

## Derivative Markets Module 2 (Condensed)

### Put-Call Parity

$$Call(K, T) - Put(K, T) = F_{0,T}^P - K v^T$$

Long K1-K2 **Bull Spread**: Long Call(K1,T) + Short Call(K2,T)

Long K1-K2 **Bear Spread**: Short Call(K1,T) + Long Call(K2,T)

Long K1-K2 **Collar**: Long Put(K1,T) + Short Call(K2,T)

Long **Straddle**: Long Call(K,T) + Long Put(K,T)

Long K1-K2 **Strangle**: Long Put(K1,T) + Long Call(K2,T)

Long K1-K2-K3 **Butterfly Spread**:

Short K2 Straddle + Long K1-K3 Strangle: (In terms of Calls and Puts, this is)  
[Short Call(K2,T) + Short Put(K2,T)] + [Long Put(K1,T) + Long Call(K3,T)]

A **box spread** is achieved by using options to create a synthetic long forward at one price and a synthetic short forward at another price.

$$[\text{Long Call}(K1, T) + \text{Short Put}(K1, T)] + [\text{Short Call}(K2, T) + \text{Long Put}(K2, T)]$$

A **ratio spread** is achieved by buying  $m$  calls at one strike price and selling  $n$  calls at a different strike price. We can choose  $m$  and  $n$  such that the initial cost of the ratio spread is 0, and when this is done we call it a **paylater** strategy.

$$2 \text{ Long Call}(K1, T) + 6 \text{ Short Call}(K2, T)$$

A **swap** is a contract that exchanges one set of payments for another set of payments such that the present values of the two sets of payments are equal. Commonly, a set of non-level payments is exchanged for a set of level payments, and in this case the amount of the level payments is called the **swap price**. A **pre-paid** swap would occur if the original set of payments is exchanged for a single payment at time 0.

An **interest rate swap** is an agreement in which the forward rates that are implied by the current term structure of interest rates are exchanged for a constant set of forward rates, called the **swap rate**, such that, per dollar invested at the beginning of each period, the two interest streams will produce the same (time 0) present value.