Template | fairmat

Interest Rate *Floor CMS - CMS spread*

1 Introduction

An Interest Rate *Floor* is (generally) an O.T.C. derivative contract based on a series of European interest rate put options. This interest rate sensitive instrument protects the floor buyer from losses resulting from a decrease in interest rates. The floor seller compensates the buyer with a payoff when the reference interest rate falls below the floor strike rate. In details the underlying of this Interest Rate *Floor* is a CMS rate or the differential between two CMS rates.

Interest Rate *Floor CMS - CMS spread*	
Principal	100 *bullet*
Trade Date	23/03/2010
Effective Date	25/03/2010
Termination Date	25/03/2015
Payment Frequency	*Quarterly*
Payoff	
From Effective to Termination date	max[1% - (*30-Year CMS - 2-Year CMS*); 0%]
Conventions	
Reset dates	*Advance*, 2 days before
Day Count Fraction	*Act*/360 (*Adjusted*)

Table 1: *Example of an Interest Rate Floor CMS - CMS spread template.*

2   Template implementation

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

Interest Rate *Floor CMS - CMS spread* on *Fairmat*	
Principal	**N**
Trade Date	Trading date (simulation start date)
Effective Date	Contract initial date
Termination Date	**Pd**[end]
Payment Frequency	**matRate**-Year (exchange per year)
Payoff	
From 1 to $length$(@**Pd**)	max[**levStk*stk** - (**levCMS1*matCMS1**-Year CMS - **levCMS2*matCMS2**-Year CMS) ; 0%]
Conventions	
Reset dates	**Advance**, **rday** days before
Day Count Fraction	**Dur**

Table 2: *Example of Interest Rate Floor CMS - CMS spread template described through Fairmat objects.*

The variables of Interest Rate *Floor CMS - CMS spread* template loaded on "*Parameters & Functions*" can be classified into three categories:

N	pdu
100.00	25/06/2010
100.00	25/09/2010
100.00	25/12/2010
100.00	25/03/2011
100.00	25/06/2011
100.00	25/09/2011
100.00	25/12/2011
100.00	25/03/2012
100.00	25/06/2012
100.00	25/09/2012
100.00	25/12/2012
100.00	25/03/2013
100.00	25/06/2013
100.00	25/09/2013
100.00	25/12/2013
100.00	25/03/2014
100.00	25/06/2014
100.00	25/09/2014
100.00	25/12/2014
100.00	25/03/2015

Table 3: *Input (Vectors) of Interest Rate Floor CMS - CMS spread template loaded on "Parameters & Functions" Fairmat enviroment.*

1. *Contract specific* parameters:

   - **N**: principal, bullet or amortizing (see Table 3);
   - **pdu**: payment date (unadjusted), used for auxiliary item **Pd** (see Table 3);

- **matCMS1**: time horizon of CMS rate n.1, expressed in years;
- **levCMS1**: leverage on CMS rate n.1;
- **tenor1**: payment frequency of CMS rate n.1 (exchange per year);
- **matCMS2**: time horizon of CMS rate n.2, expressed in years. It is used only with *CMS spread* floor;
- **levCMS2**: leverage on CMS rate n.2. It is used only with *CMS spread* floor;
- **tenor2**: payment frequency of CMS rate n.2 (exchange per year). It is used only with *CMS spread* floor;
- **levStk**: leverage on strike (**stk**) rate;
- **stk**: strike rate;
- **rday**: number of days before *Initial* (*Advance*) / *Ending* (*Arrears*) period;

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*" enviroment.

- **FloorletSpread**: analytic function of a *floorlet* payoff with underlying an unique CMS rate[1] or a differential CMS rates;
- **Pd**: date's vector transformation from **pdu** vector (see Table 3);
- **Rd**: date's vector transformation from **pdu** vector (see Table 3) using **rday** constant;
- **Dur**: date's vector difference transformation from **pdu** vector (see Table 3);

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[1]In this case matCMS2, tenor2 and levCMS2 aren't used.