT EXERCISE

If the put holder does not choose to liquidate the option in the listed market, but instead exercises the put—thereby selling stock at the striking price—the net cost of the put is subtracted from the net sale proceeds of the underlying stock.

Example: Assume an XYZ April 45 put was bought for 2 points. XYZ had declined in price below 45 by April expiration, and the put holder decides to exercise his in-the-money put rather than sell it in the option market. The commission on the stock sale is $85, so the net sale proceeds for the underlying stock would be:

Sale of 100 XYZ at 45 strike ($4,500 – $85)	$4,415
Net cost of put ($200 + $25)	– 225
Net sale proceeds on stock for tax purposes:	$4,190

If the stock sale represents a new position—that is, the investor has shorted the underlying stock—it will eventually be a short-term gain or loss, according to present tax rules governing short sales. If the put holder already owns the underlying stock and is using the put exercise as a means of selling that stock, his gain or loss on the stock transaction is computed, for tax purposes, by subtracting his original net stock cost from the sale proceeds as determined above.

PUT ASSIGNMENT

If a written put is assigned, stock is bought at the striking price. The net cost of this purchased stock is reduced by the amount of the original put premium received.

Example: If one initially sold an XYZ July 40 put for 4 points, and it was assigned, the net cost of the stock would be determined as follows, assuming a $75 commission charge on the stock purchase:

Cost of 100 XYZ assigned at 40 ($4,000 + $75)	$4,075
Net proceeds of put sale ($400 – $25)	– 375
Net cost basis of stock	$3,700

The holding period for stock purchased via a put assignment begins on the day of the put assignment. The period during which the investor was short the put has no bearing on the holding period of the stock. Obviously, the put transaction itself does not become a capital item; it becomes part of the stock transaction.

SPECIAL TAX PROBLEMS

THE WASH SALE RULE

The call buyer should be aware of the wash sale rule. In general, the wash sale rule denies a tax deduction for a security sold at a loss if a substantially identical security, or an option to acquire that security, is purchased within 30 days before or 30 days after the original sale. This means that one cannot sell XYZ to take a tax loss and also purchase XYZ within the 61-day period that extends 30 days before and 30 days after the sale. Of course, an investor can legally make such a trade, he just cannot take the tax loss on the sale of the stock. A call option is certainly an option to acquire the security. *It would thus invoke the wash sale rule for an investor to sell XYZ stock to take a loss and also purchase any XYZ call within 30 days before or after the stock sale.*

Various series of call options are not generally considered to be substantially identical securities, however. If one sells an XYZ January 50 call to take a loss, he may then buy any other XYZ call option without jeopardizing his tax loss from the sale of the January 50. It is not clear whether he could repurchase another January 50 call—that is, an identical call—without jeopardizing the taxable loss on the original sale of the January 50.

It would also be acceptable for an investor to sell a call to take a loss and then immediately buy the underlying security. This would not invoke the wash sale rule.

Avoiding a Wash Sale. It is generally held that the sale of a put is not the acquisition of an option to buy stock, even though that is the effect of assignment of the written put. This fact may be useful in certain cases. If an investor holds a stock at a loss, he may want to sell that stock in order to take the loss on his taxes for the current year. The wash sale rule prevents him from repurchasing the same stock, or a call option on that stock, within 30 days after the sale. Thus, the investor will be "out of" the stock for a month; that is, he will not be able to participate in any rally in the stock in the next 30 days. If the underlying

stock has listed put options, the investor may be able to partially offset this negative effect. By selling an in-the-money put at the same time that the stock is sold, the investor will be able to take his stock loss on the current year's taxes and also will be able to participate in price movements on the underlying stock.

If the stock should rally, the put will decrease in price. However, if the stock rallies above the striking price of the put, the investor will not make as much from the put sale as he would have from the ownership of the stock. Still, he does realize some profits if the stock rallies.

Conversely, if the stock falls in price, the investor will lose on the put sale. This certainly represents a risk—although no more of a risk than owning the stock did. An additional disadvantage is that the investor who has sold a put will not receive the dividends, if any are paid by the underlying stock.

Once 30 days have passed, the investor can cover the put and repurchase the underlying stock. The investor who utilizes this tactic should be careful to select a put sale in which early assignment is minimal. Therefore, he should sell a long-term, in-the-money put when utilizing this strategy. (He needs the in-the-money put in order to participate heavily in the stock's movements.) Note that if stock should be put to the investor before 30 days had passed, he would thus be forced to buy stock, and the wash sale rule would be invoked, preventing him from taking the tax loss on the stock at that time. He would have to postpone taking the loss until he makes a sale that does not invoke the wash sale rule.

Finally, this strategy must be employed in a margin account, because the put sale will be uncovered. Obviously, the money from the sale of the stock itself can be used to collateralize the sale of the put. If the stock should drop in value, it is always possible that additional collateral will be required for the uncovered put.

THE SHORT-SALE RULE—PUT HOLDER'S PROBLEM

A put purchase made by an investor who also owns the underlying stock may have an effect on the holding period of the stock. If a stock holder buys a put, he would normally do so to eliminate some of the downside risk in case the stock falls in price. However, if a put option is purchased to protect stock that is not yet held long enough to qualify for long-term capital gains treatment, the entire holding period of the stock is wiped out. Furthermore, the holding period for the stock will not begin again until the put is disposed of. For example, if an investor has held XYZ for 11 months—not quite long enough to qualify as a long-term holding—and then buys a put on XYZ, he will wipe out the entire accrued holding period on the stock. Furthermore, when he finally disposes of the put, the holding period for the stock must begin all over again. The previous 11-month

holding period is lost, as is the holding period during which the stock and put were held together. This tax consequence of a put purchase is derived from the general rules governing short sales, which state that the acquisition of an option to sell property at a fixed price (that is, a put) is treated as a short sale. This ruling has serious tax consequences for an investor who has bought a put to protect stock that is still in a short-term tax status.

"Married" Put and Stock. There are two cases in which the put purchase does not affect the holding period of the underlying stock. First, if the stock has already been held long enough to qualify for long-term capital treatment, the purchase of a put has no bearing on the holding period of the underlying stock. Second, if the put and the stock that it is intended to protect are bought at the same time, and the investor indicates that he intends to exercise that particular put to sell those particular shares of stock, the put and the stock are considered to be "married" and the normal tax rulings for a stock holding would apply. The investor must actually go through with the exercise of the put in order for the "married" status to remain valid. If he instead should allow the put to expire worthless, he could not take the tax loss on the put itself but would be forced to add the put's cost to the net cost of the underlying stock. Finally, if the investor neither exercises the put nor allows it to expire worthless but sells both the put and the stock in their respective markets, it would appear that the short sale rules would come back into effect.

This definition of "married" put and stock, with its resultant ramifications, is quite detailed. What exactly are the consequences? The "married" rule was originally intended to allow an investor to buy stock, protect it, and still have a chance of realizing a long-term gain. This is possible with options with more than one year of life remaining. The reader must be aware of the fact that, if he initially "marries" stock and a listed 3-month put, for example, there is no way that he can replace that put at its expiration with another put and still retain the "married" status. Once the original "married" put is disposed of—through sale, exercise, or expiration—no other put may be considered to be "married" to the stock.

Protecting a Long-Term Gain or Avoiding a Long-Term Loss. The investor may be able, at times, to use the short-sale aspect of put purchases to his advantage. The most obvious use is that he can protect a long-term gain with a put purchase. He might want to do this if he had decided to take the long-term gain, but would prefer to delay realizing it until the following tax year. A purchase of a put with a maturity date in the following year would accomplish that purpose.

Another usage of the put purchase, for tax purposes, might be to avoid a long-term loss on a stock position. If an investor owns a stock that has declined in price and also is about to become a long-term holding, he can buy a put on that stock to eliminate the

holding period. This avoids having to take a long-term loss. Once the put is removed, either by its sale or by its expiring worthless, the stock holding period would begin all over again and it would be a short-term position. In addition, if the investor should decide to exercise the put that he purchased, the result would be a short-term loss. The sale basis of the stock upon exercise of the put would be equal to the striking price of the put less the amount of premium paid for the put, less all commission costs. Furthermore, note that this strategy does not lock in the loss on the underlying stock. If the stock rallies, the investor would be able to participate in that rally, although he would probably lose all of the premium that he paid for the put. Note that both of these long-term strategies can be accomplished via the sale of a deeply in-the-money call as well.

SUMMARY

This concludes the section of the tax chapter dealing with listed option trades and their direct consequences on option strategies. In addition to the basic tax treatment for option traders of liquidation, expiring worthless, or assignment or exercise, several other useful tax situations have been described. The call buyer should be aware of the wash sale rule. The put buyer must be aware of the short sale rules involving both put and stock ownership. The call writer should realize the beneficial effects of selling an in-the-money call to protect the underlying stock, while waiting for a realization of profit in the following tax year. The put writer may be able to avoid a wash sale by utilizing an in-the-money put write, while still retaining profit potential from a rally by the underlying stock.

TAX PLANNING STRATEGIES FOR EQUITY OPTIONS

DEFERRING A SHORT-TERM CALL GAIN

The call holder may be interested in either deferring a gain until the following year or possibly converting a short-term gain on the call into a long-term gain on the stock. It is much easier to do the former than the latter. A holder of a profitable call that is due to expire in the following year can take any of three possible actions that might let him retain his profit while deferring the gain until the following tax year. One way in which to do this would be to buy a put option. Obviously, he would want to buy an in-the-money put for this purpose. By so doing, he would be spending as little as possible in the way of time value premium for the put option and he would also be locking in his gain on the call. The gains and losses from the put and call combination would nearly equal each other from that time forward as the stock moves up or down, unless the stock rallies

strongly, thereby exceeding the striking price of the put. This would be a happy event, however, since even larger gains would accrue. The combination could be liquidated in the following tax year, thus achieving a gain.

Example: On September 1st, an investor bought an XYZ January 40 call for 3 points. The call is due to expire in the following year. XYZ has risen in price by December 1st, and the call is selling for 6 points. The call holder might want to take his 3-point gain on the call, but would also like to defer that gain until the following year. He might be able to do this by buying an XYZ January 50 put for 5 points, for example. He would then hold this combination until after the first of the new year. At that time, he could liquidate the entire combination for at least 10 points, since the striking price of the put is 10 points greater than that of the call. In fact, if the stock should have climbed to or above 50 by the first of the year, or should have fallen to or below 40 by the first of the year, he would be able to liquidate the combination for more than 10 points. The increase in time value premium at either strike would also be a benefit. In any case, he would have a gain—his original cost was 8 points (3 for the call and 5 for the put). Thus, he has effectively deferred taking the gain on the original call holding until the next tax year. The risk that the call holder incurs in this type of transaction is the increased commission charges of buying and selling the put as well as the possible loss of any time value premium in the put itself. The investor must decide for himself whether these risks, although they may be relatively small, outweigh the potential benefit from deferring his tax gain into the next year.

Another way in which the call holder might be able to defer his tax gain into the next year would be to sell another XYZ call against the one that he currently holds. That is, he would create a spread. To assure that he retains as much of his current gain as possible, he should sell an in-the-money call. In fact, he should sell an in-the-money call with a lower striking price than the call held long, if possible, to ensure that his gain remains intact even if the underlying stock should collapse substantially. Once the spread has been established, it could be held until the following tax year before being liquidated. The obvious risk in this means of deferring gain is that one could receive an assignment notice on the short call. This is not a remote possibility, necessarily, since an in-the-money call should be used as protection for the current gain. Such an assignment would result in large commission costs on the resultant purchase and sale of the underlying stock, and could substantially reduce one's gain. Thus, the risk in this strategy is greater than that in the previous one (buying a put), but it may be the only alternative available if puts are not traded on the underlying stock in question.

Example: An investor bought an XYZ February 50 call for 3 points in August. In December, the stock is at 65 and the call is at 15. The holder would like to "lock in" his 12-point

call profit, but would prefer deferring the actual gain into the following tax year. He could sell an XYZ February 45 call for approximately 20 points to do this. If no assignment notice is received, he will be able to liquidate the spread at a cost of 5 points with the stock anywhere above 50 at February expiration. Thus, in the end he would still have a 12-point gain—having received 20 points for the sale of the February 45 and having paid out 3 points for the February 50 plus 5 points to liquidate the spread to take his gain. If the stock should fall below 50 before February expiration, his gain would be even larger, since he would not have to pay out the entire 5 points to liquidate the spread.

The third way in which a call holder could lock in his gain and still defer the gain into the following tax year would be to sell the stock short while continuing to hold the call. This would obviously lock in the gain, since the short sale and the call purchase will offset each other in profit potential as the underlying stock moves up or down. In fact, if the stock should plunge downward, large profits could accrue. However, there is risk in using this strategy as well. The commission costs of the short sale will reduce the call holder's profit. Furthermore, if the underlying stock should go ex-dividend during the time that the stock is held short, the strategist will be liable for the dividend as well. In addition, more margin will be required for the short stock.

The three tactics discussed above showed how to defer a profitable call gain into the following tax year. The gain would still be short-term when realized. The only way in which a call holder could hope to convert his gain into a long-term gain would be to exercise the call and then hold the stock for more than one year. Recall that the holding period for stock acquired through exercise begins on the day of exercise—the option's holding period is lost. If the investor chooses this alternative, he of course is spending some of his gains for the commissions on the stock purchase as well as subjecting himself to an entire year's worth of market risk. There are ways to protect a stock holding while letting the holding period accrue—for example, writing out-of-the-money calls—but the investor who chooses this alternative should carefully weigh the risks involved against the possible benefits of eventually achieving a long-term gain. The investor should also note that he will have to advance considerably more money to hold the stock.

DEFERRING A PUT HOLDER'S SHORT-TERM GAIN

Without going into as much detail, there are similar ways in which a put holder who has a short-term gain on a put due to expire in the following tax year can attempt to defer the realization of that gain into the following tax year. One simple way in which he could protect his gain would be to buy a call option to protect his profitable put. He would want to buy an in-the-money call for this purpose. This resulting combination is similar in nature to the one described for the call buyer in the previous section.

A second way that he could attempt to protect his gain and still defer its realization into the following tax year would be to sell another XYZ put option against the one that he holds long. This would create a vertical spread. This put holder should attempt to sell an in-the-money put, if possible. Of course, he would not want to sell a put that was so deeply in-the-money that there is risk of early assignment. The results of such a spread are analogous to the call spread described in detail in the last section.

Finally, the put holder could buy the underlying stock if he had enough available cash or collateral to finance the stock purchase. This would lock in the profit, as the stock and the put would offset each other in terms of gains or losses while the stock moved up or down. In fact, if the stock should experience a large rally, rising above the striking price of the put, even larger profits would become possible.

In each of the tactics described, the position would be removed in the following tax year, thereby realizing the gain that was deferred.

DIFFICULTY OF DEFERRING GAINS FROM WRITING

As a final point in this section on deferring gains from option transactions, it might be appropriate to describe the risks associated with the strategy of attempting to defer gains from uncovered option writing into the following tax year. Recall that in the previous sections, it was shown that a call or put holder who has an unrealized profit in an option that is due to expire in the following tax year could attempt to "lock in" the gain and defer it. The dollar risks to a holder attempting such a tax deferral were mainly commission costs and/or small amounts of time value premium paid for options. However, the option writer who has an unrealized profit may have a more difficult time finding a way to both "lock in" the gain and also defer its realization into the following tax year. It would seem, at first glance, that the call writer could merely take actions opposite to those that the call buyer takes: buying the underlying stock, buying another call option, or selling a put. Unfortunately, none of these actions "locks in" the call writer's profit. In fact, he could lose substantial investment dollars in his attempt to defer the gain into the following year.

Example: An investor has written an uncovered XYZ January 50 call for 5 points and the call has dropped in value to 1 point in early December. He might want to take the 4-point gain, but would prefer to defer realization of the gain until the following tax year. Since the call write is at a profit, the stock must have dropped and is probably selling around 45 in early December. Buying the underlying stock would not accomplish his purpose, because if the stock continued to decline through year-end, he could lose a substantial amount on the stock purchase and could make only 1 more point on the call write. Similarly, a call purchase would not work well. A call with a lower striking price—for example, the XYZ January 45 or the January 40—could lose substantial value if the underlying

stock continued to drop in price. An out-of-the-money call—the XYZ January 60—is also unacceptable, because if the underlying stock rallied to the high 50's, the writer would lose money both on his January 50 call write and on his January 60 call purchase at expiration. Writing a put option would not "lock in" the profit either. If the underlying stock continued to decline, the losses on the put write would certainly exceed the remaining profit potential of 1 point in the January 50 call. Alternatively, if the stock rose, the losses on the January 50 call could offset the limited profit potential provided by a put write. Thus, there is no relatively safe way for an uncovered call writer to attempt to "lock in" an unrealized gain for the purpose of deferring it to the following tax year. The put writer seeking to defer his gains faces similar problems.

UNEQUAL TAX TREATMENT ON SPREADS

There are two types of spreads in which the long side may receive different tax treatment than the short side. One is the normal equity option spread that is held for more than one year. The other is any spread between futures, futures options, or cash-based options and equity options.

With equity options, if one has a spread in place for more than one year and if the movement of the underlying stock is favorable, one could conceivably have a long-term gain on the long side and a short-term loss on the short side of the spread.

Example: An investor establishes an XYZ bullish call spread in options that have 15 months of life remaining: In October of one year, he buys the January 70 LEAPS call expiring just over a year in the future. At the same time, he sells the January 80 LEAPS call, again expiring just over a year hence. Suppose he pays 13 for the January 70 call and receives 7 for the January 80 call. In December of the *following* year, he decides to remove the spread, after he has held it for more than one year—specifically, for 14 months in this case. XYZ has advanced by that time, and the spread is worth 9. With XYZ at 90, the January 70 call is trading at 20 and the January 80 call is trading at 11. The capital gain and loss results for tax purposes are summarized in the following table (commissions are omitted from this example):

Option	Cost	Proceeds	Gain/Loss
XYZ January 70 LEAPS call	$1,300	$2,000	$700 long-term gain
XYZ January 80 LEAPS call	$1,100	$ 700	$400 short-term loss

No taxes would be owed on this spread since one-half of the long-term gain is less than the short-term loss. The investor with this spread could be in a favorable position

since, even though he actually made money in the spread—buying it at a 6-point debit and selling it at a 9-point credit—he can show a loss on his taxes due to the disparate treatment of the two sides of the spread.

The above spread requires that the stock move in a favorable direction in order for the tax advantage to materialize. If the stock were to move in the opposite direction, then one should liquidate the spread before the long side of the spread had reached a holding period of one year. This would prevent taking a long-term loss.

Another type of spread may be even more attractive in this respect. That is a spread in which nonequity options are spread against equity options. In this case, the trader would hope to make a profit on the nonequity or futures side, because part of that gain is automatically long-term gain. He would simultaneously want to take a loss on the equity option side, because that would be entirely short-term loss.

There is no riskless way to do this, however. For example, one might buy a package of puts on stocks and hedge them by selling an index put on an index that performs more or less in line with the chosen stocks. If the index rises in price, then one would have short-term losses on his stock options, and part of the gain on his index puts would be treated as long-term. However, if the index were to fall in price, the opposite would be true, and long-term losses would be generated—not something that is normally desirable. Moreover, the spread itself has risk, especially the tracking risk between the basket of stocks and the index itself.

This brings out an important point: One should be cautious about establishing spreads merely for tax purposes. He might wind up losing money, not to mention that there could be unfavorable tax consequences. As always, a tax advisor should be consulted before any tax-oriented strategy is attempted.

SUMMARY

Options can be used for many tax purposes. Short-term gains can be deferred into the next tax year, or can be partially protected with out-of-the-money options until they mature into long-term gains. Long-term losses can be avoided with the purchase of a put or sale of a deeply in-the-money call. Wash sales can be avoided without giving up the entire ownership potential of the stock. There are risks as well as rewards in any of the strategies. Commission costs and the dissipation of time value premium in purchased options will both work against the strategist.

A tax advisor should be consulted before actually implementing any tax strategy, whether that strategy employs options or not. Tax rules change from time to time. It is even possible that a certain strategy is not covered by a written rule, and only a tax advisor is qualified to give consultation on how such a strategy might be interpreted by the IRS.

Finally, the options strategist should be careful not to confuse tax strategies with his profit-oriented strategies. It is generally a good idea to separate profit strategies from tax strategies. That is, if one finds himself in a position that conveniently lends itself to tax applications, fine. However, one should not attempt to stay in a position too long or to close it out at an illogical time just to take advantage of a tax break. The tax consequences of options should never be considered to be more important than sound strategy management.

CHAPTER 43

The Best Strategy?

There is no one best strategy. Although this statement may appear to be unfair and disappointing to some, it is nevertheless the truth. Its validity lies in the fact that there are many types of investors, and no one strategy can be best for all of them. Knowledge and suitability are the keys to determining which strategy may be the best one for an individual. The previous chapters have been devoted to imparting much of the knowledge required to understand an individual strategy. This chapter attempts to point out how the investor might incorporate his own risk/reward attitude and financial condition to select the most feasible strategies for his own use. The final section of this chapter describes which strategies have the better probabilities of success.

GENERAL CONCEPT: MARKET ATTITUDE AND EQUIVALENT POSITIONS

A wide variety of strategies has been described. Certain ones are geared to capitalizing on one's (hopefully correct) outlook for a particular stock, or for the market in general. These tend to be the more aggressive strategies, such as outright put or call buying and low-debit (high-potential) bull and bear spreads. Other strategies are much more conservative, having as their emphasis the possibility of making a reasonable but limited return, coupled with decreased risk exposure. These include covered call writing and in-the-money (large-debit) bull or bear spreads. Even in these strategies, however, one has a general attitude about the market. He is bullish or bearish, but not overly so. If he is proven slightly wrong, he can still make money. However, if he is gravely wrong, relatively large percentage losses might occur. The third broad category of strategies is the one that is not oriented toward picking stock market direction, but is rather an approach based on the value of the option—what is generally called volatility trading. If the net change in the

market is small over a period of time, these strategies should perform well: ratio writing, ratio spreading (especially "delta neutral spreads"), straddle and strangle writing, neutral calendar spreading, and butterfly spreads. On the other hand, if options are cheap and the market is expected to be volatile, then these would be best: straddle and strangle buys, backspreads, and reverse hedges and spreads.

Certain other strategies overlap into more than one of the three broad categories. For example, the bullish or bearish calendar spread is initially a neutral position. It only assumes a bullish or bearish bias after the near-term option expires. In fact, any of the diagonal or calendar strategies whose ultimate aim is to generate profits on the sale of shorter-term options are similar in nature. If these near-term profits are generated, they can offset, partially or completely, the cost of long options. Thus, one might potentially own options at a reduced cost and could profit from a definitive move in his favor at the right time. It was shown in Chapters 14, 23, and 24 that diagonalizing a spread can often be very attractive.

This brief grouping into three broad categories does not cover all the strategies that have been discussed. For example, some strategies are generally to be avoided by most investors: high-risk naked option writing (selling options for fractional prices) and covered or ratio put writing. In essence, the investor will normally do best with a position that has limited risk and the potential of large profits. Even if the profit potential is a low-probability event, one or two successful cases may be able to overcome a series of limited losses. Complex strategies that fit this description are the diagonal put and call combinations described in Chapters 23 and 24. The simplest strategy fitting this description in the T-bill/option purchase program described in Chapter 26.

Finally, many strategies may be implemented in more than one way. The method of implementation may not alter the profit potential, but the percentage risk levels can be substantially different. Equivalent strategies fit into this category.

Example: Buying stock and then protecting the stock purchase with a put purchase is an equivalent strategy in profit potential to buying a call. That is, both have limited dollar risk and large potential dollar profit if the stock rallies. However, they are substantially different in their structure. The purchase of stock and a put requires substantially more initial investment dollars than does the purchase of a call, but the limited dollar risk of the strategy would normally be a relatively small percentage of the initial investment. The call purchase, on the other hand, involves a much smaller capital outlay; in addition, while it also has limited dollar risk, the loss may easily represent the entire initial investment. The stockholder will receive cash dividends while the call holder will not. Moreover, the stock will not expire as the call will. This provides the stock/put holder with an additional alternative of choosing to extend his position for a longer period of time by buying another put or possibly by just continuing to hold the stock after the original put expires.

Many equivalent positions have similar characteristics. The straddle purchase and the reverse hedge (short stock and buy calls) have similar profit and loss potential when measured in dollars. Their percentage risks are substantially different, however. In fact, as was shown in Chapter 20, another strategy is equivalent to both of these—buying stock and buying several puts. That is, buying a straddle is equivalent to buying 100 shares of stock and simultaneously buying two puts. The "buy stock and puts" strategy has a larger initial dollar investment, but the percentage risk is smaller and the stockholder will receive any dividends paid by the common stock.

In summary, the investor must know two things well: the strategy that he is contemplating using, and his own attitude toward risk and reward. His own attitude represents suitability, a topic that is discussed more fully in the following section. Every strategy has risk. It would not be proper for an investor to pursue the best strategy in the universe (such a strategy does not exist, of course) if the risks of that strategy violated the investor's own level of financial objectives or accepted investment methodology. On the other hand, it is also not sufficient for the investor to merely feel that a strategy is suitable for his investment objectives. Suppose an investor felt that the T-bill/option strategy was suitable for him because of the profit and risk levels. Even if he understands the philosophies of option purchasing, it would not be proper for him to utilize the strategy unless he also understands the mechanics of buying Treasury bills and, more important, the concept of annualized risk.

WHAT IS BEST FOR ME MIGHT NOT BE BEST FOR YOU

It is impossible to classify any one strategy as the best one. The conservative investor would certainly not want to be an outright buyer of options. For him, covered call writing might be the best strategy. Not only would it accomplish his financial aims—moderate profit potential with reduced risk—but it would be much more appealing to him psychologically. The conservative investor normally understands and accepts the risks of stock ownership. It is only a small step from that understanding to the covered call writing strategy. The aggressive investor would most likely not consider covered call writing to be the best strategy, because he would consider the profit potential too small. He is willing to take larger risks for the opportunity to make larger profits. Outright option purchases might suit him best, and he would accept, by his aggressive stature, that he could lose nearly all his money in a relatively short time period. (Of course, one would hope that he uses only 15 to 20% of his assets for speculative option buying.)

Many investors fit somewhere in between the conservative description and the aggressive description. They might want to have the opportunity to make large profits, but certainly are not willing to risk a large percentage of their available funds in a short period

of time. Spreads might therefore appeal to this type of investor, especially the low-debit bullish or bearish calendar spreads. He might also consider occasional ventures into other types of strategies—bullish or bearish spreads, straddle buys or writes, and so on—but would generally not be into a wide range of these types of positions. The T-bill/option strategy might work well for this investor also.

The wealthy aggressive investor may be attracted by strategies that offer the opportunity to make money from credit positions, such as straddle or combination writing. Although ratio writing is not a credit strategy, it might also appeal to this type of investor because of the large amounts of time value premium that are gathered in. These are generally strategies for the wealthier investor because he needs the "staying power" to be able to ride out adverse cycles. If he can do this, he should be able to operate the strategy for a sufficient period of time in order to profit from the constant selling of time value premiums.

In essence, the answer to the question of "which strategy is best" again revolves around that familiar word, "suitability." *The financial needs and investment objectives of the individual investor are more important than the merits of the strategy itself.* It sounds nice to say that he would like to participate in strategies with limited risk and potentially large profits. Unfortunately, if the actual mechanics of the strategy involve risk that is not suitable for the investor, he should not use the strategy, no matter how attractive it sounds.

Example: The T-bill/option strategy seems attractive: limited risk because only 10% of one's assets are subjected to risk annually; the remaining 90% of one's assets earn interest; and if the option profits materialize, they could be large. What if the worst scenario unfolds? Suppose that poor option selections are continuously made and there are three or four years of losses, coupled with a declining rate of interest earned from the Treasury bills (not to mention the commission charges for trading the securities). The portfolio might have lost 15 or 20% of its assets over those years. *A good test of suitability is for the investor to ask himself, in advance: "How will I react if the worst case occurs?"* If there will be sleepless nights, pointing of fingers, threats, and so forth, the strategy is unsuitable. If, on the other hand, the investor believes that he would be disappointed (because no one likes to lose money), but that he can withstand the risk, the strategy may indeed be suitable.

MATHEMATICAL RANKING

The discussion above demonstrates that it is not possible to ultimately define the best strategy when one considers the background, both financial and psychological, of the individual investor. However, the reader may be interested in knowing which strategies

have the best mathematical chances of success, regardless of the investor's personal feelings. Not unexpectedly, *strategies that take in large amounts of time value premium have high mathematical expectations.* These include ratio writing, ratio spreading, straddle writing, and naked call writing (but only if the "rolling for credits" follow-up strategy is adhered to). The ratio strategies would have to be operated according to a delta-neutral ratio in order to be mathematically optimum. Unfortunately, these strategies are not for everyone. All involve naked options, and also require that the investor have a substantial amount of money (or collateral) available to make the strategies work properly. Moreover, naked option writing in any form is not suitable for some investors, regardless of their protests to the contrary.

Another group of strategies that rank high on an expected profit basis are those that have limited risk with the potential of occasionally attaining large profits. The T-bill/option strategy is a prime example of this type of strategy. The strategies in which one attempts to reduce the cost of longer-term options through the sale of near-term options fit in this broad category also, although one should limit his dollar commitment to 15 to 20% of his portfolio. Calendar spreads such as the combinations described in Chapter 23 (calendar combination, calendar straddle, and diagonal butterfly spread) or bullish call calendar spreads or bearish put calendar spreads are all examples of such strategies. These strategies may have a rather frequent probability of losing a small amount of money, coupled with a low probability of earning large profits. Still, a few large profits may be able to more than overcome the frequent, but small, losses. *Ranking behind these strategies are the ones that offer limited profits with a reasonable probability of attaining that profit.* Covered call writing, large debit bull or bear spreads (purchased option well in-the-money and possible written option as well), neutral calendar spreads, and butterfuly spreads fit into this category.

Unfortunately, all these strategies involve relatively large commission costs. Even though these are not strategies that normally require a large investment, the investor who wants to reduce the percentage effect of commissions must take larger positions and will therefore be advancing a sizable amount of money.

Speculative buying and spreading strategies rank the lowest on a mathematical basis. The T-bill/option strategy is not a speculative buying strategy. In-the-money purchases, including the in-the-money combination, generally outrank out-of-the-money purchases. This is because one has the possibility of making a large percentage profit but has decreased the chance of losing all his investment, since he starts out in-the-money. In general, however, the constant purchase of time value premiums, which must waste away by the time the options expire, will have a burdensome negative effect. The chances of large profits and large losses are relatively equal on a mathematical basis, and thus become subsidiary to the time premium effect in the long run. This mathematical outlook, of course, precludes those investors who are able to predict stock movements with an

above-average degree of accuracy. Although the true mathematical approach holds that it is not possible to accurately predict the market, there are undoubtedly some who can and many who try.

SUMMARY

Mathematical expectations for a strategy do not make it suitable even if the expected returns are good, for the improbable may occur. Profit potentials also do not determine suitability; risk levels do. In the final analysis, one must determine the suitability of a strategy by determining if he will be able to withstand the inherent risks if the worst scenario should occur. For this reason, no one strategy can be designated as the best one, because there are numerous attitudes regarding the degree of risk that is acceptable.

Postscript

Option strategies cannot be unilaterally classified as aggressive or conservative. There are certainly many aggressive applications, the simplest being the outright purchase of calls or puts. However, options can also have conservative applications, most notably in reducing some of the risks of common stock ownership. In addition, there are less polarized applications, particularly spreading techniques, that allow the investor to take a middle-of-the-road approach.

Consequently, *the investor himself—not options—becomes the dominant force in determining whether an option strategy is too risky.* It is imperative that the investor understand what he is trying to accomplish in his portfolio before actually implementing an option strategy. Not only should he be cognizant of the factors that go into determining the initial selection of the position, but he must also have in mind a plan of follow-up action. If he has thought out, in advance, what action he will take if the underlying entity rises or falls, he will be in a position to make a more rational decision when and if it does indeed make a move. The investor must also determine if the risk of the strategy is acceptable according to his financial means and objectives. If the risk is too high, the strategy is not suitable.

Every serious investor owes it to himself to acquire an understanding of listed option strategies. Since various options strategies are available for a multitude of purposes, *almost every money manager or dedicated investor will be able to use options in his strategies at one time or another.* This is especially true now that the options have been listed on the volatility assets class. For a stock-oriented investor to ignore the potential advantages of using options would be as serious a mistake as it would be for a large grain company to ignore the hedging properties available in the futures market, or as it would be for an income-oriented investor to concentrate only in utilities and Treasury bills

while ignoring less well known, but equally compatible, alternatives such as municipal bonds.

Moreover, in today's markets, with options being available on futures, equities, and indices, the strategist in any one field should familiarize himself with the others, because any of them will provide profit opportunities at one time or another.

PART VII

Appendices

APPENDIX A

Strategy Summary

Except for arbitrage strategies and tax strategies, the strategies we have described deal with risk of market movement. It is therefore often convenient to summarize option strategies by their risk and reward characteristics and by their market outlook—bullish, bearish, or neutral. Table A-1 lists all the risk strategies that were discussed and gives a general classification of their risks and rewards. If a strategist has a definite attitude about the market's outlook or about his own willingness to accept risks, he can scan Table A-1 and select the strategies that most closely resemble his thinking. The number in parentheses after the strategy name indicates the chapter in which the strategy was discussed.

Table A-1 gives a *broad* classification of the various risk and reward potentials of the strategies. For example, a bullish call calendar spread does not actually have unlimited profit potential unless its near-term call expires worthless. In fact, *all calendar spread or diagonal spread positions have limited profit potential at best until the near-term options expire.*

Also, the definition of limited risk can vary widely. Some strategies do have a risk that is truly limited to a relatively small percentage of the initial investment—the protected stock purchase, for example. *In other cases, the risk is limited but is also equal to the entire initial investment.* That is, one could lose 100% of his investment in a short time period. Option purchases and bull, bear, or calendar spreads are examples.

Thus, although Table A-1 gives a broad perspective on the outlook for various strategies, one must be aware of the differences in reward, risk, and market outlook when actually implementing one of the strategies.

TABLE A-1.
General strategy summary.

Strategy (Chapter)	Risk	Reward
Bullish strategies		
Call purchase (3)	Limited	Unlimited
Synthetic long stock (short put/long call) (21)	Unlimited[a]	Unlimited
Bull spread—puts or calls (7 and 22)	Limited	Limited
Protected stock purchase (long stock/long put) (17)	Limited	Unlimited
Bullish call calendar spread (9)	Limited	Unlimited
Covered call writing (2)	Unlimited[a]	Limited
Uncovered put write (19)	Unlimited[a]	Limited
Bearish strategies		
Put purchase (16)	Limited	Unlimited*
Protected short sale (synthetic put) (4 and 16)	Limited	Unlimited*
Synthetic short sale (long put/short call) (21)	Unlimited	Unlimited*
Bear spread—put or call (and 22)	Limited	Limited
Covered put write (19)	Unlimited	Limited
Bearish put calendar spread (22)	Limited	Unlimited*
Naked call write (5)	Unlimited	Limited
Neutral strategies		
Straddle purchase (18)	Limited	Unlimited
Reverse hedge (simulated straddle buy) (4)	Limited	Unlimited
Fixed income + option purchase (25)	Limited	Unlimited
Diagonal spread (14, 23, and 24)	Limited	Unlimited
Neutral calendar spread—puts or calls (9 and 22)	Limited	Limited
Butterfly and Iron Condor spread (10 and 23)	Limited	Limited
Calendar straddle or combination (23)	Limited	Unlimited
Reverse spread (13)	Limited	Unlimited
Ratio write—put or call (6 and 19)	Unlimited	Limited
Straddle or combination write (20)	Unlimited	Limited
Ratio spread—put or call (11 and 24)	Unlimited	Limited
Ratio calendar spread—put or call (12 and 24)	Unlimited	Unlimited

*Wherever the risk or reward is limited only by the fact that a stock cannot fall below zero in price, the entry is marked. Obviously, although the potential may technically be limited, it could still be quite large if the underlying stock did fall a large distance.

APPENDIX B

Equivalent Positions

Some strategies can be constructed with either puts or calls to attain the same profit potential. These are called equivalent strategies and are given in Table B-1. They do not necessarily have the same potential returns, because the investment required may be quite different. However, equivalent positions have profit graphs with exactly the same shape.

Other equivalences can be determined by combining any two strategies in the left-hand column and setting that combination equivalent to the two corresponding strategies in the right-hand column.

TABLE B-1.
Equivalent strategies.

This Strategy	is equivalent to	This Strategy
Call purchase		Long stock/long put
Put purchase		Short stock/long call (synthetic put)
Long stock		Long call/short put (synthetic stock)
Short stock		Long put/short call (synthetic short sale)
Naked call write		Short stock/short put
Naked put write		Covered call write (long stock/short call)
Bullish call spread (long call at lower strike/ short call at higher strike)		Bullish put spread (long put at lower strike/ short put at higher strike)
Bearish call spread (long call at higher strike/ short call at lower strike)		Bearish put spread (long put at higher strike/ short put at lower strike)
Ratio call write (long stock/short calls)		Straddle write (short put/short call)
. . . and is also equivalent to . . .		Ratio put write (short stock/short puts)
Straddle buy (long call/long put)		Reverse hedge (short stock/long calls) *or* buy stock/buy puts
Butterfly call spread (long 1 call at each outside strike/ short 2 calls at middle strike)		Butterfly put spread (long one put at each outer strike/ short two calls at middle strike)
All four of these "butterfly" strategies are equivalent		
Butterfly combination (bullish call spread at two lower strikes/bearish put spread at two higher strikes)		Protected straddle write (short straddle at middle strike/ long call at highest strike/ long put at lowest strike

APPENDIX C

Formulae

Chapter references are given in parentheses. The following notation is used throughout this appendix.

x = current stock price
s = striking price
c = call price
p = put price
r = interest rate
t = time (in years)
B = break-even point
U = upside break-even point
D = downside break-even point
P = maximum profit potential
R = maximum risk potential

Subscripts indicate multiple items. For example s_1, s_2, s_3 would designate three striking prices in a formula. The formulae are arranged alphabetically by title or by strategy.

Annualized Risk (Ch. 26)

$$\text{Annualized risk} = \sum_i \text{INV}_i \frac{360}{\text{H}_i}$$

where INV_i = percent of total assets invested in options with holding periods, H_i

H_i = length of holding period in days

Bear Spread

$s_1 < s_2$

—Calls (Ch. 8)

$$P = c_1 - c_2$$
$$R = s_2 - s_1 - P$$
$$B = s_1 + P$$

—Puts (Ch. 22)

$$P = c_{/_1} - c_{/_2}$$
$$R = s_2 - s_1 - P$$
$$B = s_1 + P$$

Black Model (Ch. 34):

Theoretical futures call price $= e^{-rt} \times \text{BSM}[r = 0\%]$

where BSM$[r = 0]$ is the Black–Scholes Model using $r = 0\%$ as the short-term interest rate

Put price = Call price $- e^{-rt} \times (f - s)$

where f = futures price

---

x	=	current stock price	B	=	break-even point
s	=	striking price	U	=	upside break-even point
c	=	call price	D	=	downside break-even point
p	=	put price	P	=	maximum profit potential
r	=	interest rate	R	=	maximum risk potential
t	=	time (in years)			
f	=	futures price			

Subscripts indicate multiple items. For example s_1, s_2, s_3 would designate three striking prices in a formula. The formulae are arranged alphabetically by title or by strategy.

Black–Scholes Model (Ch. 28)

$$\text{Theoretical call price} = xN(d_1) - se^{-rt}N(d_2)$$

$$\text{where } d_1 = \frac{\ln(x/s) + (r + \frac{1}{2}v^2)t}{v\sqrt{t}}$$

$$\text{and } d_2 = d_1 - v\sqrt{t}$$

$$\ln = \text{natural logarithm}$$

$$N() = \text{cumulative normal density function}$$

$$v = \text{annual volatility}$$

$$\text{Delta} = N(d_1)$$

Bull Spread

$s_1 < s_2$

—Calls (Ch. 7)

$$R = c_1 - c_2$$
$$P = s_2 - s_1 - R$$
$$B = s_2 - P = s_1 - c_2 + c_1$$

—Puts (Ch. 22)

$$P = p_2 - p_1$$
$$R = s_2 - s_1 - P$$
$$B = s_2 - P$$

Butterfly Spread

A butterfly spread combines a bull spread using strikes s_1 and s_2 with a bear spread using strikes s_2 and s_3.

$s_1 < s_2 < s_3$

$s_3 - s_2 = s_2 - s_1$

—if using all calls (Ch. 10)

$$R = c_1 + c_3 - 2c_2$$

—if using all puts (Ch. 23)

$$R = p_1 + p_2 - 2p_2$$

—if using put bull spread and call bear spread (Ch. 23)

$$P = c_2 + p_2 - c_3 - p_1$$

—if using call bull spread and put bear spread (Ch. 23)

$$R = p_2 + c_2 - p_1 - c_3 - s_3 + s_2$$

Then

$$P = s_3 - s_2 - R \text{ or } R = s_3 - s_2 - P$$
$$D = s_1 + R$$
$$U = s_3 - R$$

Combination Buy (Ch. 18)

$s_1 < s_2$

Out-of-the-money: $R = c_2 + p_1$

In-the-money: $R = c_1 + p_2 - s_2 + s_1$

$$D = s_1 - P$$
$$U = s_2 + P$$

Combination Sale (Ch. 20)

$s_1 < s_2$

Out-of-the-money: $P = c_2 + p_1$

In-the-money: $P = c_1 + p_2 - s_2 + s_1$

$$D = s_1 - P$$
$$U = s_2 + P$$

Condor (Iron Condor) (Ch. 23)

$s_1 < s_2 < s_3 < s_4$

$s_4 - s_3 = s_2 - s_1$

If using both puts and calls (Iron Condor) (Ch. 23):

$$P = c_3 - c_4 + (p_2 - p_1)$$
$$R = s_4 - s_3 - P$$
$$\text{Upside B} = s_3 + P$$
$$\text{Downside B} = s_2 - P$$

---

x	=	current stock price	B	=	break-even point
s	=	striking price	U	=	upside break-even point
c	=	call price	D	=	downside break-even point
p	=	put price	P	=	maximum profit potential
r	=	interest rate	R	=	maximum risk potential
t	=	time (in years)			
f	=	futures price			

Subscripts indicate multiple items. For example s_1, s_2, s_3 would designate three striking prices in a formula. The formulae are arranged alphabetically by title or by strategy.

Conversion and Reversal Profit (Ch. 27)

Conversion: $P = s + c - x - p +$ dividends $-$ carrying cost
Reversal: $P = x + p - c - s -$ dividends $+$ carrying cost

where

$$\text{carrying cost} \begin{cases} srt \text{ (simple interest)} \\ s[1-(1+r)^{-t}] \text{ (compound interest, present worth)} \end{cases}$$

Covered Call Write (Ch. 2)

$P = s + c - x$
$B = x - c$

Covered Straddle Write (Ch. 20)

$P = s + c + p - x$
$B = s - \frac{1}{2}P = \frac{1}{2}(x + s - p - c)$

Cumulative Normal Density Function (Ch. 28)

Approximation by fifth-order polynomial

$$a = 1 - z(1.330274y^5 - 1.821256y^4 + 1.781478y^3 - .3565638y^2 + .3193815y)$$

where $y = \dfrac{1}{1 + .2316419|\sigma|}$

$z = .3989423e^{-\sigma^2/2}$

Then

$$N(\sigma) = \begin{cases} a & \text{if } \sigma > 0 \\ 1-a & \text{if } \sigma < 0 \end{cases}$$

Delta—see Black–Scholes Model

Delta Neutral Ratio:

—stock versus option (Ch. 6)

$$\text{Neutral ratio} = \frac{1}{\text{Delta of option}}$$

—spread (Chs. 11 and 24)

$$\text{Neutral ratio} = \frac{\text{Delta of long option}}{\text{Delta of short option}}$$

Equivalent Futures Position (Ch. 34]

$$\text{EFP} = \text{Delta} \times \text{Number of options}$$

Equivalent Stock Position (Ch. 28]

$$\text{ESP} = \text{Unit of trading} \times \text{Delta} \times \text{number of options}$$

where unit of trading is the number of shares of the underlying stock that can be bought or sold with the option (normally 100).

Futures Contract Fair Value (Ch. 29)

—*Stock index futures*

$$\text{Index value} \times (1 + rt) + \text{Present worth (dividends)}$$

Also see *Present worth.*

Future Stock Price (Ch. 28)

—lognormal distribution, assuming a movement of a fixed number of standard deviations

$$q = xe^{av_t}$$

where

q = future stock price

v_t = volatility for the time period

a = number of standard deviations of movement

(normally $-3.0 \leq a \leq 3.0$)

Gamma (Ch. 40)

$$\text{let z} = \ln\left[\frac{\text{x}}{\text{s} \times (1 + \text{r})^{\text{t}}}\right] \Big/ \text{v}\sqrt{\text{t}} + \frac{\text{v}\sqrt{\text{t}}}{2}$$

Then

$$\Gamma = \frac{e^{(-x^2/2)}}{\text{xv}\sqrt{2\pi t}}$$

---

x	=	current stock price	U	=	upside break-even point
s	=	striking price	D	=	downside break-even point
c	=	call price	P	=	maximum profit potential
p	=	put price	R	=	maximum risk potential
r	=	interest rate			
t	=	time (in years)			
B	=	break-even point			

Subscripts indicate multiple items. For example s_1, s_2, s_3 would designate three striking prices in a formula. The formulae are arranged alphabetically by title or by strategy.

Iron Condor-see Condor

Probability of Stock Movement (Ch. 28)

—lognormal distribution

$$P(\text{below } q) = N\left\{\frac{\ln(q/x)}{v_t}\right\}$$

$$P(\text{above } q) = 1 - P(\text{below } q)$$

where

q = stock price in question

$N()$ = cumulative normal density function

In = natural logarithm

v_t = volatility for the time period

Present Worth of a Future Amount (Ch. 28)

$$\text{Present worth} = \frac{\text{Future amount}}{(1 + r)^t}$$

Put Pricing Model—Arbitrage Model (Ch. 28)

$$\text{Theoretical put price} = \text{Theoretical call price} + s - x + \text{dividends} - \text{carrying cost}$$

where

$$\text{carrying cost} = \begin{cases} srt\,(\text{simple interest}) \\ s[1 - (1 + r)^{-t}]\,(\text{compound interest, present worth}) \end{cases}$$

Ratio Call Write (Ch. 6)

General case: long m round lots of stock, short n calls

$$P = m(s - x) + nc$$

$$U = s + \frac{P}{n - m}$$

$$D = s - \frac{P}{m}$$

2:1 ratio (straddle sale)

$$P = s - x + 2c$$

$$U = s + p$$

$$D = s - p = x - 2c$$

Ratio Spread

—*Calls* (Ch. 11): buy n_1 calls at lower strike, s_1, and sell n_2 calls at higher strike, s_2

$$s_1 < s_2$$
$$n_1 < n_2$$
$$R = n_1c_1 - n_2c_2$$
$$P = (s_2 - s_1)n_1 - R$$
$$U = s_2 + \frac{P}{n_2 - n_1}$$

Break-even cost of long calls for follow-up action (Ch. 11)

$$\text{Break-even cost} = \frac{n_2(s_2 - s_1) - R}{n_2 - n_1}$$

—Puts (Ch. 24): buy n_2 puts at higher strike, s_2, and sell n_1 puts at lower strike, s_1

$$s_1 < s_2$$
$$n_2 < n_1$$
$$R = n_2p_2 - n_1p_1$$
$$P = n_2(s_2 - s_1) - R$$
$$D = s_1 - \frac{P}{n_1 - n_2}$$

Reversal—*See* Conversion and Reversal Profit

Reverse Hedge (Ch. 4)—simulated straddle purchase

General case: short m round lots of stock and long n calls

$$R = m(s - x) + nc$$
$$U = s + \frac{R}{n - m}$$
$$D = s - \frac{R}{m}$$

---

x	=	current stock price	B	=	break-even point
s	=	striking price	U	=	upside break-even point
c	=	call price	D	=	downside break-even point
p	=	put price	P	=	maximum profit potential
r	=	interest rate	R	=	maximum risk potential
t	=	time (in years)			

Subscripts indicate multiple items. For example s_1, s_2, s_3 would designate three striking prices in a formula. The formulae are arranged alphabetically by title or by strategy.

2:1 ratio (straddle buy):

$$R = s + 2c - x$$
$$U = s + R$$
$$D = s - R = x - 2c$$

Using puts (long 100 stock, long 2 puts) (Ch. 18)

$$R = x + 2p - s$$
$$U = s + R = x + 2p$$
$$D = s - R$$

Straddle Buy (Ch. 18)

$$R = p + c$$
$$U = s + R$$
$$D = -R$$

Straddle Sale (Ch. 20)

$$P = p + c$$
$$U = s + p$$
$$D = s - p$$

Synthetic Put Purchase—short stock and long call (Ch. 4)

$$R = s + c - x$$
$$B = s - c$$

Variable Ratio Write (Ch. 6)

—long 100 shares of stock, short one call at strike s_1, short one call at strike s_2

$s_1 < x < s_2$

$$P = c_1 + c_2 + s_1 - x$$
$$D = s_1 - P = x - c_1 - c_2$$
$$U = s_2 + P$$

Volatility—Standard Deviation (Ch. 28)

$$\upsilon^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n - 1}$$

Where

x_i = daily stock closing price
x = mean (average) of the x_i's
n = number of observations

—if υ is the annual volatility, then the volatility for a time period, t, is

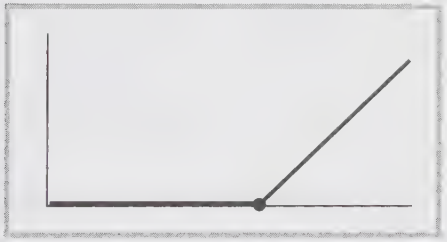
$$\upsilon_t = \upsilon\sqrt{t}$$

APPENDIX D

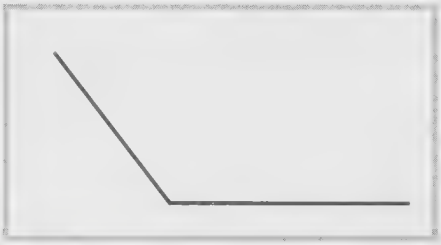
Graphs

Chapter references are in parentheses.

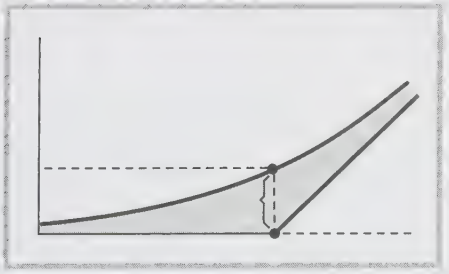
A. Intrinsic Value—Call (Ch. 1)



B. Intrinsic Value—Put (Ch. 15)



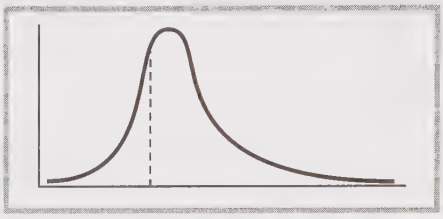
C. Call Option Pricing Curve (Ch. 1)



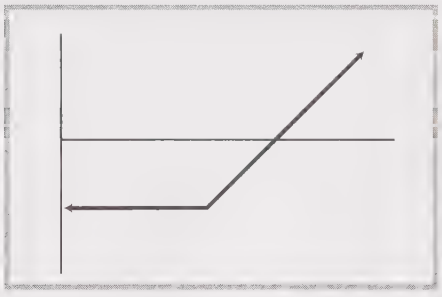
D. Put Option Pricing Curve (Ch. 15)

E. Time Value Premium Decay (Ch. 1)

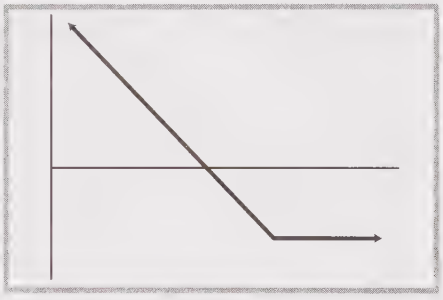
F. Lognormal Distribution (Ch. 28)



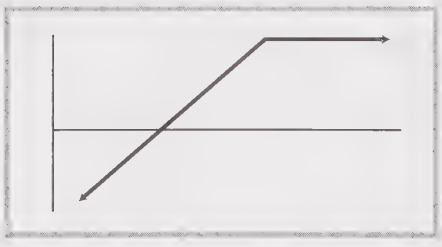
G. Call Purchase (Ch. 1)
(long stock/long put—Ch. 17)



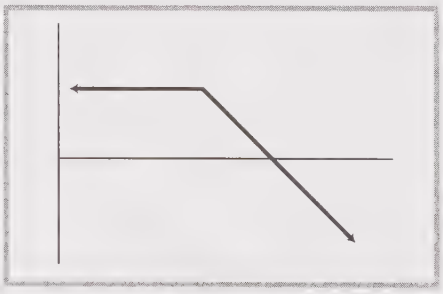
H. Put Purchase (Ch. 16)
(short stock/long call—Ch. 4)



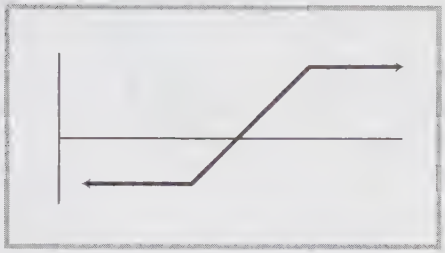
I. Covered Call Write (Ch. 2)
Naked Put Write (Ch. 19)



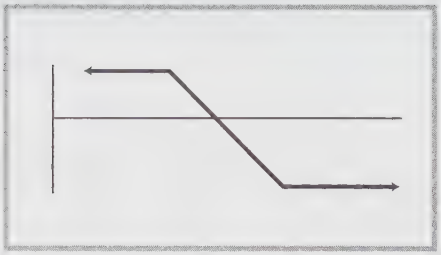
J. Naked Call Write (Ch. 5)
(short stock/short put—Ch. 19)



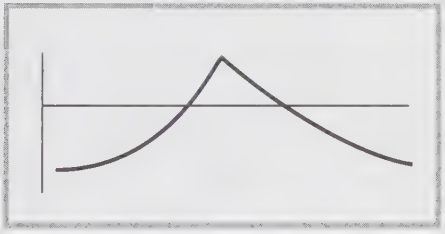
K. Bull Spread (Chs. 7 and 22)
(covered call write + long put out-of-the-money—Ch. 17)



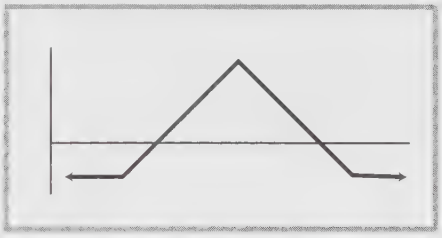
L. Bear Spread (Chs. 8 and 22)



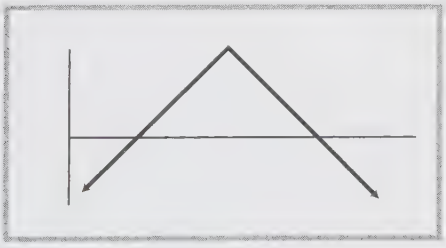
M. Calendar Spread (Chs. 9 and 22)



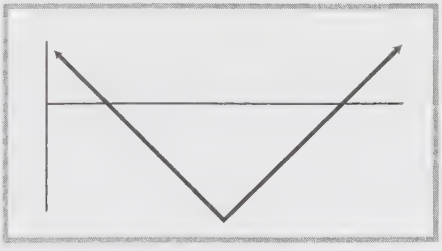
N. Butterfly Spread (Chs. 10 and 23)



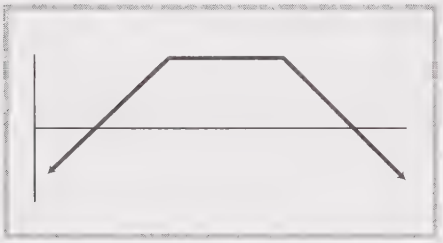
O. Naked Straddle Write (Ch. 20)
Ratio Call Write (long 100 stock, short 2 calls—Ch. 6)
Ratio Put Write (short 100 stock, short 2 puts—Ch. 19)



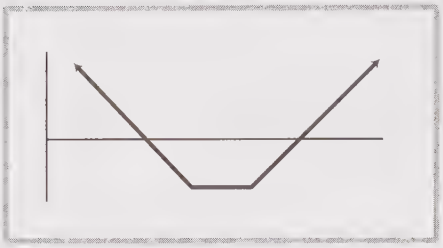
P. Straddle Purchase (Ch. 18)
Reverse hedge (short 100 stock, long 2 calls—Ch. 4)
Put Hedge (long 100 stock, long 2 puts—Ch. 18)



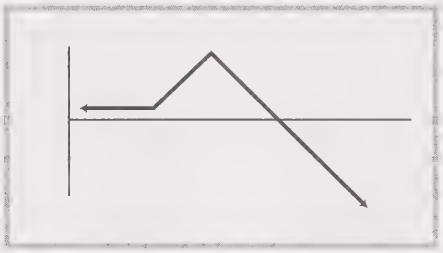
Q. Combination Sale (Ch. 20)
Variable Ratio Write (long 100 stock, short 2 calls with different strikes—Ch. 6)



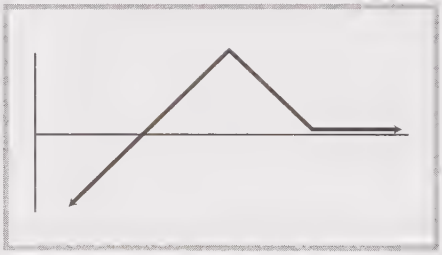
R. Combination Purchase (Ch. 18)
(short 100 stock, long 2 calls with different strikes—Ch. 4)



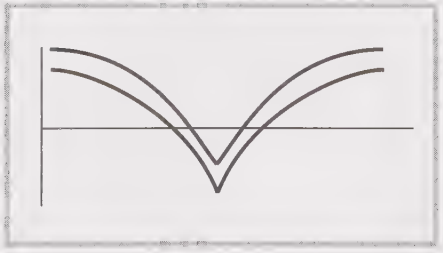
S. Ratio Call Spread (Ch. 11)



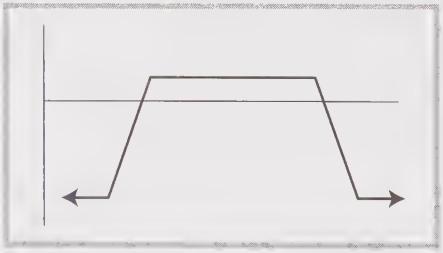
T. Ratio Put Spread (Ch. 24)



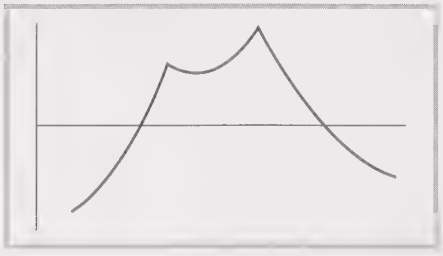
U. Reverse Calendar Spread (Ch. 13)



V. Iron Condor (Condor) (Ch. 23)



W. Dual Calendar Spread (Ch. 23)



APPENDIX E

Qualified Covered Calls

For tax purposes, there is no effect on the holding period of the stock when one writes an out-of-the-money call. However, when one writes an in-the-money call, he eliminates the holding period on his common stock unless the stock is already held long-term. The only exception to this is that if the covered call is deemed to be qualified, then the holding period is merely suspended rather than eliminated. Table E-1 shows the lowest striking price that may be written if the stock is in the price range shown.

TABLE E-1.
Qualified covered call strikes for stocks priced $25 or less, and Striking Prices are at intervals of $2.50.

Stock Price*	In-the-money Qualified Strike
Below 2.50	None
2.51 to 2.94	2.50
2.95 to 5.00	None
5.01 to 5.88	5.00
5.89 to 7.50	None
7.51 to 8.82	7.50
8.83 to 10.00	None
10.01 to 11.76	10
11.77 to 12.50	None
12.51 to 14.70	12.50
14.71 to 15.00	None
15.01 to 17.50	15
17.51 to 20.00	17.50
20.01 to 22.50	20
22.51 to 25.00	22.50

TABLE E-2.
Qualified covered call strikes for stocks priced $25 or less, and Striking Prices are at intervals of $1.00.

Stock Price*	In-the-money Qualified Strike
1.00 to 1.17	1.00
1.18 to 2.00	None
2.01 to 2.35	2.00
2.36 to 3.00	None
3.01 to 3.52	3.00
3.53 to 4.00	None
4.01 to 4.70	4.00
4.71 to 5.00	None
5.01 to 5.88	5.00
5.89 to 6.00	None
6.01 to 7.00	6.00
7.01 to 25.00	Closest in-the-money strike only

TABLE E-3.
Qualified covered call strikes for stocks priced higher than $25.

Stock Price*	31-90 days to expiration in-the-money Qualified Strike	More than 90 days to expiration Lowest in-the-money Qualified Strike
25.01 to 50	One strike below previous day's close	One strike below previous day's close
50.01 to 150	One strike below previous day's close	Two strikes below previous day's close as long as strike price is greater than 50 (But not more than $10 in-the-money)
More than 150	One strike below previous day's close	Two strikes below previous day's close

These rules are applicable, whether the striking price intervals are 1.00, 5.00, or 10.00, or anything else. In all the above tables, "stock price" is the previous day's closing price, *unless* the stock opens more than 110% higher the next day and the option is written on that gap day, in which case the opening price is the "stock price" for the purposes of the above tables.

APPENDIX F

Portfolio Margin

On April 2, 2007, the final phase of the Portfolio Margin requirements for listed stock and index options went into effect. Any account approved for naked option trading is eligible to be granted these reduced margin requirements. Assuming that one's broker has a real-time margining system, the minimum account size to be eligible for these requirements is $100,000; otherwise, it's $150,000, although any brokerage firm can impose higher minimums. Your broker can elect *not* to grant you these requirements (much as the broker doesn't have to grant one exchange minimum margin requirements).

Under Portfolio Margin, requirements no longer are computed based on arbitrary parameters, nor not even necessarily on the maximum risk of the strategy. Rather, the risk of an option or stock position will be determined by evaluating the position at 10 equally spaced intervals within a predetermined price range. The requirement will be the risk of the most adverse move. The essential data used in these calculations is supplied daily by the CBOE for each underlying entity.

The movements are fixed, and not really volatility-based. This is where Portfolio Margin can differ substantially from futures' SPAN Margin, which *is* more or less volatility-based. Hence, selling a naked S&P 500 futures put will still have a lower requirement than selling the same SPX put listed on the CBOE (same expiration month and striking price), for the likelihood of SPX dropping 8% immediately is minuscule, which SPAN accounts for but Portfolio Margin does not.

The ranges are defined as:

+/-15% for stocks, stock options, stock futures, and narrow-based index options.
+/-10% for broad-based indices that are *not* high capitalization.
+6%/-8% for high capitalization broad-based indices.
There is a minimum requirement of $37.50 per contract.

Thus a naked SPX put would be valued as if the underlying index had fallen 8%; a naked SPX call would use a movement of +6% in the index. In either case, this is a lower requirement than the normal customer naked margin requirement. Most positions involving naked options, especially ones such as reverse calendar spreads or reverse diagonal spreads, will have greatly reduced margin requirements under the new system.

Any truly hedged position (long stock, long put for example) will benefit greatly from this new computation, since the fact that risk is limited will be taken into account.

Even a covered call write will have greatly reduced requirements since one is only forced to margin a decline of 15% in the stock price rather than putting up 50% of the stock price.

Example: Suppose IBM is trading at 106 and one is considering a covered write on margin of the July 110 call, trading at 1.50.

Old margin requirement: 50% of stock price (53) less option price (1.5) = 51.50 points
($5,150 per 100 shares), commissions *not* included.

New margin requirement: 15% of stock price (15.90) less option price (1.50) = 14.40 points ($1,440 per 100 shares).

This is a large difference, and may just make covered writing on margin a viable strategy once again (the requirements for vertical spreads don't drop nearly as much, in general).

While actual Portfolio Margin requirements are dependent on the specific stock price and its relationship to the striking price, we can make some general observations about which strategies will benefit the most from this change in requirements:

Most reduced: protective put, collar, short calendar (or other strategies involving buying near-term options and selling longer-term ones).

Potentially large reduction: long strangle, long straddle, especially if long-term options are used (the stock price movement assumptions are so big that the straddles and strangles appear to have little or no risk—an erroneous assumption that benefits long options unfairly).

Reasonably sized reduction: covered call, short long-term strangle, short index straddle, index condor, index naked option, short index strangle.

Smallest reductions: vertical spreads, long calendars, synthetic long stock.

Any other strategies not mentioned (such as naked equity puts) likely will fall between "smallest reduction" and "reasonably sized reduction"; in other words, there will be *some* reduction, but not an extremely large one.

The lower minimum requirement (for customer margin, it is 10% of the underlying for naked options) will be beneficial as well. For example, if you sell a naked equity put

whose strike is more than 15% out of the money—or if you sell any naked equity put and then the underlying makes a move to the upside of more than 15%—your requirement could be very small.

An OCC portfolio margin calculator can be found at https://cpm.theocc.com/tims_online.htm.

The CBOE has several memos and examples regarding Portfolio Margin requirements and calculations on its website. Visit http://cboe.com/margin if you are interested.

SUMMARY

Portfolio Margin gives one more leverage. Leverage is not necessarily a good thing or a bad thing. Leverage is within the trader's control—one can allocate more than the minimum margin to any position and thereby reduce the leverage.

Glossary

American Exercise: a feature of an option that indicates it may be exercised at any time. Therefore, it is subject to early assignment.

Arbitrage: the process in which professional traders simultaneously buy and sell the same or equivalent securities for a riskless profit. *See also* Risk Arbitrage.

Assign: to designate an option writer for fulfillment of his obligation to sell stock (call option writer) or buy stock (put option writer). The writer receives an assignment notice from the Options Clearing Corporation. *See also* Early Exercise.

Assignment Notice: *see* Assign.

Automatic Exercise: a protection procedure whereby the Options Clearing Corporation attempts to protect the holder of an expiring in-the-money option by automatically exercising the option on behalf of the holder.

Average Down: to buy more of a security at a lower price, thereby reducing the holder's average cost. (Average Up: to buy more at a higher price.)

Backspread: *see* Reverse Strategy.

Backwardation: *see* Term Structure.

Bear Spread: an option strategy that makes its maximum profit when the underlying stock declines and has its maximum risk if the stock rises in price. The strategy can be implemented with either puts or calls. In either case, an option with a higher striking price is purchased and one with a lower striking price is sold, both options generally having the same expiration date. *See also* Bull Spread.

Bearish: an adjective describing an opinion or outlook that expects a decline in price, either by the general market or by an underlying stock, or both. *See also* Bullish.

Beta: a measure of how a stock's movement correlates to the movement of the entire stock market. The beta is not the same as volatility. *See also* Standard Deviation, Volatility.

Black Model: a model used to predict futures option prices; it is a modified version of the Black–Scholes model. *See* Model.

Board Broker: the exchange member in charge of keeping the book of public orders on exchanges utilizing the "market-maker" system, as opposed to the "specialist system," of executing orders. *See also* Market-Maker, Specialist.

Box Spread: a type of option arbitrage in which both a bull spread and a bear spread are established for a riskless profit. One spread is established using put options and the other is established using calls. The spreads may both be debit spreads (call bull spread vs. put bear spread), or both credit spreads (call bear spread vs. put bull spread).

Break-Even Point: the stock price (or prices) at which a particular strategy neither makes nor loses money. It generally pertains to the result at the expiration date of the options involved in the strategy. A "dynamic" break-even point is one that changes as time passes.

Broad-Based: generally referring to an index, it indicates that the index is composed of a sufficient number of stocks or of stocks in a variety of industry groups. Broad-based indices are subject to more favorable treatment for naked option writers. *See also* Narrow-Based.

Bull Spread: an option strategy that achieves its maximum potential if the underlying security rises far enough, and has its maximum risk if the security falls far enough. An option with a lower striking price is bought and one with a higher striking price is sold, both generally having the same expiration date. Either puts or calls may be used for the strategy. *See also* Bear Spread.

Bullish: describing an opinion or outlook in which one expects a rise in price, either by the general market or by an individual security. *See also* Bearish.

Butterfly Spread: an option strategy that has both limited risk and limited profit potential, constructed by combining a bull spread and a bear spread. Three striking prices are involved, with the lower two being utilized in the bull spread and the higher two in the bear spread. The strategy can be established with either puts or calls; there are four different ways of combining options to construct the same basic position.

Calendar Spread: an option strategy in which a short-term option is sold and a longer-term option is bought, both having the same striking price. Either puts or calls may be used. A dual calendar spread (calendar combination) is a strategy that consists of a call calendar spread and a put calendar spread at the same time. The striking prices of the calls would be higher than the striking prices of the puts. A calendar straddle consists of selling a near-term straddle and buying a longer-term straddle, both with the same striking price.

Calendar Straddle or Combination: *see* Calendar Spread.

Call: an option that gives the holder the right to buy the underlying security at a specified price for a certain, fixed period of time. *See also* Put.

Call Price: the price at which a bond or preferred stock may be called in by the issuing corporation; *see* Redemption Price.

Capitalization-Weighted Index: a stock index that is computed by adding the capitalizations (float times price) of each individual stock in the index, and then dividing by the divisor. The stocks with the largest market values have the heaviest weighting in the index. *See also* Divisor, Float, Price-Weighted Index.

Carrying Cost: the interest expense on a debit balance created by establishing a position.

Cash-Based: Referring to an option or future that is settled in cash when exercised or assigned. No physical entity, either stock or commodity, is received or delivered.

CBOE: the Chicago Board Options Exchange; the first national exchange to trade listed stock options.

Circuit Breaker: a limit applied to the trading of index futures contracts designed to keep the stock market from crashing.

Class: a term used to refer to all put and call contracts on the same underlying security.

Closing Transaction: a trade that reduces an investor's position. Closing buy transactions reduce short positions and closing sell transactions reduce long positions. *See also* Opening Transaction.

Collar: a strategy for protecting a stock holding, by buying an out-of-the-money put *and* selling an out-of-the-money call. A "no-cost" collar is one in which the price of the call is greater than or equal to the price of the put. When combined with the underlying, the strategy has both limited profit potential and limited loss potential.

Collateral: the loan value of marginable securities; generally used to finance the writing of uncovered options.

Combination: (1) any position involving both put and call options that is not a straddle. *See also* Straddle. (2) the name given to the trade at expiration whereby an arbitrageur rolls his options from one month to the next. For example, if he sells his synthetic long stock position in June and reestablishes it by buying a synthetic long stock position in September, the entire four-sided trade is called a combination by floor traders. *See also* Straddle, Strangle.

Commodities: *see* Futures Contract.

Condor: a spread with limited risk and limited reward, using four different striking prices but the same expiration date. The position can be constructed with all calls (Call Condor), all puts (Put Condor), or more commonly, *puts and calls*—all of which are out-of-the-money (Iron Condor). The maximum profit is realized between the two inner strikes, and the maximum risk is realized outside of the higher and lower strikes.

Contango: *see* Term Structure.

Contingent Order: an order whose execution or price is dependent on the alignment or price of the underlying security and/or its options. Most commonly it is an order to buy stock and sell a covered call option that is given as one order to the trading desk of a brokerage firm. Also called a "net order." This is a "not held" order. *See also* Market Not Held Order.

Conversion Arbitrage: a riskless transaction in which the arbitrageur buys the underlying security, buys a put, and sells a call. The options have the same terms. *See also* Reversal Arbitrage.

Conversion Ratio: *see* Convertible Security.

Converted Put: *see* Synthetic Put.

Convertible Security: a security that is convertible into another security. Generally, a convertible bond or convertible preferred stock is convertible into the underlying stock of the same corporation. The rate at which the shares of the bond or preferred stock are convertible into the common is called the conversion ratio.

Cover: to buy back as a closing transaction an option that was initially written, or stock that was initially sold short.

Covered: a written option is considered to be covered if the writer also has an opposing market position on a share-for-share basis in the underlying security. That is, a short

call is covered if the underlying stock is owned, and a short put is covered (for margin purposes) if the underlying stock is also short in the account. In addition, a short call is covered if the account is also long another call on the same security, with a striking price equal to or less than the striking price of the short call. A short put is covered if there is also a long put in the account with a striking price equal to or greater than the striking price of the short put.

Covered Call Write: a strategy in which one writes call options while simultaneously owning an equal number of shares of the underlying stock.

Covered Put Write: a strategy in which one sells put options and simultaneously is short an equal number of shares of the underlying security.

Covered Straddle Write: the term used to describe the strategy in which an investor owns the underlying security and also writes a straddle on that security. This is not really a covered position.

Credit: money received in an account. A credit transaction is one in which the net sale proceeds are larger than the net buy proceeds (cost), thereby bringing money into the account. *See also* Debit.

Cycle: the expiration dates applicable to various classes of options. There are three cycles: January/April/July/October, February/May/August/November, and March/June/September/December.

Debit: an expense, or money paid out from an account. A debit transaction is one in which the net cost is greater than the net sale proceeds. *See also* Credit.

Deliver: to take securities from an individual or firm and transfer them to another individual or firm. A call writer who is assigned must deliver stock to the call holder who exercised. A put holder who exercises must deliver stock to the put writer who is assigned.

Delivery: the process of satisfying an equity call assignment or an equity put exercise. In either case, stock is delivered. For futures, the process of transferring the physical commodity from the seller of the futures contract to the buyer. Equivalent delivery refers to a situation in which delivery may be made in any of various, similar entities that are equivalent to each other (for example, Treasury bonds with differing coupon rates).

Delta: (1) the amount by which an option's price will change for a corresponding 1-point change in price by the underlying entity. Call options have positive deltas, while put options have negative deltas. Technically, the delta is an instantaneous measure of the option's price change, so that the delta will be altered for even fractional changes by

the underlying entity. Consequently, the terms "up delta" and "down delta" may be applicable. They describe the option's change after a full 1-point change in price by the underlying security, either up or down. The "up delta" may be larger than the "down delta" for a call option, while the reverse is true for put options. (2) the percent probability of a call being in-the-money at expiration. *See also* Hedge Ratio.

Delta Neutral Spread: a ratio spread that is established as a neutral position by utilizing the deltas of the options involved. The neutral ratio is determined by dividing the delta of the purchased option by the delta of the written option. *See also* Delta, Ratio Spread.

Depository Trust Corporation (DTC): a corporation that will hold securities for member institutions. Generally used by option writers, the DTC facilitates and guarantees delivery of underlying securities when assignment is made against securities held in DTC.

Diagonal Spread: any spread in which the purchased options have a longer maturity than do the written options, as well as having different striking prices. Typical types of diagonal spreads are diagonal bull spreads, diagonal bear spreads, and diagonal butterfly spreads.

Discount: an option is trading at a discount if it is trading for less than its intrinsic value. A future is trading at a discount if it is trading at a price less than the cash price of its underlying index or commodity. *See also* Intrinsic Value, Parity.

Discount Arbitrage: a riskless arbitrage in which a discount option is purchased and an opposite position is taken in the underlying security. The arbitrageur may either buy a call at a discount and simultaneously sell the underlying security (basic call arbitrage), or buy a put at a discount and simultaneously buy the underlying security (basic put arbitrage). *See also* Discount.

Discretion: *See* Limit Order, Market Not Held Order.

Dividend Arbitrage: in the riskless sense, an arbitrage in which a put is purchased and so is the underlying stock. The put is purchased when it has time value premium less than the impending dividend payment by the underlying stock. The transaction is closed after the stock goes ex-dividend. Also used to denote a form of risk arbitrage in which a similar procedure is followed, except that the amount of the impending dividend is unknown and therefore risk is involved in the transaction. *See also* Ex-Dividend, Time Value Premium.

Divisor: a mathematical quantity used to compute an index. It is initially an arbitrary number that reduces the index value to a small, workable number. Thereafter the divisor is adjusted for stock splits (price-weighted index) or additional issues of stock (capitalization-weighted index).

Downside Protection: generally used in connection with covered call writing, this is the cushion against loss, in case of a price decline by the underlying security, that is afforded by the written call option. Alternatively, it may be expressed in terms of the distance the stock could fall before the total position becomes a loss (an amount equal to the option premium), or it can be expressed as percentage of the current stock price. *See also* Covered Call Write.

Dynamic: for option strategies, describing analyses made during the course of changing security prices and during the passage of time. This is as opposed to an analysis made at expiration of the options used in the strategy. A dynamic break-even point is one that changes as time passes. A dynamic follow-up action is one that will change as either the security price changes or the option price changes or time passes. *See also* Break-Even Point, Follow-Up Action.

Early Exercise (assignment): the exercise or assignment of an option contract before its expiration date.

Equity Option: an option that has common stock as its underlying security. *See also* Non-Equity Option.

Equity Requirement: a requirement that a minimum amount of equity must be present in a margin account. Normally, this requirement is $2,000, but some brokerage firms may impose higher equity requirements for uncovered option writing.

Equivalent Positions: positions that have similar profit potential, when measured in dollars, but are constructed with differing securities. Equivalent positions have the same profit graph. A covered call write is equivalent to an uncovered put write, for example. *See also* Profit Graph.

Escrow Receipt: a receipt issued by a bank in order to verify that a customer (who has written a call) in fact owns the stock and therefore the call is considered covered.

European Exercise: a feature of an option that stipulates that the option may be exercised only at its expiration. Therefore, there can be no early assignment with this type of option.

Exchange-Traded Fund (ETF) or Note (ETN): an entity whose shares are publicly traded on a listed exchange. The entity tracks an index, commodity, or basket of assets (which could be futures), akin to an index fund. Options are listed on some ETFs. *See also* Index Fund.

Ex-Dividend: the process whereby a stock's price is reduced when a dividend is paid. The ex-dividend date (ex-date) is the date on which the price reduction takes place. Investors

who own stock on the ex-date will receive the dividend, and those who are short stock must pay out the dividend.

Exercise: to invoke the right granted under the terms of a listed options contract. The holder is the one who exercises. Call holders exercise to buy the underlying security, while put holders exercise to sell the underlying security.

Exercise Limit: the limit on the number of contracts a holder can exercise in a fixed period of time. Set by the appropriate option exchange, it is designed to prevent an investor or group of investors from "cornering" the market in a stock.

Exercise Price: the price at which the option holder may buy or sell the underlying security, as defined in the terms of his option contract. It is the price at which the call holder may exercise to buy the underlying security or the put holder may exercise to sell the underlying security. For listed options, the exercise price is the same as the striking price. *See also* Exercise.

Expected Return: a rather complex mathematical analysis involving statistical distribution of stock prices, it is the return an investor might expect to make on an investment if he were to make exactly the same investment many times throughout history.

Expiration Date: the day on which an option contract becomes void. The expiration date for listed stock options is the Saturday after the third Friday of the expiration month. All holders of options must indicate their desire to exercise, if they wish to do so, by this date. *See also* Expiration Time.

Expiration Time: the time of day by which all exercise notices must be received on the expiration date. Technically, the expiration time is currently 5:00 p.m. on the expiration date, but public holders of option contracts must indicate their desire to exercise no later than 5:30 p.m. on the business day preceding the expiration date. The times are Eastern Time. *See also* Expiration Date.

Facilitation: the process of providing a market for a security. Normally, this refers to bids and offers made for large blocks of securities, such as those traded by institutions. Listed options may be used to offset part of the risk assumed by the trader who is facilitating the large block order. *See also* Hedge Ratio.

Fair Value: normally, a term used to describe the worth of an option or futures contract as determined by a mathematical model. Also sometimes used to indicate intrinsic value. *See also* Intrinsic Value, Model.

First Notice Day: the first day upon which the buyer of a futures contract can be called upon to take delivery. *See also* Notice Period.

Float: the number of shares outstanding of a particular common stock.

Floor Broker: a trader on the exchange floor who executes the orders of public customers or other investors who do not have physical access to the trading area.

Follow-Up Action: any trading in an option position after the position is established. Generally, to limit losses or to take profits.

FOREX Option: an option whose underlying entity is a physical foreign currency—yen, pound, Euro, etc. *See also* Physical Option.

Fundamental Analysis: a method of analyzing the prospects of a security by observing accepted accounting measures such as earnings, sales, assets, and so on. *See also* Technical Analysis.

Futures Contract: a standardized contract calling for the delivery of a specified quantity of a commodity at a specified date in the future.

Gamma: a measure of risk of an option that measures the amount by which the delta changes for a 1-point change in the stock price; alternatively, when referring to an entire option position, the amount of change of the delta of the entire position when the stock changes in price by one point.

Gamma of the Gamma: a mathematical measure of risk that measures by how much the gamma will change for a 1-point move in the stock price. *See* Gamma.

Good Until Canceled (GTC): a designation applied to some types of orders, meaning that the order remains in effect until it is either filled or canceled. *See also* Limit, Stop-Limit Order, Stop Order.

Hedge Ratio: the mathematical quantity that is equal to the delta of an option. It is useful in facilitation in that a theoretically riskless hedge can be established by taking offsetting positions in the underlying stock and its call options. *See also* Delta, Facilitation.

Historical Volatility: *See* Volatility.

Holder: the owner of a security.

Horizontal Spread: an option strategy in which the options have the same striking price, but different expiration dates.

Implied Volatility: a prediction of the volatility of the underlying stock, it is determined by using prices currently existing in the option market at the time, rather than using historical data on the price changes of the underlying stock. *See also* Volatility.

Incremental Return Concept: a strategy of covered call writing in which the investor is striving to earn an additional return from option writing against a stock position that he is targeted to sell, possibly at substantially higher prices.

Index: a compilation of the prices of several common entities into a single number. *See also* Capitalization-Weighted Index, Price-Weighted Index.

Index Arbitrage: a form of arbitraging index futures against stock. If futures are trading at prices significantly higher than fair value, the arbitrager sells futures and buys the exact stocks that make up the index being arbitraged; if futures are at a discount to fair value, the arbitrage entails buying futures and selling stocks.

Index Fund: a mutual fund whose components exactly match the stocks that make up a widely disseminated index, such as the S&P 500, Dow-Jones, Russell 2000, or NASDAQ-100. *See also* Exchange-Traded Fund.

Index Option: an option whose underlying entity is an index. Most index options are cash-based.

Institution: an organization, probably very large, engaged in investing in securities. Normally a bank, insurance company, or mutual fund.

Intermarket Spread: a futures spread in which futures contracts in one market are spread against futures contracts trading in another market. Examples: Currency spreads (yen vs. deutsche mark) or TED spread (T-Bills vs. Eurodollars).

In-the-Money: a term describing any option that has intrinsic value. A call option is in-the-money if the underlying security is higher than the striking price of the call. A put option is in-the-money if the security is below the striking price. *See also* Intrinsic Value, Out-of-the-Money.

Intramarket Spread: a futures spread in which futures contracts are spread against other futures contracts in the same market; example, buy May soybeans, sell March soybeans.

Intrinsic Value: the value of an option if it were to expire immediately with the underlying stock at its current price; the amount by which an option is in-the-money. For call options, this is the difference between the stock price and the striking price, if that difference is a positive number, or zero otherwise. For put options it is the difference between the striking price and the stock price, if that difference is positive, and zero otherwise. *See also* In-the-Money, Parity, Time Value Premium.

Last Trading Day: the third Friday of the expiration month. Options cease trading at 3:00 p.m. Eastern Time on the last trading day.

LEAPS: Long-term Equity Anticipation Securities. These are long-term listed options, currently having maturities as long as two and one-half years.

Leg: a risk-oriented method of establishing a two-sided position. Rather than entering into a simultaneous transaction to establish the position (a spread, for example), the trader first executes one side of the position, hoping to execute the other side at a later time and a better price. The risk materializes from the fact that a better price may never be available, and a worse price must eventually be accepted.

Letter of Guarantee: a letter from a bank to a brokerage firm stating that a customer (who has written a call option) does indeed own the underlying stock and the bank will guarantee delivery if the call is assigned. Thus, the call can be considered covered. Not all brokerage firms accept letters of guarantee.

Leverage: in investments, the attainment of greater percentage profit and risk potential. A call holder has leverage with respect to a stockholder—the former will have greater percentage profits and losses than the latter, for the same movement in the underlying stock.

Limit: *see* Trading Limit.

Limit Order: an order to buy or sell securities at a specified price (the limit). A limit order may also be placed "with discretion"—a fixed, usually small, amount such as ⅛ or ¼ of a point. In this case, the floor broker executing the order may use his discretion to buy or sell at ⅛ or ¼ of a point beyond the limit if he feels it is necessary to fill the order.

Listed Option: a put or call option that is traded on a national option exchange. Listed options have fixed striking prices and expiration dates. *See also* Over-the-Counter Option.

Local: a trader on a futures exchange who buys and sells for his own account and may fill public orders.

Lognormal Distribution: a statistical distribution that is often applied to the movement of the stock prices. It is a convenient and logical distribution because it implies that stock prices can theoretically rise forever but cannot fall below zero—a fact which is, of course, true.

Margin: to buy a security by borrowing funds from a brokerage house. The margin requirement—the maximum percentage of the investment that can be loaned by the broker firm—is set by the Federal Reserve Board.

Market Basket: a portfolio of common stocks whose performance is intended to simulate the performance of a specific index. *See* Index.

Market-Maker: an exchange member whose function is to aid in the making of a market, by making bids and offers for his account in the absence of public buy or sell orders. Several market-makers are normally assigned to a particular security. The market-maker system encompasses the market-makers and the board brokers. *See also* Board Broker, Specialist.

Market Not Held Order: also a market order, but the investor is allowing the floor broker who is executing the order to use his own discretion as to the exact timing of the execution. If the floor broker expects a decline in price and he is holding a "market not held" buy order, he may wait to buy, figuring that a better price will soon be available. There is no guarantee that a "market not held" order will be filled.

Market Order: an order to buy or sell securities at the current market. The order will be filled as long as there is a market for the security.

Married Put and Stock: a put and stock are considered to be married if they are bought on the same day, and the position is designated at that time as a hedge.

Model: a mathematical formula designed to price an option as a function of certain variables—generally stock price, striking price, volatility, time to expiration, dividends to be paid, and the current risk-free interest rate. The Black–Scholes model is one of the more widely used models.

Monte Carlo Simulation: a model designed to simulate a real-world event that cannot be approximated merely with a mathematical formula. The Monte Carlo simulation approximates such an event (the movement of the stock market, for example) and then it is simulated a great number of times. The net result of all the simulations is then interpreted as the result, generally expressed as a probability of occurrence. For example, a Monte Carlo simulation can be used to determine how stocks might behave under certain stock price distributions that are different from the lognormal distribution.

Naked Option: see Uncovered Option.

Narrow-Based: Generally referring to an index, it indicates that the index is composed of only a few stocks, generally in a specific industry group. Narrow-based indices are not subject to favorable treatment for naked option writers. *See also* Broad-Based.

"Net" Order: *see* Contingent Order.

Neutral: describing an opinion that is neither bearish nor bullish. Neutral option strategies are generally designed to perform best if there is little or no net change in the price of the underlying stock. *See also* Bearish, Bullish.

Non-Equity Option: an option whose underlying entity is not common stock; typically refers to options on physical commodities, but may also be extended to include index options.

"Not Held": *see* Market Not Held Order.

Notice Period: the time during which the buyer of a futures contract can be called upon to accept delivery. Typically, the 3 to 6 weeks preceding the expiration of the contract.

Open Interest: the net total of outstanding open contracts in a particular option series. An opening transaction increases the open interest, while any closing transaction reduces the open interest.

Opening Transaction: a trade that adds to the net position of an investor. An opening buy transaction adds more long securities to the account. An opening sell transaction adds more short securities. *See also* Closing Transaction.

Option Pricing Curve: a graphical representation of the projected price of an option at a fixed point in time. It reflects the amount of time value premium in the option for various stock prices, as well. The curve is generated by using a mathematical model. The delta (or hedge ratio) is the slope of a tangent line to the curve at a fixed stock price. *See also* Delta, Hedge Ratio, Model.

Options Clearing Corporation (OCC): the issuer of all listed option contracts that are trading on the national option exchanges.

Original Issue Discount (OID): the initial price of a zero-coupon bond. The owner owes taxes on the theoretical interest, or phantom income, generated by the annual appreciation of the bond toward maturity. In reality, no interest is paid by the zero-coupon bond, but the government is taxing the appreciation of the bond as if it were interest.

Out-of-the-Money: describing an option that has no intrinsic value. A call option is out-of-the-money if the stock is below the striking price of the call, while a put option is out-of-the-money if the stock is higher than the striking price of the put. *See also* In-the-Money, Intrinsic Value.

Over-the-Counter Option (OTC): an option traded over-the-counter, as opposed to a listed stock option. The OTC option has a direct link between buyer and seller, has no secondary market, and has no standardization of striking prices and expiration dates. *See also* Listed Option, Secondary Market.

Overvalued: describing a security trading at a higher price than it logically should. Normally associated with the results of option price predictions by mathematical models.

If an option is trading in the market for a higher price than the model indicates, the option is said to be overvalued. *See also* Fair Value, Undervalued.

Pairs Trading: a hedging technique in which one buys a particular stock and sells short another stock. The two stocks are theoretically linked in their price history, and the hedge is established when the historical relationship is out of line, in hopes that it will return to its former correlation.

Parity: describing an in-the-money option trading for its intrinsic value: that is, an option trading at parity with the underlying stock. Also used as a point of reference—an option is sometimes said to be trading at a half-point over parity or at a quarter-point under parity, for example. An option trading under parity is a discount option. *See also* Discount, Intrinsic Value.

PERCS: Preferred Equity Redemption Cumulative Stock. Issued by a corporation, this preferred stock pays a higher dividend than the common and has a price at which it can be called in for redemption by the issuing corporation. As such, it is really a covered call write, with the call premium being given to the holder in the form of increased dividends. *See* Call Price, Covered Call Write, Redemption Price.

Physical Option: an option whose underlying security is a physical commodity that is not stock or futures. The physical commodity itself, typically a currency or Treasury debt issue, underlies that option contract. *See also* Equity Option, Index Option.

Portfolio Insurance: a method of selling index futures or buying index put options to protect a portfolio of stocks.

Portfolio Margin: a reduced margin requirement that may be available, at the broker's discretion, to experienced, fairly large option accounts.

Portfolio Protection: a strategy for protecting a portfolio of stocks using listed derivatives. The most popular (although not necessarily the best) strategy is the purchase of broad-based index puts. A more modern approach is to purchase VIX calls as protection. *See also* Collar and Portfolio Insurance.

Position: as a noun, specific securities in an account or strategy. A covered call writing position might be long 1,000 XYZ and short 10 XYZ January 30 calls. As a verb, to facilitate; to buy or sell—generally a block of securities—thereby establishing a position. *See also* Facilitation, Strategy.

Position Limit: the maximum number of put or call contracts on the same side of the market that can be held in any one account or group of related accounts. Short puts and

long calls are on the same side of the market. Short calls and long puts are on the same side of the market.

Premium: for options, the total price of an option contract. The sum of the intrinsic value and the time value premium. For futures, the difference between the futures price and the cash price of the underlying index or commodity.

Present Worth: a mathematical computation that determines how much money would have to be invested today, at a specified rate, in order to produce a designated amount at some time in the future. For example, at 10% for one year, the present worth of $110 is $100.

Price-Weighted Index: a stock index that is computed by adding the prices of each stock in the index, and then dividing by the divisor. *See also* Capitalization-Weighted Index, Divisor.

Profit Graph: a graphical representation of the potential outcomes of a strategy. Dollars of profit or loss are graphed on the vertical axis, and various stock prices are graphed on the horizontal axis. Results may be depicted at any point in time, although the graph usually depicts the results at expiration of the options involved in the strategy.

Profit Range: the range within which a particular position makes a profit. Generally used in reference to strategies that have two break-even points—an upside break-even and a downside break-even. The price range between the two break-even points would be the profit range. *See also* Break-Even Point.

Profit Table: a table of results of a particular strategy at some point in time. This is usually a tabular compilation of the data drawn on a profit graph. *See also* Profit Graph.

Program Trading: the act of buying or selling a particular portfolio of stocks and hedging with an offsetting position in index futures. The portfolio of stocks may be small or large, but it is not the makeup of any stock index. *See also* Index Arbitrage.

Protected Strategy: a position that has limited risk. A protected short sale (short stock, long call) has limited risk, as does a protected straddle write (short straddle, long out-of-the-money combination). *See also* Combination, Straddle.

Public Book (of orders): the orders to buy or sell, entered by the public, that are away from the current market. The board broker or specialist keeps the public book. Market-makers on the CBOE can see the highest bid and lowest offer at any time. The specialist's book is closed (only he knows at what price and in what quantity the nearest public orders are). *See also* Board Broker, Market-Maker, Specialist.

Put: an option granting the holder the right to sell the underlying security at a certain price for a specified period of time. *See also* Call.

Put-Call Ratio: the ratio of put trading volume divided by call trading volume; sometimes calculated with open interest or total dollars instead of trading volume. Can be calculated daily, weekly, monthly, etc. Moving averages are often used to smooth out short-term, daily figures.

Quarterly Option: a listed option that expires at the end of a calendar quarter (March, June, September, or December). Currently, only a few large indices have listed quarterly options.

Ratio Calendar Combination: a strategy consisting of a simultaneous position of a ratio calendar spread using calls and a similar position using puts, where the striking price of the calls is greater than the striking price of the puts.

Ratio Calendar Spread: selling more near-term options than longer-term ones purchased, all with the same strike, either puts or calls.

Ratio Spread: constructed with either puts or calls, the strategy consists of buying a certain amount of options and then selling a larger quantity of out-of-the-money options.

Ratio Strategy: a strategy in which one has an unequal number of long securities and short securities. Normally, it implies a preponderance of short options over either long options or long stock.

Ratio Write: buying stock and selling a preponderance of calls against the stock that is owned. (Occasionally constructed as shorting stock and selling puts.)

Redemption Price: the price at which a structured product may be redeemed for cash. This is distinctly different from a "call price," which is the price at which an issue may be called away by the issuer. *See also* Call Price, PERCS, Structured Product.

Resistance: a term in technical analysis indicating a price area higher than the current stock price where an abundance of supply exists for the stock, and therefore the stock may have trouble rising through the price. *See also* Support.

Return (on investment): the percentage profit that one makes, or might make, on his investment.

Return if Exercised: the return that a covered call writer would make if the underlying stock were called away.

Return if Unchanged: the return that an investor would make on a particular position if the underlying stock were unchanged in price at the expiration of the options in the position.

Reversal Arbitrage: a riskless arbitrage that involves selling the stock short, writing a put, and buying a call. The options have the same terms. *See also* Conversion Arbitrage.

Reverse Hedge: a strategy in which one sells the underlying stock short and buys calls on more shares than he has sold short. This is also called a synthetic straddle and is an outmoded strategy for stocks that have listed puts trading. *See also* Ratio Write, Straddle.

Reverse Strategy: a general name that is given to strategies that are the opposite of better-known strategies. For example, a ratio spread consists of buying calls at a lower strike and selling more calls at a higher strike. A reverse ratio spread, also known as a backspread, consists of selling the calls at the lower strike and buying more calls at the higher strike. The results are obviously directly opposite to each other. *See also* Reverse Hedge Ratio Write, Reverse Hedge.

Rho: the measure of how much an option changes in price for an incremental move (generally 1%) in short-term interest rates; more significant for longer-term or in-the-money options.

Risk Arbitrage: a form of arbitrage that has some risk associated with it. Commonly refers to potential takeover situations in which the arbitrageur buys the stock of the company about to be taken over and sells the stock of the company that is effecting the takeover. *See also* Dividend Arbitrage.

Roll: a follow-up action in which the strategist closes options currently in the position and opens other options with different terms, on the same underlying stock. *See also* Roll Down, Roll Forward, Roll Up.

Roll Down: close out options at one strike and simultaneously open other options at a lower strike.

Roll Forward: close out options at a near-term expiration date and open options at a longer-term expiration date.

Roll Up: close out options at a lower strike and open options at a higher strike.

Rotation: a trading procedure on the open exchanges whereby bids and offers, but not necessarily trades, are made sequentially for each series of options on an underlying stock or index.

Secondary Market: any market in which securities can be readily bought and sold after their initial issuance. The national listed option exchanges provided, for the first time, a secondary market in stock options.