

## *Spread Trading Strategies: Calendar Spread strategy*

### **1 Introduction**

The *Calendar Spread* strategy is composed of two options of the same type (calls or puts), same strike price, but different expiry date. It differs from *Bull Call - Put Spread* or *Bear Call - Put Spread* strategy because this last strategy consists of options of the same type, same expiry date, but different strike price.

The *Diagonal Spread* strategy derives from the combination of options of the same type but with different strike prices and different expiry dates. In other words, this strategy is a mix between a simply *Calendar Spread* and *Bull - Bear Spread* strategy.



## 2 Template implementation

This section describes the constants, symbols and functions we used for the implementation of the template:

<i>Calendar Spread strategy on Fairmat</i>	
Number of options	N
Trade Date	Trading date (simulation start date)
Effective Date	Contract initial date
Strike Call / Put n.1 (K1)	K1
Strike Call / Put n.2 (K2) NB: (K2 ≥ K1)	K2
Expiry Date n.1 (T1)	T1
Expiry Date n.2 (T2) NB (T2 ≥ T1)	T2
Price Call Strike n.1 at Expiry Date n.1	c1
Price Call Strike n.2 at Expiry Date n.2	c2
Price Put Strike n.1 at Expiry Date n.1	p1
Price Put Strike n.2 at Expiry Date n.2	p2
Spot stock value	Sv
<b>Payoff</b>	
At 0	$p^{*}(+c1 - c2)$
At T1	$p^{*}(-\max(V1[T1] - K1; 0))$
At T2	$p^{*}(\max(V1[T2] - K2; 0))$
	p=1 long position on strategy
	p=-1 short position on strategy
<b>Conventions</b>	
Day Count Fraction	Act/Act (default <i>Fairmat</i> setting)

Table 2: Example of long - short position on Calendar Spread strategy with Calls - Puts options template described through *Fairmat* objects.

The variables loaded on “*Parameters & Functions*” can be classified into three categories:

1. *Contract specific* parameters:

- **N**: number of options;
- **Sv**: stock value at Trading Date (simulation start date);
- **p**: position. **p**=1 means a long position on a *Calendar Spread* strategy. **p**=-1 means a short position on a *Calendar Spread* strategy, both with call and put options;
- **T1**: expiry date (or Exercise Date) n.1;
- **T2**: expiry date (or Exercise Date) n.2. **T1** ≠ **T2** for *Calendar Spread* strategy;
- **K1**: options strike price n.1;
- **K2**: options strike price n.2. **K2** ≠ **K1** for *Diagonal Spread* strategy;
- **c1**: price of a call option with strike price **K1** at expiry date n.1 (**T1**);
- **c2**: price of a call option with strike price **K2** at expiry date n.2 (**T2**);
- **p1**: price of a put option with strike price **K1** at expiry date n.1 (**T1**);
- **p2**: price of a put option with strike price **K2** at expiry date n.2 (**T2**);

2. *Market* data:

- **zr**: zero rate (derived from *spot* rate);

3. *Auxiliary* and *Instrumental* variables: the following elements are other objects and functions that aren’t input – they are derived from or depend on *Contract specific* data or *Market* data inputs – but they are useful for use within “*Option Map*” environment.

- **Call11**: payoff of a call option with strike price **K1** at expiry date n.1 (**T1**);
- **Call12**: payoff of a call option with strike price **K2** at expiry date n.1 (**T2**);
- **Put1**: payoff of a put option with strike price **K1** at expiry date n.1 (**T1**);
- **Put2**: payoff of a put option with strike price **K2** at expiry date n.1 (**T2**);

**Note:** the default setting of this template refers to a *Calendar Spread* strategy on a stock, but “*Parameters & Functions*” contains a second strike price, as well, in order to cover a *Diagonal Spread* strategy, too.