Price Calculations for a Regular Treasury Note with Accrued Interest

These examples are provided for illustrative purposes only and are in no way a prediction of interest rates or prices on any bills, notes or bonds issued by the Treasury.

In order for the reader to follow the step-by-step calculations, these examples were prepared on an Excel spreadsheet using 15 decimals, with rounding at each step. For readers who use multi-decimal calculators, we recommend setting the calculator to its maximum decimal settings and then applying normal rounding procedures.

In actual practice, Treasury uses a mainframe and generally does not round prior to determining the final result. In the case of any discrepancies due to rounding, determinations by the Treasury shall be final.

Variables / Inputs

Description: **US Treasury Notes 2 1/4% Due 02/15/2007**

Issuance & Pay Date Information	
Dated Date:	02/15/2004
Issue date:	02/17/2004
Maturity Date:	02/15/2007
Pay Dates:	2/15, 8/15
First Payment Date:	08/15/2004

Security Information		
C =	2.250	Coupon
i =	0.02801	Yield
n =	5	(number of full semiannual periods from the issue date to maturity.)
r =	180	(February 17, 2004 - August 15, 2004)
s =	182	(February 15, 2004 - August 15, 2004)

Solving for the Input Variables

In order to solve for price we must first solve for A, Accrued Interest and calculate the Present Value of the Note's cash flows.

Using the formulas below we can calculate the Present Value of cash flows discounted for n periods into the future. In this example n = 5.

Solve for Cash Flows Step 1

The following formula is used to calculate the Present Value of 1 due at the end of n periods, in this example 5 periods.

$v^n = 1 / (1 + i / 2)^n$

1) $v^n = 1 / (1 + 0.02801 / 2)^5$
2) $v^n = 1 / (1 + 0.014005)^5$
3) $v^n = 1 / (1.014005)^5$
4) $v^n = 1 / 1.072014062553833$
5) $v^n =$ 0.932823584065422

Solve for Cash Flows Step 2

The following formula is used to calculate the Present Value of 1 period for n periods, in this example 5 periods.

$a_{\overline{n}|} = (1 - v^n) / (i / 2) = v + v^2 + v^3 + \ldots v^n$

1) $a_{\overline{n}|} = (1 - 0.932823584065422) / (0.02801 / 2)$
2) $a_{\overline{n}|} = 0.067176415934578 / 0.014005$
3) $a_{\overline{n}|} =$ 4.796602351629989

Solving for Accrued Interest

Using the variables from above:

$A = [(s - r) / s] (C / 2)$

1) A = ((182 - 180) / 182) * (2.250 / 2)
2) A = (2 / 182) * 1.125
3) A = 0.010989010989011 * 1.125
4) A = 0.012362637362637
5) A = 0.012363 Rounded to 6 places

Solving for Price

After having calculated the necessary variables we can now solve for price by using the following formulas.
The first step is to populate the formula with the values derived above. We can then begin to break the equation down into smaller parts as expressed by labels.
Begin by solving Part A, Part B, Part C, Part D, and Part E.

Solve for Price

$(P + A) * [1 + (r / s) (i / 2)] = C / 2 + (C / 2) a_{\overline{n}|} + 100 v^{n}$

(P + 0.012363) * (1 + (180 / 182) (0.02801 / 2)) = (2.250 / 2) + ((2.250 / 2) * 4.796602351629989) + (100 * 0.932823584065422)

(1) (P + 0.012363)*(1 + 0.013851098901099) = (1.125 + 5.396177645583738 + 93.282358406542200)

(2) (P + 0.012363) * (1.013851098901099) = 99.803536052125938

(3) (P + 0.012363) = (99.803536052125938 / 1.013851098901099)

(4) P + 0.012363 = 98.440033413488222

(5) P = 98.440033413488222 - 0.012363

(6) P = 98.427670413488222

(7) P = 98.427670 Rounded to 6 places

Sample Settlement Information

If the 6-decimal Price per hundred is 98.427670 and the 6-decimal Accrued Interest per hundred is 0.012363, then:

Face Amount	1,000,000.00	100,000,000.00	1,000,000,000.00
Principal Amount	984,276.70	98,427,670.00	984,276,700.00
Accrued Interest	123.63	12,363.00	123,630.00
Settlement Amount	984,400.33	98,440,033.00	984,400,330.00