NOTICE

LCH.CLEARNET

NOTICE >> LCH.Clearnet SA Corporate Reference No.: 2012-010

RISK NOTICE

From: Risk Department
Date: 13th February 2012

Markets affected: Transactions on Debt securities executed on trading and matching platforms and on MTS Italy market

NOTICE ON MARGIN PARAMETERS AND CALCULATION METHODOLOGY

In accordance with Instruction IV.2-5, LCH.Clearnet SA indicates below the different steps of calculation of the Variation Margins and the parameters used in the calculation of the Initial Margin. The algorithm used for the duration calculation is explained.
Specific parameters for Forward Repo Margin and Intra-Day margin call are included in this Notice.

This notice informs on the introduction of a Variation Margin Adjustment detailed in section 3.
The goal of the VM adjustment is to adjust the existing Variation margin in order to take into account the remaining period of term repos, between calculation date and the maturity of the transaction.

The launch of this algorithm shall come into effect on **24th February 2012 close of day positions** with impact on the margin call on the morning of **27th February 2012.**

1. Initial Margins parameters

1.1. BANDS AND DEPOSIT FACTOR APPLIED ON DURATION CLASSES

The bonds are allocated in duration classes upon the Government issuer and upon their duration.
Duration is used as the criteria of the bonds' risk, and therefore triggers the parameters applied for deposit calculations (i.e for Initial Margins).

There are 3 bond classes, one for each debt:

- Italian segment debt: the duration classes are numbered from 001 to 012 for Italian bonds**;** class 12 is used only for all Italian Treasury bonds indexed on inflation rate, called BTPi's.
- French segment debt: the duration classes are numbered from 101 to 113 for French bonds; French OATi's bonds are assigned to duration classes 101 to 111 and 113 upon their duration
- Spanish segment debt: the duration classes are numbered from 201 to 211 for Spanish bonds

* Effective date: 24th February 2012

Deposit factors applied on “Italy segment” positions:

Classes : Italy	Duration	Duration Class Parameter	Trend
001	(0-1 month]	0,70%	⇔
002	(1-3 month]	1,10%	⇔
003	(3-9 month]	3,10%	⇔
004	(0,75-1,25 year]	3,60%	⇔
005	(1,25-2 year]	3,80%	⇔
006	(2-3,25 year]	4,70%	⇔
007	(3,25-4,75 year]	6,60%	⇔
008	(4,75-7 year]	8,10%	⇔
009	(7-10 year]	8,30%	⇔
010	(10-15 year]	11,45%	⇔
011	(15-30 year]	18,00%	⇔
012	Italian inflation indexed Bonds (BTPi’s)	15,85%	⇔

* Effective date: 24th February 2012

Deposit factors applied on "France segment" positions:

Classes : France	Duration	Duration Class Parameter	Trend
101	(0-1 month]	0,45%	⇔
102	(1-3 month]	0,60%	⇔
103	(3-9 month]	1,35%	⇔
104	(0,75-1,25 year]	1,50%	⇔
105	(1,25-2 year]	1,70%	⇔
106	(2-3,25 year]	2,15%	⇔
107	(3,25-4,75 year]	3,00%	⇔
108	(4,75-7 year]	3,65%	⇔
109	(7-10 year]	4,60%	⇔
110	(10-15 year]	5,20%	⇔
111	(15-30 year]	11,05%	⇔
113	(30-50 year]	16,10%	⇔

Deposit factors applied on "Spain segment" positions:

Classes : Spain	Duration	Duration Class Parameter	Trend
201	(0-1 month]	0,69%	⇔
202	(1-3 month]	0,95%	⇔
203	(3-9 month]	1,90%	⇔
204	(0,75-1,25 year]	2,20%	⇔
205	(1,25-2 year]	2,40%	⇔
206	(2-3,25 year]	3,22%	⇔
207	(3,25-4,75 year]	4,40%	⇔
208	(4,75-7 year]	6,15%	⇔
209	(7-10 year]	8,53%	⇔
210	(10-15 year]	9,61%	⇔
211	(15-30 year]	17,50%	⇔

1.2. PRIORITIES AND CROSS POSITION CREDITS

Minoration coefficients are applied:

1) on positions (buy versus sell positions) in intra and inter classes upon defined priorities as displayed in the following tables (cf Margining methodology).

2) on positions (buy versus sell positions) between each debt couple: in inter classes upon defined priorities as displayed in the following tables.

"Italy segment": minoration coefficients applied on positions on debt securities issued by Italy:

Class	001	002	003	004	005	006	007	008	009	010	011	012
001 Priority	10% 0001											
002 Priority		25% 0002	20% 0012									
003 Priority		20% 0012	40% 0003	15% 0013								
004 Priority			15% 0013	70% 0004	45% 0014	30% 0015						
005 Priority				45% 0014	70% 0005	50% 0016	35% 0017					
006 Priority				30% 0015	50% 0016	75% 0006	55% 0018	45% 0019	30% 0020			
007 Priority					35% 0017	55% 0018	70% 0007	60% 0021	45% 0022	35% 0023		
008 Priority						45% 0019	60% 0021	75% 0008	60% 0024	45% 0025		
009 Priority						30% 0020	45% 0022	60% 0024	75% 0009	60% 0026	30% 0027	
010 Priority							35% 0023	45% 0025	60% 0026	75% 0010	50% 0028	
011 Priority									30% 0027	50% 0028	60% 0011	
012 Priority												20% 0029

“France segment”: minoration coefficients applied on positions on debt securities issued by France

Class	101	102	103	104	105	106	107	108	109	110	111	113
101 Priority	30% 0101											
102 Priority		30% 0102	0% 0112									
103 Priority		0% 0112	45% 0103	45% 0113								
104 Priority			45% 0113	85% 0104	65% 0114	55% 0115						
105 Priority				65% 0114	75% 0105	70% 0116	60% 0117	45% 0118				
106 Priority				55% 0115	70% 0116	80% 0106	65% 0119	50% 0120	40% 0121			
107 Priority					60% 0117	65% 0119	80% 0107	65% 0122	50% 0123	45% 0124		
108 Priority					45% 0118	50% 0120	65% 0122	80% 0108	65% 0125	55% 0126	50% 0127	
109 Priority						40% 0121	50% 0123	65% 0125	80% 0109	70% 0128	60% 0129	
110 Priority							45% 0124	55% 0126	70% 0128	80% 0110	70% 0130	
111 Priority								50% 0127	60% 0129	70% 0130	85% 0111	
113 Priority												85% 0131

“Spain segment”: minoration coefficients applied on positions on debt securities issued by Spain

Class	201	202	203	204	205	206	207	208	209	210	211
201 Priority	25% 0201										
202 Priority		25% 0202	0% 0212								
203 Priority		0% 0212	40% 0203	0% 0213							
204 Priority			0% 0213	65% 0204	0% 0214	0% 0215					
205 Priority				0% 0214	55% 0205	55% 0216	50% 0217	40% 0218			
206 Priority				0% 0215	55% 0216	75% 0206	65% 0219	50% 0220	45% 0221		
207 Priority					50% 0217	65% 0219	80% 0207	70% 0222	55% 0223	45% 0224	
208 Priority					40% 0218	50% 0220	70% 0222	80% 0208	65% 0225	55% 0226	40% 0227
209 Priority						45% 0221	55% 0223	65% 0225	80% 0209	70% 0228	55% 0229
210 Priority							45% 0224	55% 0226	70% 0228	80% 0210	65% 0230
211 Priority								40% 0227	55% 0229	65% 0230	85% 0211

* Effective date: 24th February 2012

Italy-France: applied on the residual positions in spread between “Italy” and “France”

Class	101	102	103	104	105	106	107	108	109	110	111	113
001 Priority	30% 1001											
002 Priority		35% 1002	35% 1012									
003 Priority		30% 1013	30% 1003	30% 1014								
004 Priority			30% 1015	30% 1004	30% 1016	0% 1018						
005 Priority				30% 1017	30% 1005	25% 1020	0% 1022					
006 Priority				0% 1019	30% 1021	30% 1006	25% 1024	0% 1026	0% 1028			
007 Priority					0% 1023	30% 1025	30% 1007	25% 1030	0% 1032	0% 1034		
008 Priority						0% 1027	30% 1031	25% 1008	25% 1036	0% 1038		
009 Priority						0% 1029	0% 1033	30% 1037	30% 1009	25% 1040	0% 1042	
010 Priority							0% 1035	0% 1039	30% 1041	25% 1010	25% 1044	
011 Priority									0% 1043	30% 1045	30% 1011	
012 Priority												

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Italy-Spain: applied on the residual positions in spread between “Italy” and “Spain”

Class	201	202	203	204	205	206	207	208	209	210	211
001 Priority	30% 2001										
002 Priority		25% 2002	20% 2012								
003 Priority		25% 2013	20% 2003	20% 2014							
004 Priority			20% 2015	20% 2004	45% 2016	0% 2018					
005 Priority				15% 2017	50% 2005	70% 2020	0% 2022				
006 Priority				0% 2019	50% 2021	70% 2006	70% 2024	0% 2026	0% 2028		
007 Priority					0% 2023	65% 2025	70% 2007	70% 2030	0% 2032	0% 2034	
008 Priority						0% 2027	65% 2031	70% 2008	70% 2036	0% 2038	
009 Priority						0% 2029	0% 2033	65% 2037	70% 2009	65% 2040	0% 2042
010 Priority							0% 2035	0% 2039	55% 2041	60% 2010	60% 2044
011 Priority									0% 2043	50% 2045	65% 2011
012 Priority											

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France-Spain: applied on the residual positions in spread between “France” and “Spain”

Class	201	202	203	204	205	206	207	208	209	210	211
101 Priority	30% 2101										
102 Priority		25% 2102	25% 2112								
103 Priority		25% 2113	20% 2103	20% 2114							
104 Priority			20% 2115	20% 2104	20% 2116	0% 2118					
105 Priority				20% 2117	25% 2105	30% 2120	0% 2122				
106 Priority				0% 2119	25% 2121	30% 2106	30% 2124	0% 2126	0% 2128		
107 Priority					0% 2123	25% 2125	25% 2107	30% 2130	0% 2132	0% 2134	
108 Priority						0% 2127	25% 2131	25% 2108	25% 2136	0% 2138	
109 Priority						0% 2129	0% 2133	25% 2137	25% 2109	30% 2140	0% 2142
110 Priority							0% 2135	0% 2139	20% 2141	25% 2110	30% 2144
111 Priority									0% 2143	25% 2145	30% 2111
113 Priority											

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2. Variation margins

The calculation is based on the following steps:

STEP 1 RETRIEVAL OF MARKET PRICES

The determination of "Settlement Price" is defined in a dedicated Notice.

Timing for price capture:
- French bonds:
  - BTAN: available between 5.00 pm and 5.30 pm
  - BTF and OAT: available after 5.30 pm
- Italian bonds: after 4.30 pm
- Spanish bonds: after 4.30 pm

STEP 2 SELECTION OF TRADE LEGS TO BE INCLUDED IN CALCULATION OF VARIATION MARGINS

The following Trade Legs will be included in calculation of Variation Margins:

a) For sell and purchase Transactions, all unsettled Trade Legs at the Margin calculation date
b) For Repos, all Trade Legs whose Initial leg has already been settled and its Return leg is still unsettled at the Margin calculation date.

STEP 3 CALCULATION OF THE ACCRUED COUPON

The time interval to be considered in coupon accrual calculation changes according to the type of contract:

a) For sell and purchase Transactions, the accrued coupon is calculated starting from the maturity date of the previous coupon until the settlement date; it is not necessary to update such calculation during the three days between the trade date and the settlement date given that the accrual can be considered irrelevant for margining purposes;

b) For Repos Transactions, the accrued coupon is calculated starting from the maturity date of the previous coupon until the first working day after margin calculation; in this case the accrual is considered relevant for margining purposes

The accrued coupon will be calculated according to the "Euroland" market convention : Act/Act.

STEP 4 DETERMINATION OF *REPO INTEREST*

Case 1 : Fixed or floating rate Repo :

Interests on repo transactions (*RI*) are calculated starting from the repo commencement date until the first working day after margin calculation; therefore:

$$RI = \frac{t \times TA \times RR}{36000}$$

where *t* is number of days, *TA* is the traded amount and *RR* is the repo rate.

The repo interest amount is rounded to the nearest integer Euro.

Case 2 : All-in deal interests

Interests on repo transactions (*RI*) are calculated starting from the repo commencement date until the first working day after margin calculation; therefore:

$$RI = \frac{t \times TI}{RD}$$

where *t* is number of days, *TI* is the traded interest amount of the Repo and *RD* is the repo duration (in days).

The repo interest amount is rounded to the nearest integer Euro.

STEP 5 DETERMINATION OF THE TRANSACTION REVALUATED AMOUNT

The Transaction Revaluated Amount (*TRA*) is equal to the nominal value (*NV*) of the traded security, revaluated at the current market price (*P*) as per step1 above, plus the accrued coupon (*AC*) calculated as per step 3 above. Therefore:

$$TRA = (NV/100) \times (P + AC)$$

In case of bond indexed on inflation rate, the Transaction Revaluated Amount (*TRA*) is equal to the nominal value (*NV*) of the traded security, revaluated at the current market price (*P*) as per step 1 above, plus the accrued coupon (*AC*) calculated as per step 3 above. This amount is multiplied by the inflation index $Iidx$ available for the intended settlement date.

Therefore:

$$TRA = (NV/100) \times (P + AC) \times Iidx$$

STEP 6 CALCULATION OF VARIATION MARGIN PER TRADE LEGS

The Variation Margin is equal to the difference between the Trade Legs revaluated amount as per step 5 above and the traded amount; for Repo Trade Legs , the repo interest amount as per step 4 above must also be taken into consideration.

Therefore:

a) Sell and purchase Trade Leg :

Variation Margin= (TRA – Traded amount) × position sign[1];

b) Repos Trade Leg:

Variation Margin= (TRA – Traded amount – RI) × position sign[2].

STEP 7 CALCULATION OF THE OVERALL VARIATION MARGIN

The Overall Variation Margin is equal to the sum of all the Variation Margins calculated for each Trade Legs.

Overall Variation Margins = Σ Variation Margins per each Trade Legs.

A negative Variation Margin is a debit for the member towards the CCP; a positive Variation Margin is a theoretical credit for the member.

[1] For sell and purchase Transactions, the buyer of securities has a long position (+1) and the seller of securities has a short position (-1)

[2] For a Repo, the buyer of Securities has a short position (-1) and the seller of Securities has a long position (+1)

3. Variation Margin Adjustment

The goal of the VM adjustment is to adjust the existing Variation Margin in order to take into account the remaining period of term repos, between calculation date and the maturity of the transaction.

The calculation follows the 8 steps described below.

Step 1. Retrieval of Market Data

The following market data are obtained through a data provider:

- The daily Eonia rate is retrieved at 6:45 pm (Paris Time) from the European Central Bank.
- Euribor rates are obtained at 11:30 am (Paris Time) from the European Banking Federation.
- Eurepo rates are obtained at 11:30 am (Paris Time) from the European Banking Federation.
- Eonia swap rates are obtained at 11:30 am (Paris Time) from the European Banking Federation.

The rates used in the calculation are obtained by linear interpolation between the two closest knot points of the reference yield curve.

Step 2. Selection of the transactions to be included in the Adjusted Variation Margin calculation:

The following positions are evaluated (as in the case of the calculation of Variation Margins):

a) For cash transactions, all unsettled transactions at margin calculation date;

b) For repo transactions, all transactions whose 1st leg has already been settled and its 2nd leg is still unsettled.

Step 3. Determination of the Adjusted Repo Interest

The adjusted repo interest of the transaction (RI') between the repo starting date and the maturity date is given by the following formula:

$$RI' = \frac{T \times TA \times RR}{360 \times 100}$$

with

T	the number of days between the starting date and the maturity date of the repo transaction,
TA	the initial traded amount,
$\frac{RR}{100}$	the repo rate of the transaction in %.

- Indexed rate repos

In this case, RR is given by the following formula:

$$\frac{RR}{100} = \frac{(t+1) \times e_a}{T} + \frac{(T-t-1) \times e_s}{T} + s$$

With

t the number of calendar days between the starting date and calculation date

$t \in [\![0; T-1]\!]$, (this statement applies to the entire document)

e_a the average of the Eonia rate (in %) between the starting date and one business day after the calculation date

e_s the Eonia Swap Rate (in %) between one business day after the calculation date and maturity date.

s the negociated spread of the repo (in %)

Step 4. Determination of the Mark-To-Market Repo Rate

$\frac{RR'}{100}$ the Mark-To-Market repo rate (in %) between the calculation date plus one business day and the maturity date

RR' is estimated by linear interpolation of the European Banking Federation Eurepo rates.

Step 5. Determination of the Adjusted Transaction Revaluated Amount

The Transaction Revaluated Amount (*TRA*) is given by the following formula:

$$TRA = \frac{NV}{100} \times (P + AC)$$

With

NV the nominal value of the traded security

P the current market price

AC the accrued coupon

In case of inflation indexed bonds, the Transaction Revaluated Amount (*TRA*) is equal to the nominal value (*NV*) of the traded security, revaluated at the current market price (*P*), plus the accrued coupon (*AC*). This amount is multiplied by the relevant inflation index *Iidx*

Therefore:

$$TRA = \frac{NV}{100} \times (P + AC) \times Iidx$$

The Adjusted Transaction Revaluated Amount (TRA') is given by the following formula for both cash and repo transactions:

$$TRA' = TRA \times \left(1 + \frac{RR' \times (T - t - 1)}{360 \times 100}\right)$$

Step 6. Calculation of Adjusted Variation Margin per transaction

The Adjusted Variation Margin is given by the following formula.

a) For cash transactions:

$$Adjusted\ Variation\ Margin = \frac{TRA' - TA}{1 + \frac{r \times (T - t - 1)}{360}} \times sgn$$

b) For repo transactions: Both Classic repos and Buy-Sell Back are considered separately.

Classic Repo Transactions:

$$Adjusted\ Variation\ Margin = \frac{TRA' - TA - RI'}{1 + \frac{r \times (T - t - 1)}{360}} \times sgn$$

With

r the Euribor rate (in %) between the calculation date and the maturity date of the repo.

sgn +1 for the holder of a repo (sell bond spot and buy it back forward),
-1 for the holder of a reverse repo (buy bond spot and sell it back forward).

Buy-Sell Back Repo Transactions:

By definition of a Buy-Sell Back transaction, a corrective term should be considered in the valuation of the second cash leg. This additional term corresponds to the sum of all the coupons capitalization between the coupon payment dates and the maturity date of the transaction.

Regarding the initial transaction, this corrective term (C_0) will consider all the coupons that will drop between the first working day after the settlement date of the first leg and the maturity of the transaction. These coupons are capitalized using the initial repo rate RR.

$$C_0 = \sum_i C_i \times \left(1 + \frac{RR \times (T - t_i)}{360 \times 100}\right)$$

With $(T - t_i)$ the number of days from the coupon payment date to the settlement date of the second leg.
C_i the i[th] coupon

Regarding the revaluated transaction, this corrective term (C') will consider only the upcoming coupons that will drop between the first working day after the calculation date and the maturity of the transaction. These coupons are capitalized using the Mark-To-Market repo rate RR'.

$$C' = \sum_j C_j \times \left(1 + \frac{RR' \times \left(T - t_j\right)}{360 \times 100}\right)$$

With $\left(T - t_j\right)$ the number of days from the coupon payment date to the settlement date of the second leg.
C_j the j[th] coupon

As a result:

$$Adjusted\ Variation\ Margin = \frac{TRA' - C' - (TA - C_0 + RI')}{1 + \frac{r \times (T - t - 1)}{360}} \times sgn$$

With
r the Euribor rate (in %) between the calculation date and the maturity date of the repo.
sgn +1 for the holder of a repo (sell bond spot and buy it back forward),
-1 for the holder of a reverse repo (buy bond spot and sell it back forward).

Step 7. Calculation of the Overall Adjusted Variation Margin

The Overall Adjusted Variation Margin is equal to the sum of the Adjusted Variation Margins on all transactions.

Step 8. Variation Margin Adjustment

The Variation Margin adjustment is the difference between the Adjusted Variation margin and the Variation Margin defined above:

$$Variation\ Margin\ adjustment = Adjusted\ Variation\ margin - Variation\ margin$$

4. Forward Repo Margin (FRM)

a) For Forward Repo with an indexed rate:

FRM = TA * (EONIA + Risk Parameter + Spread) * NbOfDay / 36000

b) For Forward Repo with a fixed rate:
If the Return Leg is before or equal D+4 (calculation date + four open days):

FRM = TA * Fixed Rate * NbOfDay / 36000

Else

FRM = TA * (Fixed Rate + Risk Parameter) * NbOfDay / 36000

With:

- D is the day of the margin calculation
- TA is the Traded amount of the Transaction
- EONIA is the official EONIA rate of D-1
- Spread is spread of the Transaction for a Repo with an indexed rate
- Fixed Rate is the rate of the Transaction for a Repo with an fixed rate
- NbOfDay is the number of calendar days between the Initial Leg and the Return Leg
- Risk Parameter is defined in the following table in function of the number of days between D and the day of the Return Leg:

Band (calendar days)	Risk Parameter
[0-7 days[	1.05
[7-31 days[	1.16
[31-91 days[	2.47
[91-182 days[	3.82
[182-364 days[	4.27
>= 364 days	4.30

The FRM is calculated transaction by transaction.

The final amount of forward repo margin (FRM) is equal to the sum of the absolute values of all the forward repo margins transaction by transaction, after netting by ISIN code.

5. Intra-day Margin Call parameter

The session of Intraday Margin Call begins at 1.45 pm.

The threshold amount is set at 0 euros.

6. Duration Calculation

6.1. ZERO COUPON BONDS

The duration is, by definition, equal to the maturity of the bond.

6.2. FIXED COUPON BONDS

The duration or Macaulay's Duration (*D*) of a fixed coupon bond producing *n* cash flows f_1, f_2,…f_5,…f_n at the maturities t_1, t_2,…t_5,…t_n which may be reinvested at rate *i*, is represented by the following analytic expression:

$$D = \frac{\sum_{s=1}^{n} t_s f_s (1+i)^{-t_s}}{\sum_{s=1}^{n} f_s (1+i)^{-t_s}} \times \frac{1}{v}$$

Description of variable:

- ⇒ ***n*** is the number of the future cash flows (coupons and principal);
- ⇒ ***v*** is the annual frequency of coupons payments (i.e. 2 if semiannual);
- ⇒ $\boldsymbol{t_s}$ is the number of periods (or fraction) between the calculation date and the maturity day of $\boldsymbol{f_s}$;
- ⇒ $\boldsymbol{f_s}$ is the amount of the periodical cash flow; it is equal to the coupon times the nominal value of the security, the last cash flow includes the principal, which is equal to the nominal value of the bond itself;
- ⇒ ***i*** is the internal rate of return (IRR); the IRR is the discount rate that when applied to futures cash flows produces the current market value of the bond. It is obtained by solving iteratively the following equation:

$$\sum_{s=1}^{n} f_s (1+i)^{-t_s} = P$$

where ***P*** is the current market value of the bond (dirty price).

All figures are rounded to the fourth decimal.

6.3. FLOATING RATE BONDS

Macaulay's duration is not applicable to floating rate bonds. The price volatility of these bonds is very low; in fact – since future coupons are adjusted to market rates – in case of a drop (raise) of interest rates, gains (losses) on the capital account are offset by losses (gains) on the interest receivable account.

However such realignment of the bond price to market rates conditions is not perfect valid for CCTs, since the accruing coupon is predetermined and its non-variability has necessarily an impact on the price of the bond (so-called "rigidity effect"), that will therefore show small variations in case of variations of interest rates[1].

The duration model for floating rate bonds are often too complex to be a viable solution for operational applications. The duration of floating rate bonds can be reasonably assumed equal to the time to maturity of the accruing coupon (t_1)[2]

6.4. BONDS INDEXED ON INFLATION RATE

BTPi's : Italian treasury inflation indexed bonds are considered into the class 012 whatever their duration.

OATi's : French treasury inflation indexed bonds are assigned to duration classes 101 to 111 and 113 upon their duration.

[1] The coupon is equal to 6 months gross RendiBot determined at the last auction before the beginning of the coupon accrual period plus a spread (s, equal to 0.30 or 0.15).

[2] The complete modified duration formula (which takes into consideration also the spread *s*) for a floating rate bonds is the so-called Yawitz's Duration:

$$D_f = \frac{t_1}{(1+i)} + \frac{(s-fm)[1-(1+i)^{-n}]}{P \times i} \times \left[\frac{1+i}{i} - \frac{n}{(1+i)^n - 1} \right]$$

This formula takes into consideration both the already mentioned "rigidity effect" and the "rental effect" that is given by the difference between the spread (s) and the financial margin (fm), which represents the additional cost (compared to market yields) applied by the market to floating rates bonds.

* Effective date: 24th February 2012

7. Annex

Below is an example of the duration at September 28, 2011 (settlement date September 29, 2011) of a BTAN (Isin FR0117836652), final maturity January 15, 2015, annual coupon of 2.5%, and annual payout.

	date	*t (in period)*	Cash flows (f)	Discounted cash flows $f(1+i)^{-t}$	t x discounted cash flows $f(1+i)^{-t}$
Calcuation	**28 Sept 2011**				
First coupon	**15 Jan 2012**	**0.2957**	**2.5**	**2.4900**	**0.7363**
Second coupon	**15 Jan 2013**	**1.2977**	**2.5**	**2.4565**	**3.1879**
Third coupon	**15 Jan 2014**	**2.2971**	**2.5**	**2.4236**	**5.5671**
Forth coupon + principal	**15 Jan 2015**	**3.2964**	**102.5**	**98.0328**	**323.1525**
			Sum	**105.4029**	**332.6438**
			Duration	**3.1559**	

The duration is equal to 3.1559 years (3 years and 57 days); the discount rate (IRR) is equal to 1.361% per annum; it has been derived from the bond dirty market price (105.4053) on September 28, 2011.

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