Put-call parity allows a discussion of option pricing relationships without actually pricing an option. Please list all the possible pricing relationships you can recall.  Then please list puts and calls, and state if certain premiums are possible.

Here is a list of the pricing relationships:

The basic parity relationship for European options with the same strike price and time to expiration is

Call - put = PV(forward price - strike price)

The parity relationship for European options on stocks is

C ( K , T) = P (K , T) + [So - PVo. r (Div)] - Ke-rT

This can be rearranged to give the following equations

P (K , T) = C ( K , T) - [So - PVo. r (Div)] + Ke-rT

[So - PVo. r (Div)] = C ( K , T) - P (K , T) + Ke-rT

Ke-rT = P( K , T) -C (K , T) + [So - PVo. r (Div)]

These relationships may be used for synthetic creations of options, stocks and bonds.

Options on currencies

Xo is the current exchange rate denominated as $/€, r€ is the euro-denominated interest rate, and r is the dollar-denominated interest rate. The parity relationship for options to buy one euro by paying xo is then

C(K, T) - P (K, T) = Xoe-r€ T - K e - r T

Options on Bonds

C ( K , T) = P (K, T) + [Bo - PVo, T (Coupons) ] -PVo. T (K )

An example of arbitrage

Let’s say that we have we have the following information for a call and a put option on XYZ stock.

Exercise price: $100

Call option price: $7

Put option price: $5

Risk-free rate: 8%

Current market price of XYZ: $98

Time to maturity: 0.5 years

Let’s plug these values in the put-call parity equation:

7 + 100/(1.08)^0.5 = 5 + 99

103.225 = 104

As we can see, the right hand side is greater than the left hand side by (104 – 103.225) = 0.775

To make use of this arbitrage opportunity, we will buy the fiduciary call and sell the protective put.

Sell the protective put: We sell a put option and receive the $5 premium. We also short sell the ABC stock and receive $99. The total cash inflow is $104.

Buy fiduciary call: We payout a total of $103.225 for the fiduciary call option. That is we pay $7 as premium for the call option and invest 96.225 in a bond for 6 months at 8%.

Net cash inflow: Our net cash inflow is (104 – 103.225) = $0.775