

Interest Rate *Floor*

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.

Interest Rate <i>Floor</i>	
Principal	100 <i>bullet</i>
Trade Date	23/03/2010
Effective Date	25/03/2010
Termination Date	25/03/2015
Payment Frequency	<i>Quarterly</i>
Payoff	
From Effective to Termination date	$\max(2\% - EUR\ Euribor\ 3M; 0\%)$
Conventions	
Reset dates	<i>Advance, 2 days before</i>
Day Count Fraction	<i>Act/360 (Adjusted)</i>

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

2 Template implementation

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

Interest Rate <i>Floor</i> on <i>Fairmat</i>	
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 <i>length</i> (@ Pd)	$\max(\text{levStk} * \text{stk} - \text{levRate} * \text{matRate} \text{-Year Euribor} ; 0\%)$
Conventions	
Reset dates	Advance , rdays days before
Day Count Fraction	Dur

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

The variables of Interest Rate *Floor* 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 Cap template loaded on “Parameters & Functions” Fairmat environment.*

1. *Contract specific* parameters:

- **N**: principal, bullet or amortizing (see Table 3);
- **pdu**: payment date (unadjusted), used for auxiliary item **Pd** (see Table 3);
- **matRate**: time horizon of Floating rate expressed into year fraction;

- **levRate**: leverage on Floating rate;
- **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*” environment.

- **Floorlet**: analytic function of a *floorlet* payoff;
- **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);