

Example for Topic 5 Individual Issue Value

To illustrate, Company MNO previously issued 20-year bonds having an 8 percent "coupon" rate, principal (face) amount of \$100,000,000, and maturity date of June 30, 20X5 – which is 5 years, or 10 interest payment periods from today, July 1, 20X0. The bonds are non-publicly traded. Management believes that current market interest rates (yields) are at a historical low-point and is currently considering refinancing the bonds with new, lower-rate bonds. Management must first estimate the *fair value* of the existing bonds. The current fair value of the bonds indicates the likely minimum amount that the company will have to pay the current bondholders to induce them to redeem the existing, relatively high-rate bonds. The company's current debt rating is "single-A" (accordingly to credit-rating agencies Standard & Poor's and Moody's Investor Services) and the current annual market rate (yield) for 5-year, A-rated bonds is 6.0 percent (or, 0.06).

PV of interest payments (annuity)	=	\$100,000,000 x 0.08 / 2	x	$1 - \frac{1}{(1 + .06 / 2)^{10}}$	
	=	\$4,000,000	x	8.53020283	
	=	\$34,120,811			
PV of principal (face) amount	=	$\frac{\$100,000,000}{(1 + .06 / 2)^{10}}$			
	=	\$ 74,409,392			
Total PV of bond's cash flow (bond's estimated fair value) ¹⁸	=	PV of interest payments (annuity)	+	PV of principal (face) amount	
	=	\$ 34,120,811	+	\$74,409,392	
	=	\$108,530,203			

Company MNO managers may also use an MS Excel spreadsheet to determine the present value of the bond's cash flows using the function (formula) described earlier: **=PV(rate,nper,-pmt,-fv,0)**

where:

- Rate** = Current annual market rate (yield) on A-rated 5-year debt *divided by* the number of periodic interest payments in each annual period (for most corporate bonds, this is 2): 6.0% / 2 = 3.0%
- Nper** = Number of remaining semi-annual interest payment periods until maturity: 5 years x 2 = 10
- Pmt** = Periodic interest payment i.e., the coupon rate *times* the outstanding principal balance of the bonds *divided by* 2: 0.08 x \$100,000,000 / 2 = \$4,000,000
- FV** = Future value – the amount of the debt principal outstanding, due at maturity: \$100,000,000
- 0** = Payment due at end of semi-annual periods through maturity

The present value of the bond's cash flows, and *estimated* fair value of the bonds, is:

MS Excel present value function (formula)	Formula result
=PV(6%/2,5*2,-100000000*0.08/2,-100000000,0)	\$108,530,203

¹⁸ Other finance courses examine the valuation of bonds on dates *between* interest payment dates.

EXAMPLE For Debt Portfolio Value

Fair Value of a Business' Capital Financing and Unrecognized or Under-valued Assets

The Topic 3-4 Background Paper examines the limitations on the usefulness of financial statements. Recall that two kinds of such limitations are:

- *Trade-offs between the **relevance** and **representational faithfulness (completeness or freedom from error)** or **verifiability** of financial statements caused by the combination of **conservatism** and **articulation**.* Under U.S. GAAP, accounting for such items as research and development (“R&D”) costs, internally generated intangible assets, and inventory reflect this trade-off and may impair the relevance of certain asset values reported in businesses' balance sheets.
- *Definitions of financial statement elements and measurement uncertainty.* Measurement uncertainty and exclusion of most executory contracts from the definitions of “assets” and “liabilities” may impair the completeness of businesses' balance sheets. Following the **revenue recognition principle**, businesses generally must complete arms-length transactions in order to record increases in net assets. In accordance with the **historical cost principle**, businesses report most assets at amounts that reflect their original exchange value, rather than their current fair values.

Managers may use present value concepts, together with an examination of other information about a business to identify:

- The *extent* to which its balance sheet may fail to recognize “probable future economic benefits” (the Financial Accounting Standards Board's definition of “assets”) or under-value recognized assets, and
- The possible *kinds or categories* of assets that could be unrecognized or under-valued

Other information that may be useful in making this analysis is included in annual reports on Form 10-K filed by public companies with the U.S. Securities and Exchange Commission. (The Topic 3-4 Background Paper examines the regulatory reporting framework of public companies in the U.S., including the periodic reports these companies must file with the SEC.) To perform this analysis, recall the basic accounting equation, examined in the Topic 3-4 Background Paper:

Left side of balance sheet	=	Right side of balance sheet
ASSETS	=	LIABILITIES + STOCKHOLDERS' EQUITY
	<i>or</i>	
INVESTMENTS	=	SOURCES OF FINANCING FOR THOSE INVESTMENTS

Accordingly, managers can estimate the implied fair value of a business' assets – recognized *and* unrecognized – by determining or estimating the fair value of its sources of financing, comprised of debt and equity. For publicly traded shares of common or preferred stock and certain bonds, managers may locate quoted market prices, as published by the securities exchanges. For non-publicly traded stocks and bonds, managers may prepare valuations of the business or its individual issues of securities using present value concepts. The table below illustrates the general framework for this analysis:

Estimated fair value of or quoted market price for ABC Company's:	\$US in millions
Common stock (10.0 million shares at \$67.67 per share)	\$ 676.7
Preferred stock, if any	–
Debt, including bonds and notes	583.3
Accounts payable, accrued and other liabilities, as reported in company's balance sheet	<u>240.0</u>
Total fair value of company's financing sources (liabilities and shareholders' equity) and, therefore, the implied fair value of company's investments (total assets)	1,500.0
Less total assets reported in company's balance sheet as of the valuation date	<u>1,400.0</u>
Excess difference	\$ 100.0

The difference between the implied fair value of a business' assets and the reported balance of total assets in the business' balance sheet as of the valuation date reflects the limitations of the financial reporting model underlying U.S. GAAP (or IFRS). An excess difference represents the estimated fair value of assets unrecognized or under-valued in the balance sheet. (Other courses examine the accounting and financial implications of a deficiency, including the possibility of unrecognized asset impairment and, in the case that the amount of a business' liabilities exceed the fair value of its assets, insolvency.)

Managers may estimate the fair value of a business' non-publicly traded bonds and notes using the present value methods described above and information contained in the business' financial statements, as illustrated below.

The financial statements of ABC Company for the fiscal year ended December 31, 20X2 include the following balance sheet and footnote information related to the company's debt and shareholders' equity.

ABC Company			
Consolidated Balance Sheet			
December 31, 20X2			
\$US in millions			
<u>Assets:</u>		<u>Liabilities and shareholders' equity:</u>	
Cash and cash equivalents	\$ 18	Accounts payable and accrued expenses	\$ 213
Investments securities, at cost (to be held to maturity)	108	Income taxes payable	27
Accounts receivable, net	37	Notes payable - current portion (Note 6)	20
Inventory, at lower of LIFO cost or market value	182	Bonds payable - current portion (Note 6)	70
Total current assets	345	Total current liabilities	330
Property, plant, and equipment, at cost	1,420	Notes payable - noncurrent portion (Note 6)	140
Less accumulated depreciation	(390)	Bonds payable - noncurrent portion (Note 6)	350
Property, plant, and equipment, net	1,030	Total liabilities	820
Investments in affiliated businesses	25	Total common shareholders' equity (Note 9)	580
Total assets	\$ 1,400	Total liabilities and shareholders' equity	\$ 1,400

Excerpts from FY 20X2 financial statement footnotes . . .

Note 6 - Debt

The company's debt at December 31, 20X2 is comprised of notes and bonds payable, as follows:

The amounts of debt outstanding as of December 31, 20X2 that is payable in each of following five years and for all remaining years thereafter in the aggregate are:

(\$US in millions)	Weighted average interest rate	Principal balance outstanding	FYE Dec. 31,	
				Principal due
			20X3	\$ 90
Working capital loans	4.625%	\$ 40	20X4	90
Term loans	5.375%	120	20X5	85
7.0 percent serial bonds	7.000%	420	20X6	75
Total		580	20X7	60
Less current portion		(90)	Thereafter	180
Noncurrent portion		\$ 490	Total	\$ 580

In January 20X1, the company issued a \$25 million note to a syndicate of banks in connection with a seven-year term loan that bears a fixed 5.0 percent interest rate. The loan is secured by the company's assets and subject to financial and other covenants, including a requirement that the company maintain a total debt ratio not exceeding 1.5:1 (or 1.50).

Note 9 - Shareholders' equity

The company's articles of incorporation authorize it to issue up to 15 million shares of the company's common stock, par value \$20 per share. At December 31, 20X2, 11.5 million shares of the company's common stock were issued and 1.5 million of those shares were held by the company as treasury stock. The company's articles authorize it to issue up to 1.0 million shares of 7.5 percent cumulative preferred stock, \$100 par value. The company had issued no shares of preferred stock as of December 31, 20X2.

Market Information

The company's bonds are currently rated "single A" (Standard & Poor's) and "A2" (Moody's Investor Services).^A Managers separately located current market yields on "single A" corporate debt securities, by term to maturity, as follows:

1 year	4.750%	6 years	6.625%
2 years	5.125%	7 years	7.000%
3 years	5.500%	8 years	7.375%
4 years	5.875%	9 years	7.750%
5 years	6.250%	10 years	8.125%

The company's common stock currently trades at \$67.67 per share on the NASDAQ.

Managers estimated the fair value of the company's outstanding debt "portfolio" using the information obtained above, as set forth below:

Year of maturity	Remaining semi-annual interest payment periods (Years to maturity TIMES 2)	Outstanding debt principal at Dec. 31, 20X2 (\$US millions)	Semi-annual Interest (1)		Current yield on comparably rated debt (3)			Estimated fair value (PV of debt principal outstanding and interest payments) (5)	
			Rate	Payment (2)	Term	Annual yield	Semi-annual yield (4)		
20X3	2	\$ 90.0	3.250%	\$ 2.93	1 year	4.750%	2.3750%	\$ 91.5	
20X4	4	90.0	3.250%	2.93	2 years	5.125%	2.5625%	92.3	
20X5	6	85.0	3.250%	2.76	3 years	5.500%	2.7500%	87.3	
20X6	8	75.0	3.250%	2.44	4 years	5.875%	2.9375%	76.6	
20X7	10	60.0	A	3.250%	1.95	5 years	6.250%	3.1250%	60.6
Thereafter		180.0	B						
		3	Years (B / A) (6)						
20X8	12	60.0	1 Yr	3.250%	1.95	6 years	6.625%	3.3125%	59.6
20X9	14	60.0	2	3.250%	1.95	7 years	7.000%	3.5000%	58.4
20Y0	16	60.0	3	3.250%	1.95	8 years	7.375%	3.6875%	56.9
20Y1	18	-		3.250%	-	9 years	7.750%	3.8750%	-
20Y2	20	-		3.250%	\$ -	10 years	8.125%	4.0625%	-
Total		\$ 580.0						\$ 583.3	

(1) Assume all debt outstanding requires semi-annual interest payments and matures December 31 of years disclosed.

The weighted average interest rate on company's "portfolio" of debt is estimated using footnote information, as follows:

	Debt footnote information			
	Weighted average interest rate	Principal balance outstanding	Percent of total	Wghtd avg int rate X Percent of total
Working capital loans	4.625%	\$ 40.0	6.9%	0.319%
Term loans	5.375%	120.0	20.7%	1.112%
7.0 percent serial bonds	7.000%	420.0	72.4%	5.069%
		\$ 580.0	100.0%	6.500% Semi-annually, 3.25%

(2) Semi-annual interest payments computed as: debt principal outstanding TIMES estimated semi-annual interest rate, in (1)

(3) Company's debt rating and current annual yields on comparably-rated debt obtained via financial Websearch.

(4) Semi-annual yield (discount rate) used to compute present value of debt principal outstanding and interest payments through maturity is the annual yield DIVIDE 2. [The effective annual yield = $1 + \text{annual yield} / 2$]² - 1]

(5) Present value of debt principal outstanding and interest payments for each maturity year computed using the MS Excel formula:

=PV(rate,nper,-pmt,-fv,0) where:

Rate = Semi-annual yield on comparably-rated debt for the maturity period indicated in (4)

Nper = Remaining semi-annual interest payment periods until maturity (years to maturity TIMES 2)

Pmt = Semi-annual interest payment, computed in (2) above

FV = Future value - i.e., the debt principal outstanding for the maturity year indicated

0 = Payment due at end of semi-annual periods through maturity

(6) Financial statement footnotes of companies disclose annual maturities of debt only for the first 5 years following the balance sheet date and disclose the remaining maturities of debt only as a "thereafter" total. For the purposes of estimating the fair value of a company's total debt, analysts estimate the amount of annual maturities after Year 5 by dividing the "thereafter" total by the amount of the debt maturing in Year 5 to estimate the average number of years over which the "thereafter" total matures. Analysts then assume that an amount similar to that maturing in Year 5 will also mature in each subsequent year (here, 20X8 - 20Y0).

^A The table below summarizes the long-term debt ratings assigned to corporate debt securities by three principal debt-rating agencies. The rating agencies call securities rated below BBB- (S&P and Fitch) or Baa3 (Moody's) "non-investment grade" or "speculative" because of the issuer presents pronounced credit (default) risk.

S&P	Moody's	Fitch	Credit-worthiness category
AAA	Aaa	AAA	Prime
AA+	Aa1	AA+	High grade
AA	Aa2	AA	
AA-	Aa3	AA-	
A+	A1	A+	Upper medium grade
A	A2	A	
A-	A3	A-	
BBB+	Baa1	BBB+	Lower medium grade
BBB	Baa2	BBB	
BBB-	Baa3	BBB-	