

SMITH BARNEY, HARRIS UPHAM AND CO., INC.

In July 1977, Ed Burton, head of options trading for the investment firm of Smith Barney, Harris Upham, finally sat down to consider the impact of the introduction of put-options trading. Until recently, only trading of call options had been allowed, but beginning the following week, the Securities and Exchange Commission was to permit trading of put options on equities. The SEC had delayed the introduction of put options until convinced that the options markets could operate smoothly. After four years of experience with call options, it was now ready to introduce puts.

Burton believed this move would open up a whole new world of option-trading possibilities. He was specifically interested in how he might be able to use put-call parity to develop profitable trading opportunities. Because only call options had previously been traded, he had not been able to institute any trading strategies based on puts and calls. He believed, however, that especially in the early stages of the introduction of put options, considerable opportunities would be available for arbitrage. Therefore, he decided to devise strategies that would allow his trading operation to take full advantage of any market inefficiencies that might exist. By the middle of the next week, Burton wanted to present some simple and basic strategies to his traders that they could use to trade both the puts and calls.

Background

Before coming to Smith Barney, Ed Burton had been an economics professor at Cornell University. Early in his career at Cornell, he had been attracted by the option-pricing models developed by Fischer Black and Myron Scholes and had himself done some work on option pricing. Early in the 1970s, when options first began trading on the organized exchanges, people who had a strong understanding of option pricing were in strong demand. Burton came to Wall Street specifically to work on option pricing, but for most of his career, he had worked on trading strategies related to the pricing models he had developed. From his experience, he believed that the most fundamental relationship in option pricing was put-call parity.

Put-call parity was based on a simple concept: the assumption that two investments having the same payoff have, in an efficient market, the same cost. Ed Burton and others had

recognized that a position composed of buying a stock and a put on that stock had the same payoff as buying a call on that stock and buying a risk-free zero-coupon bond. If the payoffs were exactly the same, then the cost of taking either of the two positions should also be exactly the same. Burton often used the following example to make these points:

Suppose you have a stock currently selling for \$100 per share. In addition, assume a put and a call option are available, both with a maturity of three months and a stock price of \$105. Put-call parity implies that buying the stock and buying the put with the strike price of \$105 is exactly the same as buying the call with the strike price of \$105 and investing in a zero-coupon bond with a payoff of \$105 three months from today. Regardless of the stock price three months from now, the payoff from each position would be the same. For the stock-plus-put position, the payoff would be $\text{MAX}[\$105, \text{stock price}]$, where the minimum of \$105 would come from the exercise of the put if the stock price were to fall below \$105. For the call-plus-bond position, the payoff is also $\text{MAX}[\$105, \text{stock price}]$. In this case, the bond has a payoff of \$105 regardless of the stock price, and the call has a value of $\text{MAX}[0, \text{stock price} - \$105]$. Taken together, the payoff of the bond and the call is equivalent to the stock and the put.

Burton had spent considerable time convincing himself and others that the payoff from these two investments would be exactly the same and, therefore, that the cost of entering into either of these two positions would also be exactly the same. In this case, put-call parity could be expressed as

$$\text{Stock} \% \text{ Put} + \text{Call} \% \text{ Bond},$$

where the bond is a zero-coupon bond that pays off the exercise price of the put and call at a maturity corresponding to that of the options.

Now that Burton could put the theory of put-call parity into practice, he had two basic objectives for any strategy he chose. First was to exploit any opportunities where a trader could buy one side, sell the other side, and wind up with cash but no long-term obligation in either case. Second was, if possible, to lower the cost of borrowing for Smith Barney. Because investors who had margin accounts with Smith Barney had the shares placed in a street name, Smith Barney, as a firm, had access to these shares. In fact, Smith Barney used these shares when customers wanted to sell short. Smith Barney would lend the shares to the customer; the customer would then sell the shares, deposit the proceeds with Smith Barney, and at some later date, have to return the shares that were borrowed. Smith Barney, as a firm, also had these shares available to sell short against any position it might take in options. Thus Burton was considering using these shares in a program that would lower Smith Barney's cost of borrowing.

A final point worried Burton, however--dividends. He wondered how they might affect any of the strategies he could devise concerning put-call parity. Ideally, Ed Burton wanted two or three simple trading rules his traders could use to trade profitably against put-call parity. He

wanted the trading rules to be simple, but he also wanted to make sure that the traders understood all the risks involved.