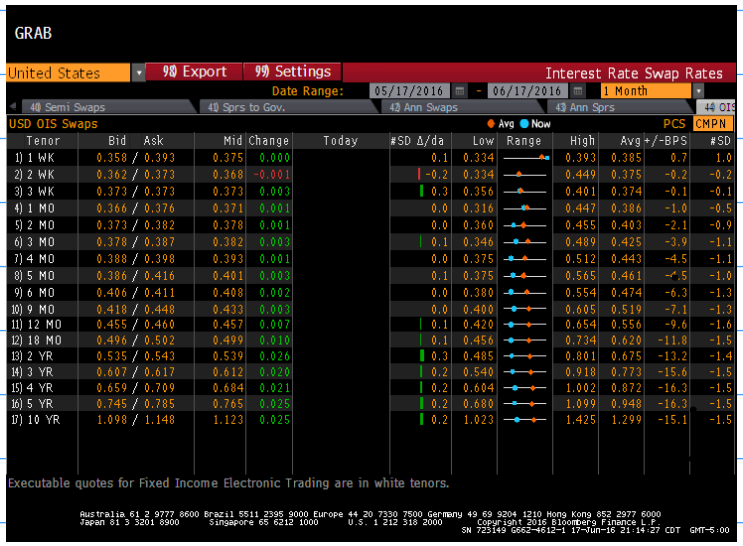
Algoritmo de Bootstrapping



GRAB

United States | 90 Export | 99 Settings | Interest Rate Swap Rates

Date Range: 05/17/2016 - 06/17/2016 | 1 Month

40 Semi Swaps | 41 Sprs to Gov. | 42 Ann Swaps | 43 Ann Sprs | 44 OIS

USD OIS Swaps — Avg Now — PCS CMPN

Tenor	Bid	Ask	Mid	Change	Today	#SD Δ/da	Low	Range	High	Avg	+/-BPS	#SD
1) 1 WK	0.358	0.393	0.375	0.000		0.1	0.334		0.393	0.385	0.7	1.0
2) 2 WK	0.362	0.373	0.368	-0.001		-0.2	0.334		0.449	0.375	-0.2	-0.2
3) 3 WK	0.373	0.373	0.373	0.003		0.3	0.356		0.401	0.374	-0.1	-0.1
4) 1 MO	0.366	0.376	0.371	0.001		0.0	0.316		0.447	0.386	-1.0	-0.5
5) 2 MO	0.373	0.382	0.378	0.001		0.0	0.360		0.455	0.403	-2.1	-0.9
6) 3 MO	0.378	0.387	0.382	0.003		0.1	0.346		0.489	0.425	-3.9	-1.1
7) 4 MO	0.388	0.398	0.393	0.001		0.0	0.375		0.512	0.443	-4.5	-1.1
8) 5 MO	0.386	0.416	0.401	0.003		0.1	0.375		0.565	0.461	-4.5	-1.0
9) 6 MO	0.406	0.411	0.408	0.002		0.0	0.380		0.554	0.474	-6.3	-1.3
10) 9 MO	0.418	0.448	0.433	0.003		0.0	0.400		0.605	0.519	-7.1	-1.3
11) 12 MO	0.455	0.460	0.457	0.007		0.1	0.420		0.654	0.556	-9.6	-1.6
12) 18 MO	0.496	0.502	0.499	0.010		0.1	0.456		0.734	0.620	-11.8	-1.5
13) 2 YR	0.535	0.543	0.539	0.026		0.3	0.485		0.801	0.675	-13.2	-1.4
14) 3 YR	0.607	0.617	0.612	0.020		0.2	0.540		0.918	0.773	-15.6	-1.5
15) 4 YR	0.659	0.709	0.684	0.021		0.2	0.604		1.002	0.872	-16.3	-1.5
16) 5 YR	0.745	0.785	0.765	0.025		0.2	0.680		1.099	0.948	-16.3	-1.5
17) 10 YR	1.098	1.148	1.123	0.025		0.2	1.023		1.425	1.299	-15.1	-1.5

Executable quotes for Fixed Income Electronic Trading are in white tenors.

Australia 61 2 9777 8600 Brazil 5511 2395 9000 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2977 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000
Copyright 2016 Bloomberg Finance L.P.
SN 723149 G862-4612-1 17-Jun-16 21:14:27 CDT GMT-5:00

Tipos de Cotizaciones:

<-> A través de tasas swap.

-> Por "upfront fee"

-> Cotizar por NPV

$$V_{swap}^{receiver} = V_{fix} - V_{flt} = NPV$$

tasas fijas

-> $r_{1w} = 3\%$

Swap 1w -> $150,000 ARS

Swap 2w -> $200,000 ARS

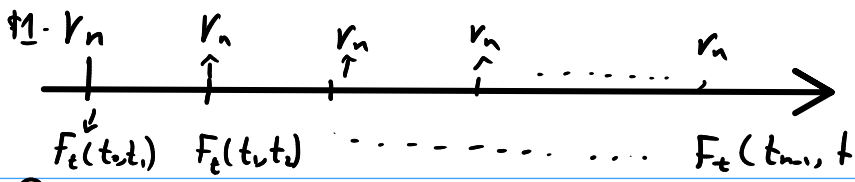
-> $r_{2w} = 3\%$ -> Upfront fee

En gral, los Swaps cotizan con un Upfront fee = 0, entonces la referencia para cotizar dichos instrumentos será la tasa swap.

$Swap(t_n)$ -> tasa swap $r_{t_n} = r_n$

$$V_{swap(t_n)}^{receiver} = V_{fix}(r_n) - V_{flt}(r_n) = 0$$

Si tenemos tasas $r_1, r_2, r_3, \ldots, r_n$, podemos inferir una estructura de factores de descuento $D_1, D_2, \ldots, D_n$?



Sabemos que:

$$V_{fix}(r_n) = \sum_{i=1}^{n} r_n \cdot D(t,t_i)\,\tau(t_{i-1},t_i)$$

$$V_{Flt}(r_n) = \sum_{i=1}^{n} F_t(t_{i-1},t_i)\underbrace{D(t,t_i)}_{D_i}\,\tau(t_{i-1},t_i)$$

$$= 1 - D(t,t_n)$$

¿Qué pasa si conocemos r_n, pero no conocemos $D_1, D_2, D_3, \dots, D_n$?

$$V_{swap} = V_{fix}(r_n) - (1 - D(t,t_n)) = 0$$

$$\Leftrightarrow V_{fix}(r_n) = 1 - D(t,t_n) \quad \text{para} \quad n = 1,$$

$2, 3, 4, \dots$

$$\sum_{i=1}^{n} r_n D_i \tau + D_n = 1 \rightarrow (*)$$

Para $n = 1$

$$(*) = r_1 \cdot D_1 \tau + D_1 = 1$$

$$D_1 [r_1 \tau + 1] = 1$$

$$\Leftrightarrow \boxed{D_1 = \frac{1}{1 + r_1 \tau}}$$

$n = 2$, D_2

$$r_2 \cdot D_1 \tau + r_2 D_2 \tau + D_2 = 1$$

$$D_1 = \frac{1}{1 + r_1 \tau}$$

$$r_2 D_1 \tau + D_2 [r_2 \tau + 1] = 1$$

$$D_2 = \frac{1 - r_2 D_1 \tau}{r_2 \tau + 1}$$

→ Dado que conocemos D_1 y D_2, $D_3, \ldots, D_{n-1}$, cómo calculamos D_n?

Para $V_{swap}(r_n) = 0$, sabemos que:

$$\sum_{i=1}^{n} r_n \cdot D_i \cdot \tau + D_n = 1$$

$$\sum_{i=1}^{n-1} r_n D_i \tau + r_n D_n \tau + D_n = 1$$

$\sum_{i=1}^{n-1}$ Ya lo conocemos!

Definamos $a = \sum_{i=1}^{n-1} r_n D_i \tau$

$b = r_n \tau$

$x = D_n$

$a + bx + x = 1 \longrightarrow x = \frac{1 - a}{b + 1}$

$$D_n = \frac{1 - \sum_{i=1}^{n-1} r_n D_i \tau}{1 + r_n \tau} \quad \Big\} \text{ Para cualquier } n.$$

TIIE 28D

Tasa de interés interbancaria de equilibrio

→ Banxico habla con varias IFI's y les pregunta a qué tasa piden prestado y prestan en un plazo de 28 días.

IRS TIIE 28D