

## IRS *Collar*

*IRS Collar* is characterized, for *Party A*, by an outflow indexed to a short term rate (e.g. *EUR 3-Months Euribor*) plus a fixed component (or spread) whose fluctuation is bounded within a minimum and maximum rate. Note that lower / higher rate could differs from floor / cap strike rate more than fixed spread component. In this case payoff is not linear due to the presence of digital (or binary) options.

*IRS Collar Template*

Up-front  
 Principal (Party A) —  
 Principal (Party B) 3,488,669.03 *bullet*  
 Trade Date 30/12/2005  
 Effective Date 31/12/2005  
 Termination Date 31/12/2018  
 Payment Frequency (Party A) *Semi – annual*  
 Payment Frequency (Party B) *Semi – annual*

	Party A	Party B
From the Effective Date to 31/12/08	If $threshold1 < EUR\ Euribor\ 6M \leq threshold1$ If $EUR\ Euribor\ 6M \leq threshold2$ If $EUR\ Euribor\ 6M > threshold2$	$Rate1$ $EUR\ Euribor\ 6M + 1\%$ $Rate2$
From 30/06/09 to 31/12/2013	If $threshold1 < EUR\ Euribor\ 6M \leq threshold1$ If $EUR\ Euribor\ 6M \leq threshold2$ If $EUR\ Euribor\ 6M > threshold2$	$Rate1$ $EUR\ Euribor\ 6M + 0.9\%$ $Rate2$
From 30/06/14 to Termination Date	If $threshold1 < EUR\ Euribor\ 6M \leq threshold1$ If $EUR\ Euribor\ 6M \leq threshold2$ If $EUR\ Euribor\ 6M > threshold2$	$Rate1$ $EUR\ Euribor\ 6M + 0.3\%$ $Rate2$

	Party A	Party B
Reset Dates	<i>Advance, first day</i>	—
Day Count Fraction	<i>Act/360 (Adjusted)</i>	<i>30/360 (Unadjusted)</i>

Table 1: Example of IRS Collar template.



Notional Amortizing	threshold1	threshold2	Rate1	Rate2	Rate3
4,806,894.22	3.30%	7.00%	4.800%	8.000%	5.000%
4,719,924.28	3.30%	7.00%	4.800%	8.000%	5.010%
4,630,805.97	3.30%	7.00%	4.800%	8.000%	5.000%
4,539,483.99	3.30%	7.00%	4.800%	8.000%	5.000%
4,445,901.53	3.30%	7.00%	4.800%	8.000%	5.000%
4,350,000.26	3.30%	7.00%	4.800%	8.000%	4.990%
4,251,720.31	3.60%	7.10%	4.800%	8.000%	4.980%
4,151,204.92	3.60%	7.10%	4.800%	8.000%	4.990%
4,048,191.31	3.60%	7.10%	4.800%	8.000%	4.980%
3,942,614.76	3.60%	7.10%	4.800%	8.000%	4.970%
3,834,408.80	3.60%	7.10%	4.800%	8.000%	4.960%
3,723,505.17	3.60%	7.10%	4.800%	8.000%	4.960%
3,609,833.77	3.60%	7.10%	4.800%	8.000%	4.950%
3,494,732.66	3.60%	7.10%	4.800%	8.000%	4.950%
3,376,763.66	3.60%	7.10%	4.800%	8.000%	4.940%
3,255,852.30	3.60%	7.10%	4.800%	8.000%	4.930%
3,131,922.12	4.20%	7.70%	4.700%	8.000%	4.920%
3,004,894.57	4.20%	7.70%	4.700%	8.000%	4.900%
2,874,689.01	4.20%	7.70%	4.700%	8.000%	4.890%
2,743,447.33	4.20%	7.70%	4.700%	8.000%	4.880%
2,608,932.00	4.20%	7.70%	4.700%	8.000%	4.860%
2,484,819.15	4.20%	7.70%	4.700%	8.000%	4.850%
2,357,707.51	4.20%	7.70%	4.700%	8.000%	4.840%
2,230,433.28	4.20%	7.70%	4.700%	8.000%	4.830%
2,100,102.56	4.20%	7.70%	4.700%	8.000%	4.820%
1,986,609.28	4.20%	7.70%	4.700%	8.000%	4.830%

Table 2: *Input (Vectors) of IRS Collar template.*

*IRS Collar Template on Fairmat*

Up-front				
Principal (Party A)				
Principal (Party B)				
Trade Date				
Effective Date				
Termination Date				
Payment Frequency (Party A)				
Payment Frequency (Party B)				
<b>Exchange</b>		<b>Party A</b>	<b>Party B</b>	<b>Party B</b>
from 1 to <b>TD</b> ( <b>matEur</b> -Year periods)				
	If <b>Low</b>	If <b>matEur</b> -Year Euribor $\leq$ <b>Low</b>	<b>Low</b> + <b>Sprlow</b>	<b>FixB</b>
		If <b>matEur</b> -Year Euribor $\leq$ <b>High</b>	<b>matEur</b> -Year Euribor + <b>Sprmed</b>	
		If <b>matEur</b> -Year Euribor $>$ <b>High</b>	<b>High</b> + <b>Sprhigh</b>	
<b>Convention</b>		<b>Party A</b>	<b>Party B</b>	<b>Party B</b>
Reset Dates				
Day Count Fraction		<b>Advance</b> , <b>RdayA</b> days before		<b>DurB</b>
		<b>DurA</b>		

Table 3: Example of IRS Collar template described through Fairmat objects.

Na	Nb	pduA	pduB	Low	High	Sprlow	Sprmed	Sprhigh	FixB
4,806,894.22	3,488,669.03	30/06/2006	30/06/2006	3.30%	7.00%	1.500%	1.00%	1.00%	5.00%
4,719,924.28	3,488,669.03	31/12/2006	31/12/2006	3.30%	7.00%	1.500%	1.00%	1.00%	5.01%
4,630,805.97	3,488,669.03	30/06/2007	30/06/2007	3.30%	7.00%	1.500%	1.00%	1.00%	5.00%
4,539,483.99	3,488,669.03	31/12/2007	31/12/2007	3.30%	7.00%	1.500%	1.00%	1.00%	5.00%
4,445,901.53	3,488,669.03	30/06/2008	30/06/2008	3.30%	7.00%	1.500%	1.00%	1.00%	5.00%
4,350,000.26	3,488,669.03	31/12/2008	31/12/2008	3.30%	7.00%	1.500%	1.00%	1.00%	4.99%
4,251,720.31	3,488,669.03	30/06/2009	30/06/2009	3.60%	7.10%	1.200%	0.90%	0.90%	4.98%
4,151,204.92	3,488,669.03	31/12/2009	31/12/2009	3.60%	7.10%	1.200%	0.90%	0.90%	4.99%
4,048,191.31	3,488,669.03	30/06/2010	30/06/2010	3.60%	7.10%	1.200%	0.90%	0.90%	4.98%
3,942,614.76	3,488,669.03	31/12/2010	31/12/2010	3.60%	7.10%	1.200%	0.90%	0.90%	4.97%
3,834,408.80	3,488,669.03	30/06/2011	30/06/2011	3.60%	7.10%	1.200%	0.90%	0.90%	4.96%
3,723,505.17	3,488,669.03	31/12/2011	31/12/2011	3.60%	7.10%	1.200%	0.90%	0.90%	4.96%
3,609,833.77	3,488,669.03	30/06/2012	30/06/2012	3.60%	7.10%	1.200%	0.90%	0.90%	4.95%
3,494,732.66	3,488,669.03	31/12/2012	31/12/2012	3.60%	7.10%	1.200%	0.90%	0.90%	4.95%
3,376,763.66	3,488,669.03	30/06/2013	30/06/2013	3.60%	7.10%	1.200%	0.90%	0.90%	4.94%
3,255,852.30	3,488,669.03	31/12/2013	31/12/2013	3.60%	7.10%	1.200%	0.90%	0.90%	4.93%
3,131,922.12	3,488,669.03	30/06/2014	30/06/2014	4.20%	7.70%	0.500%	0.30%	0.30%	4.92%
3,004,894.57	3,488,669.03	31/12/2014	31/12/2014	4.20%	7.70%	0.500%	0.30%	0.30%	4.90%
2,874,689.01	3,488,669.03	30/06/2015	30/06/2015	4.20%	7.70%	0.500%	0.30%	0.30%	4.89%
2,743,447.33	3,488,669.03	31/12/2015	31/12/2015	4.20%	7.70%	0.500%	0.30%	0.30%	4.88%
2,608,932.00	3,488,669.03	30/06/2016	30/06/2016	4.20%	7.70%	0.500%	0.30%	0.30%	4.86%
2,484,819.15	3,488,669.03	31/12/2016	31/12/2016	4.20%	7.70%	0.500%	0.30%	0.30%	4.85%
2,357,707.51	3,488,669.03	30/06/2017	30/06/2017	4.20%	7.70%	0.500%	0.30%	0.30%	4.84%
2,230,433.28	3,488,669.03	31/12/2017	31/12/2017	4.20%	7.70%	0.500%	0.30%	0.30%	4.83%
2,100,102.56	3,488,669.03	30/06/2018	30/06/2018	4.20%	7.70%	0.500%	0.30%	0.30%	4.82%
1,986,609.28	3,488,669.03	31/12/2018	31/12/2018	4.20%	7.70%	0.500%	0.30%	0.30%	4.83%

Table 4: *Input (Vectors) of IRS Collar template loaded on “Parameters & Functions” Fairmat environment.*

Other input that user finds into “Parameters & Functions” Fairmat environment are:

- **RdayA**: (Party A) number of days before *Initial (Advance) / Ending (Ar-rears)* period;
- **matEur**: time horizon of Euribor rate expressed into year fraction;
- **f1**: analytic function expression of (*Party A*) payoff, from 1 to **TD**;
- **PdA**: date’s vector transformation from **pduA** vector (see Table 4);
- **PdB**: date’s vector transformation from **pduB** vector (see Table 4);
- **RdA**: (Party A) date’s vector transformation from **pduA** vector (see Table 4) using **RdayA** constant;
- **DurA**: date’s vector difference transformation from **pduA** vector (see Table 4);
- **DurB**: date’s vector difference transformation from **pduB** vector (see Table 4);
- **zr**: zero rate (derived from *spot* rate);
- **TD**: number of last payment date (e.g. quarterly payments with time horizon 5 year equals to 20 payments,  $1/0.25 * 5$ ).