Computation of Bond YTM

PURPOSE

To explain how YTM is computed for a bond[1] in the CS Lucas system.

WHY IS THIS IMPORTANT?

Allows users to verify the formulae and methodology used by CS Lucas to compute the bond YTM.

BACKGROUND

In a period, the relationship between the opening and closing value of a bond can be expressed as follows:

$$B_n = B_{n-1} + (B_{n-1} * y) - c$$

Where

 B_n Bond Price at the start of period n

y Period yield

c Coupon income in period n

FORMULA AND EXAMPLE

To compute the yield on a bond transaction, the CS Lucas system assumes that it will be held to maturity. The YTM is the constant yield for each day in the period to maturity that will accrete/ amortize the purchase price to par value (100). See Appendix 1 for Report 8001.

Example: (Accretion - Purchase below par value)

 VDate
 5-Jan-17

 Termination Date
 1-Apr-18

 Coupon
 0.50000% c

 Constant Effective Yield
 1.0375852% YTM

 Purchase Price
 99.340

 Par Value
 100.000

		Α	В	С	D
EndDate	Days from VDate	Opening	Yield	Coupon	Closing
06-Jan-17 Fri	1	99.340000	0.00282393727	0.00136986301	99.341454
07-Jan-17 Sat	2	99.341454	0.00282397860	0.00136986301	99.342908
08-Jan-17 Sun	3	99.342908	0.00282401994	0.00136986301	99.344362
09-Jan-17 Mon	4	99.344362	0.00282406128	0.00136986301	99.345817
10-Jan-17 Tue	5	99.345817	0.00282410261	0.00136986301	99.347271
28-Mar-18 Wed	447	99.992636	0.00284248975	0.00136986301	99.994109
29-Mar-18 Thu	448	99.994109	0.00284253162	0.00136986301	99.995582
30-Mar-18 Fri	449	99.995582	0.00284257348	0.00136986301	99.997054
31-Mar-18 Sat	450	99.997054	0.00284261534	0.00136986301	99.998527
01-Apr-18 Sun	451	99.998527	0.00284265721	0.00136986301	100.000000

Where

$$B = A * YTM / 365$$

$$C = c/365$$

$$D = A + B - C$$

The closing price bond price at the end of each day (D) is carried forward to opening price (A) of the next period.

Goal seek formula is used to iterate the values of YTM so that the model of 451 rows will accrete the closing bond price to par value of 100 on maturity date.

Example: (Amortization - Purchase above par value)

 VDate
 6-Jan-17

 Termination Date
 9-Dec-18

 Coupon
 2.750000%
 C

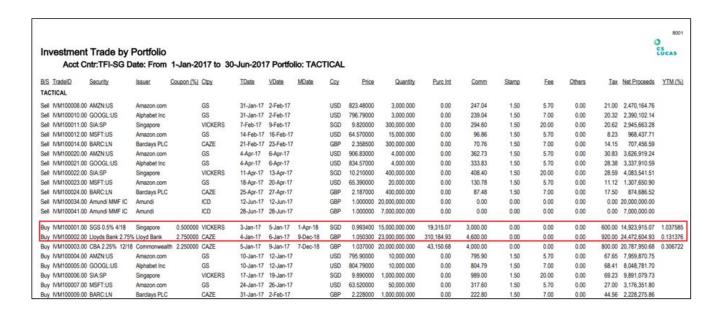
 Constant Effective Yield
 0.1313768%
 YTM

 Purchase Price
 105.030

 Par Value
 100.000

EndDate	Days from VDate	Opening	Yield	Coupon	Closing
07-Jan-17 Sat	1	105.030000	0.00037804126	0.00753424658	105.022844
08-Jan-17 Sun	2	105.022844	0.00037801550	0.00753424658	105.015688
09-Jan-17 Mon	3	105.015688	0.00037798974	0.00753424658	105.008531
10-Jan-17 Tue	4	105.008531	0.00037796399	0.00753424658	105.001375
06-Dec-18 Thu	699	100.028698	0.00036003975	0.00753424658	100.021524
07-Dec-18 Fri	700	100.021524	0.00036001393	0.00753424658	100.014349
08-Dec-18 Sat	701	100.014349	0.00035998811	0.00753424658	100.007175
09-Dec-18 Sun	702	100.007175	0.00035996228	0.00753424658	100.000001

APPENDIX 1 FOR REPORT 8001



[1] This memorandum uses terminology in the context of a bond instrument. However, the concepts are equally applicable to borrowing and debt instruments.

FREQUENTLY ASKED QUESTIONS

CHANGE HISTORY

Ву	Changes	
CS	Created.	