

Choose Your Friends, Choose Your Options

Editor's note: Cash market derivatives, including so-called exotic options, already dominate risk management in a number of markets. These traders use exchange-traded instruments to manage residual risks in their portfolio. Given the size of their trades and the correlation of many large fund positions, these activities can produce outsized effects in exchange-traded markets. This article is the second in a series explaining various types of cash-market derivatives.

Comedians could always get a cheap laugh with a rubber chicken. You can achieve local Seinfeld status by describing a chooser option to a carefully-selected circle of discerning friends: The right to decide, at a prespecified time, whether the option is a call or a put.

The giggling will stop after a few minutes. It will then become apparent that choosers aren't just the revenge of the indecisive, but rather instruments whose profiles conform far more closely to the commercial requirements of users than do those of plain vanilla options.

A Flip Of The Risk

Many transactions in your own life involve a reversal of risk from short to long, or vice-versa. Let's say it's mid-December, and you've set aside \$2,000 of your hard-earned cash to invest in an IRA for next year. You have your heart set on the Blastoff.com Fund, and you're watching in frustration each day as its price moves skyward. Your risk is short: You're hurt by higher prices and will benefit from lower prices. Now comes January 2, and you buy the fund. Now your risk is long for the entire time you own the fund: You'll profit from higher prices and will be hurt by lower prices.

Now adopt the role of a crude oil refiner. You buy a cargo of crude oil from the Persian Gulf with a two-month voyage time on a "floating" basis; the price will be decided at some point in the future, probably as close to physical delivery as possible. You are short during the whole period of floating prices, and you should be interested in call option protection against higher prices.

You may have given the seller price "triggers," or a set of rights to "fix" portions of the cargo at various times. These price triggers are equivalent to being short put options, as they are obligations – but not rights – to buy that portion of the cargo at a price to be determined by the seller. At some point, of course, you need to fix the price of the entire cargo. Once more than 50% of the cargo's price has been fixed, you are long crude oil, and you should be interested in put option protection against lower prices.

If you as the refiner buy a chooser option at the time the physical cargo is purchased on a floating basis, you will have the ability to convert it to a call option if the price remains floating or to a put option once the price is fixed. Of course, a chooser option can be employed for speculative purposes as well; at the end of a long consolidation, for example. How many times have each of us looked at a chart and said, "I'm not sure which way this is going to break out, but when it does..."

Chooser Types And Behavior

While exchange-traded options have a single time to maturity, or tenor, chooser options have at least two dates with destiny, a tenor to choice and a tenor for the option ultimately chosen. Many times, this final tenor and/or the strike of the chosen option will be different for the chosen call or put, in which case we will refer to the chooser as "complex." If the two chosen option tenors are identical, the chooser is "simple." Complex choosers tend to conform more to commercial requirements; a refiner may only need call option protection on the cargo until it arrives, but may want to put option to extend out in time if the cargo will be placed in storage.

The profit profile of a simple chooser between emplacement and the choice date is that of a long straddle with no time decay. Experienced traders know straddles – the purchase of both a call and a put at the same strike and maturity – are both expensive and subject to significant time decay (theta) and volatility exposure (vega). The chooser is exposed to neither factor up until the

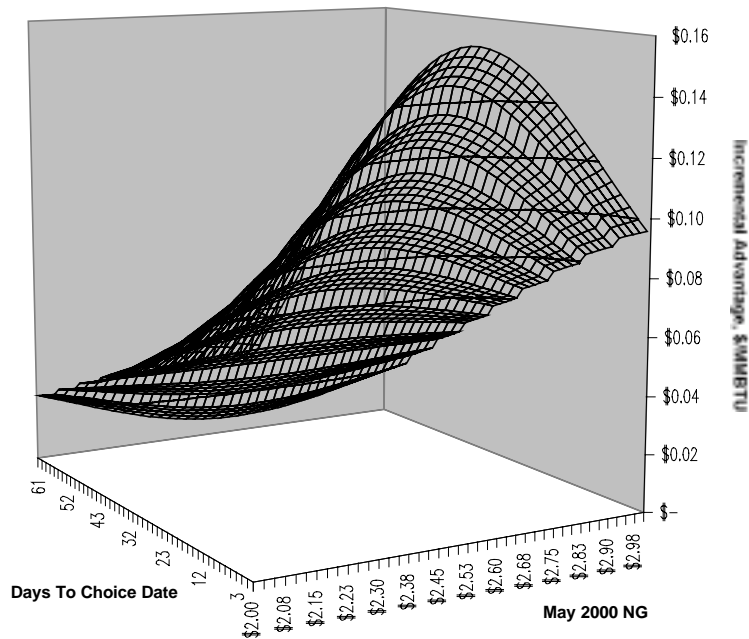
choice date, and that makes it a significantly cheaper way for speculators to play the same market view.

The table below evaluates both a simple May \$2.50 Natural Gas chooser against a May \$2.50 Black-Scholes American straddle as offered on the NYMEX on January 21, 2000. The fair-market value of the chooser is less than that of the straddle, while its gamma is greater, its vega less, and its theta is actually positive in recognition of its postponement of time decay.

Market Conditions		Comparison To Black-Scholes				
Value date:	21-Jan-00					
Spot price:	\$ 2.495		American	American		
Call strike	\$ 2.500		Chooser	Call	Put	Straddle
Put strike	\$ 2.500	Price	\$0.353	\$ 0.192	\$ 0.197	\$0.389
Choice date	24-Mar-00	Delta	0.062	0.528	-0.458	0.070
Call date	25-Apr-00	Gamma	1.759	0.791	0.791	1.581
Put date	25-Apr-00	Theta	0.002	-0.001	-0.001	-0.002
Volatility	38.7%	Vega	0.009	0.005	0.005	0.010
Rate	5.7%					

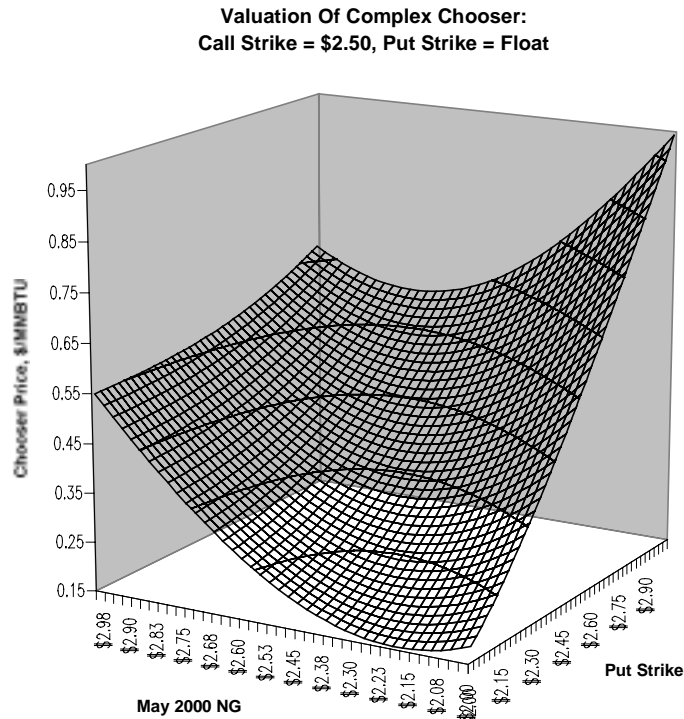
These advantages – which, to be fair, are offset by the greater liquidity of the NYMEX straddle – increase as expiration approaches, as shown below. The incremental advantage is greatest at the \$2.50 strike price; this maximizes the value of the choice itself. Since the value of the chooser cannot be less than the value of the straddle – at price extremes, it will approach the value of either the call at low prices or the put at high prices – the low bound of the chooser's incremental advantage to the NYMEX straddle is zero.

**Incremental Advantage:
Chooser Versus Straddle At Choice Date**



Adding Complexity

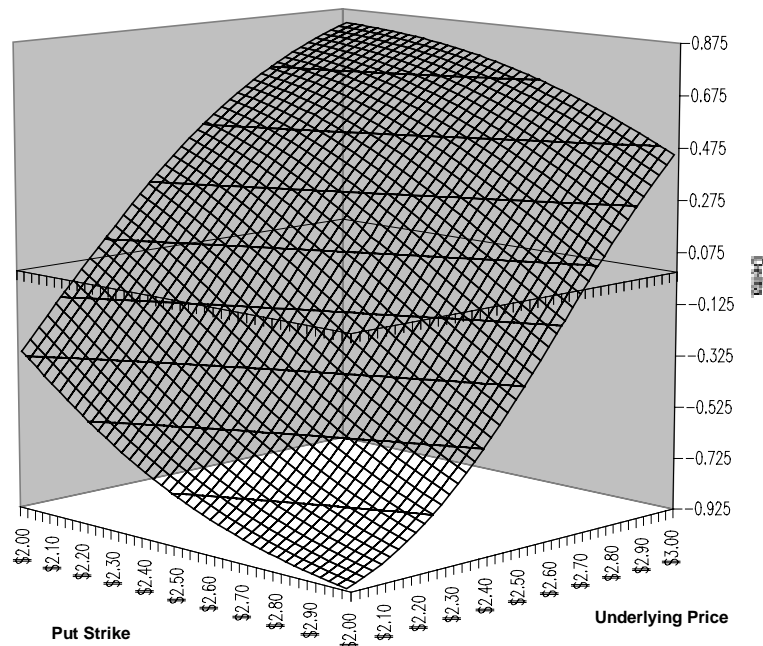
Once we move from the simple chooser to the complex chooser, we are faced with an infinite number of combinations to evaluate. Since choosers are not subject to time decay prior to the choice date, we will focus on a combination of price and strike, and since the behavior between the call strike and the put strike is symmetric, we can limit our investigation to just one kind of option. We can examine a case of both the call and the put having the same tenor, and while we will hold the call strike constant at \$2.50, we will float the put strike over a range of prices.



The value of the chooser at low prices for May natural gas will be determined by the option to choose the put, with the higher strike having the largest value. Once the price of natural gas rises over \$2.50, the value of the chooser will be determined by the option to choose the \$2.50 call, with the put strike becoming increasingly irrelevant as gas prices increase.

The delta of this chooser follows a predictable path. At a higher put strike / lower price combination, the chooser delta approaches its limit of -1 , equivalent to a short futures position. At the opposite corner, a low put strike / high price combination, the chooser delta moves toward its limit of 1 , equivalent to a long futures position. The predictability and well-behaved nature of a chooser's delta allows us to trade plain vanilla options against them to achieve a desired delta balance in an option portfolio.

Delta of Complex Chooser:
Call Strike = \$2.50, Put Strike = Float



The Path Less Traveled

One of the distinguishing facets of exotic options is “path dependency,” wherein a subsequent trading decision is determined in all or part by the path of price, volatility, intermonth spreads, or interest rates over time. Choosers, with their single choice as to option type, are one of the least subtle of this class of exotic options. We can extend the required decision of a chooser option to the optional decision of a compound option, where the underlying asset is another option; this will be our topic for next month. We can restrict the early exercise feature of an American option to a certain window in time; this has been dubbed the Bermuda option. This option, along with forward-start and pay-later options, will be addressed two months from now.

The object of all of these instruments is not to see how sophisticated they can be made – chances are we are already in a point of diminishing returns in financial engineering – but to address real commercial trading requirements. Ownership of a path-dependent option is evidence of good financial planning and sound risk management. While others may giggle, you’ll laugh all the way to the bank.

Chooser options are part of a class of derivatives that includes forward-start and pay-later options. A forward-start is the opportunity to decide at some time in the future how much to pay for an at-the-money option. A pay-later is an obligation to exercise when the underlying asset settles in the money, with payment to occur at that time. Neither type of option will be discussed in further detail in this series. We will turn our attention next month to compound options, which are options on other options: Their mention gets a few laughs as well.