

## Shanghai Clearing House Rules on Interest Calculation for Centralized Clearing of RMB Interest Rate Swap

Shanghai Clearing House (hereinafter referred to as “SHCH”) hereby issues the *Interest Calculation Rules for Centralized Clearing of RMB Interest Rate Swap (Trial)* with the aim of specifying the calculation procedure and details and standardizing the interest calculation methods for Interest Rate Swap(IRS) products that taking part in RMB IRS centralized clearing. SHCH will update the Rules from time to time in line with the future development of IRS products and market needs.

### I. Clearing Products

SHCH currently only accepts the fixed versus floating interest rate swap products. Product elements are prescribed as follows:

**Table 1: Elements of Centrally Cleared IRS Products**

Basic Elements			
<b>The Party Paying Fixed Interest Rate</b>	Clearing Member	<b>The Party Paying Floating Interest Rate</b>	Clearing Member
<b>Trade Date</b>	No restriction	<b>Notional Principal (RMB10,000)</b>	Minimum trade size of RMB100,000, minimum increment of RMB100,000
<b>Value Date</b>	No restriction	<b>First Period Value Date</b>	Equal to Value Date.
<b>Maturity Date</b>	No restriction	<b>Residual Contract Maturity<sup>1</sup></b>	Residual contract maturity ranges from 5 days (inclusive) to five years (inclusive).
<b>Business Day Convention for Payment Date</b>	The next business day adjusted, i.e. if the payment date is not a business day, extend to the next business day; if the next business day falls in the next month, the payment date shall be the immediately	<b>Tenor Adjustment</b>	Actual days-based adjustments, i.e. if the payment date is adjusted, the tenor shall be adjusted according to actual days.

<sup>1</sup> Residual contract maturity: The period from the date when the IRS transaction is submitted for clearing to maturity date. The date of submission for clearing is the date when SHCH’s system receives the IRS transaction.

	preceding business day.			
Fixed Interest Payment Details				
Frequency of Fixed Interest Payment	The same as the frequency of floating interest rate payment.			
Fixed Interest Accrual Mode	Simple	Day Count Convention	A/365	
Floating Interest Payment Details (I)				
Reference Rate	Reset Frequency	Payment Frequency	Interest Accrual Method	Day Count Convention
SHIBOR_O/N	Daily	Quarterly, at maturity	Compound	A/360
FR007	Weekly	Quarterly, at maturity	Compound	A/365
SHIBOR_3M	Quarterly	Quarterly	Simple	A/360
Floating Interest Payment Details (II)				
Reference Rate	Reset Date Rule	Date of Interest Rate Determination	Reference Rate Value	Negative Rate Treatment
SHIBOR_O/N	In each payment period, the first reset date of interest rate is the first day of the current payment period, and other reset dates are determined according to the frequency of reset. A fractional remainder is allowed.	On the reset date. If no reference rate is available that day, use the reference rate on the immediately preceding business day.	Shanghai Inter-Bank offered rate published by the China Foreign Exchange Trade System under the PBC's authorization at 9:30 a.m. via www.shibor.org on the date of interest rate determination.	Negative interest rate method: The floating amount payable by the party paying floating interest rate is zero; the party paying fixed interest rate shall pay the absolute value of the floating amount in addition to that amount payable in the relevant tenor.
FR007		The business day immediately preceding the reset date. If no reference rate is available that day, use the reference rate on the immediately preceding business day.	Inter-Bank 7-day fixing repo rate published by the China Foreign Exchange Trade System under the PBC's authorization at 11:00 a.m. via www.chinamoney.com.cn on the date of interest rate determination.	
SHIBOR_3M			Shanghai Inter-Bank offered rate published by the China Foreign Exchange Trade System under the PBC's authorization at 9:30 a.m. via www.shibor.org on	

			the date of interest rate determination.	
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## **II. Calculation of Net Interest under a Single Contract**

If the clearing member is the party paying fixed interest rate, the fixed amount shall be negative and the floating amount shall be positive. If the clearing member is the party paying floating interest rate, the floating amount shall be negative and the fixed amount shall be positive (the same below).

Net interest amount under a single contract = Fixed amount + Floating amount

### **i. Precision of Calculation**

#### **1. Calculation process**

In interest calculation, both interest rate and amount are rounded to 14 decimal places.

#### **2. Minimum number of decimal places of interest rate**

RMB interest rate expressed as a percentage is rounded to four decimal places.

#### **3. Minimum number of decimal places of amount**

RMB amount is expressed in Chinese Yuan and rounded to the nearest cent<sup>2</sup>.

### **ii. Fixed Amount**

#### **1. Formula**

Fixed amount accrues interest on a simple basis with a day count convention of A/365.

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<sup>2</sup> Inter-bank Market Financial Derivatives Transactions Definition Document (Version 2012).

$$C_{fix,i} = Qr_{fix} \frac{N_i}{D}$$

Where:  $C_{fix,i}$  is a fixed amount payable by the party paying fixed interest rate in tenor  $i$ ;  $Q$  is the notional principal of an interest rate swap transaction;  $r_{fix}$  is fixed interest rate of an interest rate swap transaction;  $\frac{N_i}{D}$  is day count convention for tenor  $i$ ;  $D$  is the number of interest days of a year under that day count convention;  $N_i$  is the number of days in the tenor.

## 2. Examples

**Table 2: Fixed Amount Calculation Form**

1. Date of Calculation	
Current Date	April 5, 2012
Next Working Day	April 6, 2012
2. Calculation Elements	
Clearing Member	The party paying fixed interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	Quarterly
Fixed Rate	3.5000%
Day Count Convention	A/365
Tenor (Days)	91
3. Calculation Result	
Calculation Formula	$C_{fix,i} = Qr_{fix} \frac{N_i}{D}$
Calculation Result	错误!未找到引用源。 100,000,000×3.5000%×91/365

### iii. Floating Amount

#### 1. Formula

##### (1) Simple interest

If interest accrues on a simple basis, the floating amount in a tenor is the sum total of floating amounts in all reset periods in the tenor:

$$C_{\text{float},i} = \sum_{j=1}^n Q(r_{\text{ref},j} + \text{BP}) \times \frac{d_j}{D}$$

Where:  $C_{\text{float},i}$  is the floating amount payable by the party paying floating interest rate in tenor  $i$ ;  $Q$  is the notional principal of an interest rate swap transaction;  $r_{\text{ref},j}$  is the floating interest rate on reset date  $j$  in tenor  $i$ ;  $\text{BP}$  is interest spread;  $d_j$  is number of actual days (start date inclusive, end date exclusive) in reset period  $j$  in tenor  $i$ ;  $D$  is the number of days of a year under the day count convention;  $n$  is the number of reset periods contained in tenor  $i$ .

## (2) Compound interest

If interest accrues on a compounding basis, the floating amount in a tenor is calculated by compounding the interest rates of all reset periods:

$$C_{\text{float},i} = Q \times \left\{ \prod_{j=1}^n \left( 1 + \frac{(r_{\text{ref},j} + \text{BP}) \times d_j}{D} \right) - 1 \right\}$$

Where:  $C_{\text{float},i}$  is the floating amount payable by the party paying floating interest rate in tenor  $i$ ;  $Q$  is the notional principal of an interest rate swap transaction;  $r_{\text{ref},j}$  is the floating interest rate on reset date  $j$  in tenor  $i$ ;  $\text{BP}$  is interest spread;  $d_j$ : (a) if reference rate is ShiborO/N,  $d_j$  is “1” when the day immediately following a business day is also a business day; or (b) when the day immediately following a business day is not a business day,  $d_j$  is the number of actual days (start date inclusive, end date exclusive) in reset period  $j$  in tenor  $i$ ;  $n$  is the number of reset periods in tenor  $i$ ;  $D$  is the number of days of a year under the day count convention;  $n$  is the number of reset periods contained in tenor  $i$ .

## (3) Floating amount calculation formula

**Table 3: Floating Amount Calculation Formula**

Reference Rate	Reset Frequency	Payment Frequency	Interest Accrual Method	Day Count Convention	Floating Amount in Interest Period $i$
SHIBOR_O/N	Daily	Quarterly, at maturity	Compound	A/360	$C_{float,i} = Q \times \left\{ \prod_{j=1}^n \left( 1 + \frac{(r_{refj} + BP) \times d_j}{360} \right) - 1 \right\}$
FR007 (complete reset periods)	Weekly	Quarterly, at maturity	Compound	A/365	$C_{float,i} = Q \times \left( \prod_{j=1}^n \left( 1 + (r_{refj} + BP) \times d_j / 365 \right) - 1 \right)$
FR007 (the last reset period is incomplete and consists of $y$ days)					$C_{float,i} = Q \times \left( \prod_{j=1}^n \left( 1 + (r_{refj} + BP) \times d_j / 365 \right) \times \left( 1 + (r_{refj} + BP) \times y / 365 \right) - 1 \right)$
SHIBOR_3M	Quarterly	Quarterly	Simple	A/360	$C_{float,i} = Q \times \left( \sum_{j=1}^n (r_{refj} + BP) \times d_j / 360 \right)$

## 2. Examples

### (1) SHIBOR\_O/N

SHIBOR\_O/N accrues interest on a compounding basis, with an A/360 day count convention and a daily reset frequency. The date of interest rate determination is the reset date. The date of interest rate determination is subject to the previous business day

rule. Float amounts are calculated for payment frequencies of quarterly and at maturity separately below.

A. SHIBOR\_O/N (Quarterly)

**Table 4: SHIBOR\_O/N (Quarterly) Elements**

<b>1. Date of Calculation</b>	
Current Date	April 5, 2012
Next Working Day	April 6, 2012
<b>2. Calculation Elements</b>	
Clearing Member	The party paying floating interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	Quarterly
SHIBOR_O/N Reference Rate	See Table 5
Spread	100 bps
Reset Frequency	Daily
Day Count Convention	A/360
Tenor (Days)	91

**Table 5: SHIBOR\_O/N (Quarterly) Calculation Form**

<b>Reset Date (2012)</b>	January 6	January 7	January 8	January 9	...	April 5
<b>Date of Interest Rate Determination (2012)</b>	January 6	January 6	January 6	January 9	...	April 5
<b>Reference Rate*</b>	3.5000%*	3.5000%*	3.5000%*	3.4000%*	...	3.7000%*
<b>Formula</b>	$C_{\text{float},i} = Q \times \left\{ \prod_{j=1}^n \left( 1 + \frac{(r_{\text{ref},j} + \text{BP}) \times d_j}{360} \right) - 1 \right\}$					
<b>Calculation Result</b>	$-100,000,000 \times \left( \prod_{j=1}^{61} \left( 1 + (r_{\text{ref},j} + \frac{100}{10000}) \times d_j / 360 \right) - 1 \right)$					

\*Interest rate here is an assumed value.

As January 7 and January 8 are not business days, the number of actual interest days for the floating interest rate on January 6  $N_1=3$ ; as January 10 is a business day, the number of actual interest days for the floating interest rate on January 9  $N_2=1$ .

There are 91 days between January 6 and April 5, 2012, including 61 business days, so  $n=61$ .

#### B. SHIBOR\_O/N (At Maturity)

**Table 6 SHIBOR\_O/N (At Maturity) Elements**

<b>1. Date of Calculation</b>	
Current Date	January 4, 2013
Next Working Day	January 7, 2013
<b>2. Calculation Elements</b>	
Clearing Member	The party paying floating interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	At maturity
SHIBOR_O/N Reference Rate	See Table 7
Spread	100 bps
Reset Frequency	Daily
Day Count Convention	A/360
Tenor (Days)	366

**Table 7: SHIBOR\_O/N (At Maturity) Calculation Form**

Year	2012				2013	
Reset Date	January 6	January 7	January 8	...	January 4	January 5
Date of Interest Rate Determination	January 6	January 6	January 6		January 4	January 4
Reference Rate*	3.5000%*	3.5000%*	3.5000%*	...	3.7000%*	3.7000%*
Formula	$C_{\text{float},i} = Q \times \left\{ \prod_{j=1}^n \left( 1 + \frac{(r_{\text{ref},j} + \text{BP}) \times d_j}{360} \right) - 1 \right\}$					



Calculation Result	$= -100,000,000 \times \left( \prod_{j=1}^{251} \left( 1 + (r_{\text{ref}} + \frac{100}{10000}) \times d_j / 360 \right) - 1 \right)$
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\*Interest rate here is an assumed value.

There are a total of 366 days between January 6, 2012 and January 5, 2012, including 251 business days, n=251.

## (2) FR007

FR007 accrues interest on a compounding basis, with an A/365 day count convention and a weekly reset frequency. The date of interest rate determination is the business day immediately preceding the reset date. The date of interest rate determination is subject to the previous business day rule.

### A. FR007 (Quarterly, with Complete Reset Periods)

The tenor of FR007 consists of complete reset periods (of seven days).

**Table 8: FR007 (Quarterly, with Complete Reset Periods) Elements**

1. Date of Calculation	
Current Date	April 5, 2012
Next Working Day	April 6, 2012
2. Calculation Elements	
Clearing Member	The party paying floating interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	Quarterly
FR007 Reference Rate	See Table 9
Spread	100 bps
Reset Frequency	Weekly
Day Count Convention	A/365
Tenor (Days)	91

**Table 9: FR007 (Quarterly, with Complete Reset Periods)**

**Calculation Form**

<b>Reset Date (2012)</b>	January 6	January 13	January 20	January 27	...	March 30
<b>Date of Interest Rate Determination (2012)</b>	January 5	January 12	January 19	January 21**		March 29
<b>Reference Rate*</b>	3.5000%*	3.3000%*	3.2000%*	3.4000%*	...	3.7000%*
<b>Formula</b>	$C_{float,i} = Q \times \left( \prod_{j=1}^n \left( 1 + (r_{ref,j} + BP) \times d_j / 365 \right) - 1 \right)$					
<b>Calculation Result</b>	$C_{float,i} = -100,000,000 \times \left( \prod_{j=1}^{13} \left( 1 + (r_{ref,j} + \frac{100}{10000}) \times 7 / 365 \right) - 1 \right)$					

\*Interest rates here are assumed values.

\*\*January 26, 2012 is the Chinese New Year. The Date of Interest Rate Determination is January 21 under the previous business day rule.

**B. FR007 (Quarterly, with Incomplete Reset Period)**

In the tenor of FR007, the last reset period is incomplete (the reset period is less than 7 days, i.e. a remainder exists) and all other reset periods are complete (all reset periods are 7-day periods).

**Table 8: FR007 (Quarterly, with Incomplete Reset Period)**

**Elements**

<b>1. Date of Calculation</b>	
Current Date	May 31, 2012
Next Working Day	June 1, 2012
<b>2. Calculation Elements</b>	
Clearing Member	The party paying floating interest rate
Trade Date	February 28, 2012
Value Date	March 1, 2012
First Period Value Date	March 1, 2012
Maturity Date	March 1, 2013

Notional Principal (RMB10,000)	10,000
Payment Frequency	Quarterly
FR007 Reference Rate	Table 11
Spread	100 bps
Reset Frequency	Weekly
Day Count Convention	A/365
Tenor (Days)	92

**Table 11: FR007 (Quarterly, with Incomplete Reset Period)**  
**Calculation Form**

<b>Reset Date (2012)</b>	March 1	March 8	March 15	...	May 24	May 31
<b>Date of Interest Rate Determinat ion (2012)</b>	February 29	March 7	March 14	...	May 23	May 30
<b>Reference Rate*</b>	3.5000%	3.3000%*	3.2000%*	...	3.4000%*	3.7000%*
<b>Formula</b>	$C_{float,i} = Q \times \left( \prod_{j=1}^{ns} \left( 1 + (r_{ref,j} + BP) \times d_j / 365 \right) \times \left( 1 + (r_{ref,i} + BP) \times y / 365 \right) - 1 \right)$					
<b>Calculation Result</b>	$C_{float,i} = -100,000,000 \times \left( \prod_{j=1}^{13} \left( 1 + (r_{ref,j} + \frac{100}{10000}) \times 7 / 365 \right) \times \left( 1 + (r_{ref,i4} + \frac{100}{10000}) \times 1 / 365 \right) - 1 \right)$					

\*Interest rates here are assumed values.

### C. FR007 (At Maturity, with Incomplete Reset Period)

**Table 12: FR007 (At Maturity, with Incomplete Reset Period)**  
**Elements**

<b>1. Date of Calculation</b>	
Current Date	January 4, 2013
Next Working Day	January 7, 2013
<b>2. Calculation Elements</b>	

Clearing Member	The party paying floating interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	At maturity
FR007 Reference Rate	Table 13
Spread	100 bps
Reset Frequency	Weekly
Day Count Convention	A/365
Tenor (Days)	366

**Table 13: FR007 (At Maturity, with Incomplete Reset Period)**  
**Calculation Form**

Year	2012				2013
Reset Date	January 6	January 13	January 20	...	January 4
Date of Interest Rate Determination (2012)	January 5	January 12	January 19		January 3
Reference Rate*	3.5000%*	3.3000%*	3.2000%*	...	3.7000%*
Formula	$C_{\text{float},1} = Q \times \left( \prod_{j=1}^n \left( 1 + (r_{\text{ref},j} + \text{BP}) \times d_j / 365 \right) \times \left( 1 + (r_{\text{ref},j} + \text{BP}) \times y / 365 \right) - 1 \right)$				
Calculation Result	$= -100,000,000 \times \left( \prod_{j=1}^{52} \left( 1 + (r_{\text{ref},j} + \frac{100}{10000}) \times 7 / 365 \right) \times \left( 1 + (r_{\text{ref},53} + \frac{100}{10000}) \times 2 / 365 \right) - 1 \right)$				

\*Interest rates here are assumed values.

### (3) SHIBOR\_3M

SHIBOR\_3M accrues interest on a simple basis, with an A/360 day count convention. The payment frequency is quarterly, so is the reset frequency. The date of interest rate determination is the business day immediately

preceding the reset date.

**Table 14: SHIBOR\_3M Calculation Form**

<b>1. Date of Calculation</b>	
Current Date	April 5, 2012
Next Working Day	April 6, 2012
<b>2. Calculation Elements</b>	
Clearing Member	The party paying floating interest rate
Trade Date	January 4, 2012
Value Date	January 6, 2012
First Period Value Date	January 6, 2012
Maturity Date	January 6, 2013
Notional Principal (RMB10,000)	10,000
Payment Frequency	Quarterly
SHIBOR_3M Reference Rate	3.4000%* (interest rate at January 5, 2012)
Spread	100 bps
Reset Frequency	Quarterly
Day Count Convention	A/360
Tenor (Days)	91
<b>3. Calculation Result</b>	
Calculation Formula	
Calculation Result	=— 错误!未找到引用源。 100,000,000 错误!未找到引用源。

\*Interest rates here are assumed values.

### III. Net Interest Amount

Calculate the net interest amount of each clearing member to be settled on the next working day.

$$\text{Net interest amount of clearing member} = \sum_{i=1}^n \text{Net interest amount under contract } i$$