

FA Module 17: Business combinations – practice problems

(The attached PDF file has better formatting.)

Exercise 17.1: Goodwill: full and partial

ABC and XYZ are publicly traded firms.

- ! XYZ has 100 shares outstanding with book values of 5 share and market values of 9 per share.
- ! ABC buys 60 shares of XYZ at the market price.

XYZ has identifiable net assets of 700 book value and 800 fair value.

- A. What is the full goodwill on ABC's consolidated balance sheet?
- B. What is the partial goodwill on ABC's consolidated balance sheet?

Part A: XYZ's fair value is 100 shares \times 9 per share = 900. Its identifiable net assets have a fair value of 800. The full goodwill is $900 - 800 = 100$.

Part B: The purchase price is 60 shares \times 9 per share = 540. The fair value of the ABC's share of XYZ's identifiable net assets is $60\% \times 800 = 480$. The partial goodwill is $540 - 480 = 60$.

Question: Is the partial goodwill = the percentage bought \times the full goodwill?

Answer: ABC pays the market price for its shares here, so the partial goodwill = the percentage bought \times the full goodwill. Sometimes the acquirer pays a premium over the market price for a controlling portion of the outstanding shares, so the partial goodwill is more than the percentage bought \times the full goodwill.

Exercise 17.2: Consolidated income statement

In 20X1, ABC and XYZ have the following income statement entries.

- ! The estimated useful lives of fixed assets remain the same with the acquisition.
- ! All debt (except the zero coupon bond) pays coupons of 5% of the face value.
- ! Days inventory on hand = 182.565 (inventory turnover = 2).
- ! ABC and XYZ use the FIFO inventory accounting method.
- ! No inter-company transactions occur.

- A. What is net revenue?
- B. What is the cost of goods sold?
- C. What is gross profit margin?
- D. What is interest expense? (Use book value of parent's debt + fair values of zero coupon bond and subsidiary's debt \Rightarrow the amortization is interest expense.
- E. What is depreciation expense?
- F. What is non-controlling (minority) interest in net income?

Part A: We consolidate ABC's income statement entry with XYZ's entry, so net revenue = $400 + 100 = 500$.

The gross profit margin = $1 - \text{the cost of goods sold} / \text{net revenue}$, so

$$\text{the cost of goods sold} = \text{net revenue} \times (1 - \text{the gross profit margin})$$

On the unconsolidated income statements:

- ! ABC has $400 \times (1 - 50\%) = 200$.
- ! XYZ has $100 \times (1 - 50\%) = 50$.

On its unconsolidated financial statements, XYZ has beginning inventory of 25; on the consolidated financial statements, XYZ has beginning inventory of 35. The days inventory on hand is 182 days (half a year), so the beginning inventory is sold in 20X1.

The ending inventory is the same for the consolidated balance sheet as the unconsolidated balance sheet. This value does not affect the computations, but the exposition is clearer if we show the arithmetic. Suppose the ending inventory is 25; any other value gives the same result.

- ! Since the beginning and ending inventory are both 25 and the cost of goods sold is 50, the purchases in 20X1 are $50 + (25 - 25) = 50$.
- ! The purchases are the same for the consolidated balance sheet as the unconsolidated balance sheet.
- ! The cost of goods sold for the consolidated income statement is $50 + (35 - 25) = 60$.

The higher fair value of the beginning inventory of $35 - 25 = 10$ causes the cost of goods sold to be $50 + 10 = 60$ on the consolidated income statement. The cost of goods sold is the cost of beginning inventory + the cost of purchases - the cost of ending inventory.

The cost of goods sold on the consolidated income statement is $200 + 60 = 260$.

Part C: The gross profit margin = $1 - 260/500 = 48.00\%$

Part D: The change from book value on XYZ's unconsolidated balance sheet to fair value (at the initial date) on the consolidated balance sheet affects the income statement as well.

The practice problem says that the estimated useful life of the fixed assets does not change when ABC buys 60% of XYZ. XYZ's depreciation expense of 30 on its unconsolidated income statement is 20% of its book carrying value of 150, for an average estimated useful life of five years.

The consolidated financial statements use the 250 fair value of XYZ's property, plant, and equipment, so the estimated depreciation expense is $(250 / 150) \times 30 = 50$.

We add ABC's depreciation of 120 to XYZ's adjusted depreciation of 50 to get 170.

Interest expense

The interest expense on the original long-term debt is 5% of the book value. We make two changes for the consolidated income statement.

The book value of XYZ's debt changes from 120 to 110, but the coupon payments do not change. The yield to maturity is more than 5%, but XYZ still pays $120 \times 5\% = 6$ each year to its creditors. The interest expense is 6, not $110 \times 5\% = 5.50$.

ABC's new zero coupon bond matures for 60 in seven years. Its effective interest rate is $(60/40)^{1/7} = 1.059634$ *per annum*. The new interest rate is consistent with the rest of the practice problem: interest rates have risen (as seen in the lower fair value of XYZ's debt), and adding a subsidiary partly financed by additional debt further raises ABC's interest rate.

The interest expense on the new zero coupon bond is $40 * 0.059634 = 2.38536$.

Question: A zero coupon bond pays no coupons; why does it have interest expense?

Answer: The income statement is on an accrual basis. The interest expense is the coupons paid + the accrual of discount – the amortization of premium. The carrying value of the zero coupon bond accrues from 40 to 42.38536 here, so the interest expense is 2.38536.

Part E: The consolidated income statement is like the consolidated balance sheet. The accounts use the full amount of XYZ's income statement entries. The portion of XYZ that ABC does not own is shown as a non-controlling (minority) interest in net income, like the non-controlling (minority) interest in shareholders' equity.

The non-controlling interest in net income is the subsidiary's contribution times the non-controlling interest percentage.

Question: Do we subtract the non-controlling (minority) interest when forming financial ratios?

Answer: No; the financial ratios use the full amounts of XYZ's income statement entries for all accounts, as well as net income and shareholders' equity.

Question: Does the non-controlling (minority) interest on the income statement differ for partial vs full goodwill?

Answer: No. Goodwill does not affect income statement entries.

The non-controlling (minority) interest percentage = $(1 - \text{the controlling interest})$ percentage.

The non-controlling interest in shareholders' equity differs for the partial goodwill vs full goodwill method.

! For the partial goodwill method, it is the non-controlling interest percentage times the carrying values of the net assets of the subsidiary on the consolidated balance sheet.

! For the full goodwill method, we add the non-controlling interest percentage times the goodwill.

Exercise 17.3: Consolidated financial statements

Book values and fair values for ABC and XYZ at December 31, 20X0, are shown below.

On December 31, 20X0, ABC buys 60% of the shares of XYZ. On ABC's consolidated financial statements:

Answer the following for both the full goodwill method and the partial goodwill method. ABC uses cash to buy the shares of XYZ.

- A. What is the entry for property, plant, and equipment?
- B. What is the entry for patents?
- C. What is the entry for long-term debt?
- D. What is the entry for goodwill?
- E. What is the entry for common stock?
- F. What is the entry for additional paid-in capital?
- G. What is the entry for retained earnings?
- H. What is the entry for non-controlling (minority) interest?
- I. What is the debt-to-equity ratio?
- J. What is the financial leverage ratio?

Part A: The book value of property, plant, and equipment on the consolidated balance sheet is the book value of ABC's property, plant, and equipment plus 60% of the fair value of XYZ's property, plant, and equipment.

In subsequent years, the balance sheet entry is depreciated; fair values are no longer relevant (unless ABC remeasures its property, plant, and equipment at fair value, an option under IFRS).

Part B: In-house developed patents have zero book values. ABC acquired 60% of XYZ, so 60% of the fair value of XYZ's patent is shown on the consolidated balance sheet.

Part C: The book value of long-term debt on the consolidated balance sheet is the book value of ABC's long-term debt plus 60% of the fair value of XYZ's long-term debt. Long-term debt is like other assets and liabilities. In contrast, shareholders' equity shows only ABC's book value, not including 60% of XYZ's market value.

Part D: Under IFRS, goodwill may be computed by the full goodwill method or the partial goodwill method; under GAAP, only the full goodwill method may be used.

- ! Full goodwill = fair value of XYZ – fair value of XYZ's identifiable net assets.
 - " Non-controlling (minority) interest = non-controlling interest's share of XYZ's fair value.
- ! Partial goodwill = purchase price – abc's share of fair value of XYZ's identifiable net assets.
 - " Non-controlling (minority) interest = non-controlling interest's share of the fair value of XYZ's identifiable net assets.

⇒ difference in goodwill (full goodwill – partial goodwill) = difference in non-controlling (minority) interest = difference in total assets = difference in shareholders' equity

Part E: The entry for common stock is the book value of ABC's cash value, not including 60% of the fair value of XYZ's common stock (or the book value of XYZ's common stock). The same is true for additional paid-in capital and retained earnings.

Illustration: ABC and XYZ each have equity of 100, and the market value of each firm equals its book value. If ABC buys 60% of XYZ, its cash decreases by 60, its other assets increase by 100, and its total assets increase by 40. Its shareholders' equity increases by 40, all of which is non-controlling (minority) interest. Its common stock, additional paid-in capital, and retained earnings do not change.

+p777 loc26365 6.4.3 non-controlling (minority) interest income statement

inter-company transactions are eliminated in full for consolidation method

net income is same for partial goodwill as for full goodwill because goodwill is not depreciated and does not affect the income statement (note: fair value of identifiable net assets is allocated same way under both full goodwill and partial goodwill methods).

ROA and ROE higher under partial goodwill method (because assets and equity are lower).

Exercise 17.4: Impairment loss

On December 31, 20X0, XYZ has 100 shares outstanding with market value of 10 per share. The identifiable net assets of XYZ have a book value of 700 and a fair value of 750. ABC buys all 100 shares of XYZ.

On December 31, 20X1, ABC has a carrying value of 1,300. The fair value of ABC = its recoverable amount = 1,200, and the estimated fair value of its identifiable net assets = 1,075.

- A. What is the goodwill impairment loss under IFRS?
- B. What is the goodwill impairment loss under GAAP?

Part A: At acquisition, the purchase price is 1,000 and the fair value of XYZ's identifiable net assets is 800, so the goodwill on ABC's balance sheet = $1,000 - 750 = 250$. ABC acquires all of XYZ, so partial goodwill = full goodwill here.

! The impairment loss is $1,300 - 1,200 = 100$.

! The remaining value of the goodwill on December 31, 20X1, is $250 - 100 = 150$.

Part B: GAAP has a two-step impairment test.

Step #1: The fair value of ABC on December 31, 20X1, is 1,200, which is less than its carrying value (book value) of 1,300, so ABC has a potential impairment loss.

Question: How does the fair value of ABC under GAAP differ from the recoverable amount under IFRS?

Answer: The textbook uses the terms in the IFRS and GAAP official statements. Sometimes the textbook explicitly says that IFRS differs from GAAP and gives the different phrases in their official statements, but the practical difference is unclear and perhaps not material.

Step #2: The implied goodwill on December 31, 20X1, is the fair value of ABC = 1,200 minus the estimated fair value of its identifiable net assets = 1,075: $1,200 - 1,075 = 125$. The carrying value of the goodwill (before the impairment loss) is 200, so the impairment loss is $200 - 125 = 75$.

Question: When do the IFRS and GAAP methods differ?

Answer: If the fair values of identifiable net assets do not change, the IFRS and GAAP methods do not differ.

If the fair value of identifiable net assets decreases, IFRS shows a decrease in the fair value of the entity and a goodwill impairment loss, even if the value of goodwill has not changed.

Question: The IFRS method is simple; why does GAAP use a more complicated method?

Answer: GAAP remeasures goodwill as if the acquisition occurred on that day.

Exercise 17.5: Business combination

Know five types of business combinations. These types are legal classifications, not accounting differences.

- A. What is a merger?
- B. What is an acquisition?
- C. What is a consolidation?
- D. What is a joint venture?
- E. What is a special purpose entity?

Part A: A merger is a business combination in which only one of the entities remains in existence

Part B: An acquisition is a business combination in which the previous entities continue as legal entities.

Part C: A consolidation forms a new legal entity; none of the previous entities remains.

Part D: A joint venture is a business combination where control is shared by two or more entities:

- ! a contractual arrangement exists between two or more venturers
- ! the contractual arrangement establishes joint control.

Each venturer uses the equity method to account for the joint venture. In rare circumstances, a venturer may use proportionate consolidation: similar to the consolidation method for control over the subsidiary.

Part E: The sponsoring company creates a special purpose entity for a narrowly defined purpose, such as to issue catastrophe bonds.

The following two practice problems use similar scenarios.

- ! First practice problem: ABC acquires 100% of XYZ.
- ! Second practice problem: ABC acquires 60% of XYZ.

The first practice problem is simple: partial goodwill = full goodwill (since ABC acquires 100% of XYZ) and no non-controlling (minority) interest exists.

Exercise 17.6: Corporate Acquisition

On December 31, 20X0, ABC issues a zero coupon bond for 100 and new common stock for 100 and pays 200 to acquire 100% of XYZ. (The zero coupon bond matures in five years for 140.)

	ABC		XYZ	
	Book Value	Fair Value	Book Value	Fair Value
<i>Cash & Marketable Securities</i>	80	80	20	20
<i>Accounts Receivable</i>	40	40	10	10
<i>Inventory</i>	100	140	25	35
<i>Property, Plant, Equipment (Net)</i>	600	1000	150	250
<i>Accounts Payable</i>	160	160	40	40
<i>Long-term Debt</i>	480	440	120	110
<i>Capital Stock (Par Value)</i>	40		10	
<i>Additional Paid-in Capital</i>	60		15	
<i>Retained Earnings</i>	80		20	

On ABC's consolidated balance sheet at December 31, 20X0:

- A. What is property, plant, and equipment?
- B. What is long-term debt?
- C. What is common stock + additional paid-in capital?
- D. What are retained earnings?
- E. What is the goodwill?

Part A: Property, plant, and equipment is ABC's book value of 600 + XYZ's fair value of 250 = 850.

Part B: Long-term debt = ABC's book value of 480 + ABC's new zero coupon bond of 100 + XYZ's fair value of 110 = 690.

Part C: Common stock + additional paid-in capital = 40 + 60 from ABC + 100 new stock issued = 200.

Question: What happened to XYZ's common stock of 10 and its additional paid-in capital of 15?

Answer: ABC buys the assets and liabilities of XYZ, not its shareholders' equity. The owners of XYZ's original stock received 200 for their stock, and they no longer have a 120 liability for long-term debt.

Question: Have the previous owners of XYZ gained $200 - 120 - 25 = 55$ from the acquisition?

Answer: The book value of common stock is not the market value of common stock. The former owners of the acquired firm generally gain from acquisitions, but we cannot determine the fair value of this gain from the accounting entries alone.

Question: The fair value of XYZ's net assets is 165, and the former owners received 200. Did they profit 35 from the acquisition?

Answer: The fair value of XYZ's identifiable net assets is 165. Many firms have value that can not be allocated to identifiable net assets. We are not told if ABC bought XYZ for its market value. In practice, acquisitions are generally for more than market value.

Part D: ABC's retained earnings = total assets – total liabilities – common stock – additional paid-in capital
= 820 – 640 – 40 – 60 = 80.

Retained earnings are part of shareholders' equity, and ABC does not acquire the shareholders' equity on XYZ's balance sheet.

Part E: Goodwill = the 200 purchase price – the 165 fair value of XYZ's identifiable net assets = 35.

Exercise 17.7: Corporate acquisition and goodwill methods

	ABC		XYZ	
	Book Value	Fair Value	Book Value	Fair Value
Cash & Marketable Securities	80	80	20	20
Accounts Receivable	40	40	10	10
Inventory	100	140	25	35
Property, Plant, Equipment (Net)	600	1000	150	250
Accounts Payable	160	160	40	40
Long-term Debt	480	440	120	110
Capital Stock (Par Value)	40		10	
Additional Paid-in Capital	60		15	
Retained Earnings	80		20	

On December 31, 20X0, ABC issues a zero coupon bond for 40 and new common stock for 40 and pays 120 to acquire 60% of the stock of XYZ at its market price. The zero coupon bond matures in seven years for 60.

On ABC's consolidated balance sheet at December 31, 20X0:

- A. What is property, plant, and equipment?
- B. What is inventory?
- C. What is long-term debt?
- D. What is common stock + additional paid-in capital?
- E. What are retained earnings?
- F. What is full goodwill?
- G. What is non-controlling (minority) interest for full goodwill?
- H. What is partial goodwill?
- I. What is non-controlling (minority) interest for partial goodwill?
- J. What is debt-to-equity ratio before the new issues of common stock and debt?
- K. What is debt-to-equity ratio after the new issues but before the acquisition?
- L. How to the accounts change after the acquisition?

Part A: ABC buys 60% of XYZ's shares, so it has a controlling interest. Its consolidated balance sheet is the book value of ABC's assets and liabilities plus the fair value of XYZ's assets and liabilities.

Property, plant, and equipment is ABC's book value of 600 + 100% of XYZ's fair value of 250 = 850.

Question: ABC bought only 60% of XYZ. Why do we include 100% of the fair value of XYZ's assets on ABC's consolidated balance sheet?

Answer: ABC has a majority of XYZ's voting shares (common stock), so it controls all of XYZ's operations. The financial statements show how the controlling interest manages the assets, liabilities, revenue, and expenses on the consolidated balance sheet and income statement. The part of XYZ that ABC does not own is a non-controlling (minority) interest and is reported as a component of shareholders' equity.

Question: Why do we add the non-controlling (minority) interest to ABC's shareholders' equity? Shouldn't we subtract it from ABC's shareholders' equity?

Answer: The shareholders' equity on the consolidated balance sheet is for all the owners: both the controlling owner (ABC) and the non-controlling (minority) interests. We explicitly show the part not owned by ABC – the non-controlling (minority) interest – so that readers of financial statements can derive ABC's share.

The excess of fair value over book value for XYZ's property, plant, and equipment causes an adjustment on the consolidated income statement as well:

- ! XYZ's unconsolidated income statement shows depreciation expense based on book values.
- ! The consolidated income statement adds depreciation of the excess of fair value over book value.

Question: If the fair value of XYZ's property, plant, and equipment changes after the acquisition, does the entry for property, plant, and equipment on the consolidated balance sheet change?

Answer: The fair values of XYZ's assets and liabilities are used only at the acquisition date, not afterwards.

Part B: Inventory on the consolidated balance sheet is ABC's book value + XYZ's fair value: $100 + 35 = 135$.

The excess of fair value over book value for XYZ's inventory causes an adjustment on the consolidated income statement as well:

- ! XYZ's unconsolidated 20X1 income statement shows cost of goods sold using the initial book value.
- ! ABC's consolidated 20X1 income statement shows cost of goods sold using XYZ's initial fair value.

Question: What do you mean by *initial* book value?

Answer: The fair value of XYZ's inventory is used at the acquisition date. Inventory bought after the acquisition date is reported at book value.

Part C: Long-term debt = ABC's book value of 480 + ABC's new zero coupon bond of 40 + (100% of) XYZ's fair value of 110 = $480 + 40 + 110 = 630$.

Question: The zero coupon bond pays 60 at its maturity, so its face value is 60. Why do we use the market value of 40 for the book value?

Answer: The book value of a bond at inception is the cost paid or the cash received, not the maturity value. Over the life of the zero coupon bond, its carrying value increases by amortization and reaches its par value right before it matures.

Part D: Common stock + additional paid-in capital (= 40 + 60 from ABC's existing balance sheet) + 40 of new stock issued = 140.

Question: What about XYZ's common stock of 10 and its additional paid-in capital of 15?

Answer: XYZ is a separate legal entity, and it issues financial statements of its own, showing its common stock and additional paid-in capital. They do not affect ABC's consolidated balance sheet.

ABC bought 60% of the assets and liabilities of XYZ, which it paid to the previous owners. The fair value of the remaining ownership is consolidated as non-controlling (minority) interest. The stock held by the previous owners do not affect the consolidated balance sheet.

Question: Is the non-controlling (minority) interest the fair value of the shares owned by others?

Answer: Two qualifications are needed. First, the relation is true only at the consolidation date, not afterward. Second, the fair value depends on the goodwill method:

- ! Full goodwill method: includes the non-controlling (minority) interest share of the goodwill.

! Partial goodwill method: the partial goodwill on the balance sheet includes only the acquirer's share.

Part E: ABC's retained earnings = total assets – total liabilities – common stock – additional paid-in capital = 820 – 640 – 40 – 60 = 80.

Question: ABC paid 120 to buy its share of XYZ:

- ! 40 from a new issue of common stock
- ! 40 from a new zero coupon bond
- ! 40 from the cash it already had

ABC has 40 less cash now on its balance sheet. Doesn't that reduce its retained earnings by 40?

Answer: Income statement transactions affect retained earnings. The purchase of assets, inventory, or other firms does not affect retained earnings (unless the acquirer reports a net gain on a bargain purchase).

- ! If ABC buys 10% of XYZ for 20, it credits cash 20 and debits financial investment 20.
- ! If ABC buys 40% of XYZ for 80, it credits cash 80 and debits equity method investment 80.

In this practice problem, ABC buys 60% of XYZ for 120, and it

- ! Credits long-term debt 40 and debits cash 40
- ! Credits (common stock + additional paid-in capital) 40 and debits cash 40
- ! Credits cash 120 and debits other net assets 120 for the net assets it received. (Other net assets is not a line item; it means the other assets and liabilities on the consolidated balance sheet.)

Retained earnings does not change since the income statement does not change.

Question: The purchase price of 120 exceeds the book value of the net assets bought, which is

$$60\% \times (205 - 160) = 0.60 * 45 = 27.$$

(XYZ's book value of total assets is 205 and of total liabilities is 160.)

Shouldn't ABC show a reduction in retained earnings of $120 - 27 = 93$?

Answer: We use the fair values of XYZ's net assets, not the book values, for the consolidated balance sheet, and we consolidate the full value of XYZ's assets and liabilities, not the percentage bought.

If ABC did not have a controlling interest, it would use the equity method, which includes its share of the fair value of XYZ's assets, which are

$$60\% \times (315 - 150) = 0.60 * 165 = 99.00$$

(XYZ's fair value of total assets is 315 and of total liabilities is 150.)

ABC would also have goodwill of $60\% \times (200 - 165) = 21$, and $21 + 99 = 120$.

The goodwill is not shown separately for the equity method.

If ABC has a controlling interest, it consolidates 100% of the purchased assets, regardless of the percentage that it bought. The part it does not buy becomes non-controlling (minority) interest, not retained earnings. The accounting for the consolidated balance sheet is discussed in the next sections of this practice problem.

Part F: Full goodwill = the fair value of XYZ – the fair value of XYZ's identifiable net assets.

ABC bought 60% of XYZ for 120 at the market price, so the market price = $120 / 60\% = 200$.

The fair value of XYZ's identifiable net assets = 165, so full goodwill = $200 - 165 = 35$.

Goodwill is an asset, so it increases total assets, net assets, and shareholders' equity.

Part G: The non-controlling (minority) interest for the full goodwill method is the portion of XYZ's fair value that ABC did not buy:

$$(1 - 60\%) \times 200 = 80$$

The non-controlling (minority) interest is shown as a component of shareholders' equity.

Part H: Partial goodwill = the purchase price – ABC's share of the fair value of XYZ's identifiable net assets

$$= 120 - 60\% \times 165 = 21.00$$

Part I: The non-controlling (minority) interest for the partial goodwill method is the portion of the fair value of XYZ's net assets that ABC did not buy:

$$(1 - 60\%) \times 165 = 66$$

Part J: ABC's long-term debt before issuing the zero coupon bond is 480 (book value). ABC's common stock + additional paid-in capital before issuing the new shares is 100, and its retained earnings are 80. The debt-to-equity ratio is $480 / 180 = 2.67$.

Part K: ABC's long-term debt before issuing the zero coupon bond is 480 (book value). Adding 40 for the zero coupon bond gives debt of 520.

ABC's common stock + additional paid-in capital before issuing the new shares is 100, and its retained earnings are 80. Adding 40 of new common stock + additional paid-in capital gives $140 + 80 = 220$.

The debt-to-equity ratio is $520 / 220 = 2.36$.

Question: Why did the debt-to-equity ratio decrease?

Answer: Before the stock and debt issues to fund the acquisition, ABC had more debt than equity. For the acquisition, it issued equal amounts of debt and equity. The percentage reduction in debt was less than the percentage reduction in equity.

Part L: The accounts change with the acquisition of XYZ. Only a few changes affect the debt-to-equity ratio.

Long-term debt is 520 right before the acquisition. Adding the 110 fair value of XYZ's debt gives 630.

Shareholders' equity is 300 with the full goodwill method, of which 35 is full goodwill, and 286 with the partial goodwill method, of which 21 is partial goodwill. The debt-to-equity ratios are

- ! Full goodwill: $630 / 300 = 2.10$
- ! Partial goodwill: $630 / 286 = 2.20$

Question: The debt on the consolidated balance sheet includes XYZ's debt. The shareholders' equity does not include XYZ's common stock, additional paid-in capital, or retained earnings. Is the comparison proper?

Answer: Shareholders' equity includes the non-controlling (minority) interest, which is XYZ's portion.

Cash starts at 80, increases 20 for XYZ's cash, increases 40 by the zero coupon bond, increases 40 by the new stock issue, and decreases 120 by the purchase price for the acquisition: $80 + 20 + 40 + 40 - 120 = 60$.

Accounts receivable = ABC's book value + XYZ's fair value = $40 + 10 = 50$.

Inventory = ABC's book value + XYZ's fair value = $100 + 35 = 135$.

Property, plant, and equipment (net) = ABC's book value + XYZ's fair value = $600 + 250 = 850$.

Total assets = $60 + 50 + 135 + 850 = 1095$.

Accounts payable = ABC's book value + XYZ's fair value = $160 + 40 = 200$.

The total debt = ABC's book value + XYZ's fair value + zero coupon bond = $480 + 110 + 40 = 630$.

Total liabilities = $200 + 630 = 830$.

Net assets (not including goodwill) = $1095 - 830 = 265$.

Common stock + additional paid-in capital increase by 40 of new shares = $100 + 40 = 140$.

Shareholders' equity increases to $140 + 80 = 220$.

Question: Shouldn't net assets = shareholders' equity?

Answer: We have left out two items:

- ! ABC paid 120 for its 60% share of XYZ, but we consolidated all of XYZ, not just 60%.
- ! We have not included goodwill.

The remaining 40% of XYZ has a fair value of $40\% \times 120 / 60\% = 80$. Full goodwill is 35.

$$265 + 35 - 80 = 220$$

Question: Where are these amounts shown?

Answer: For the full goodwill method, the 35 of goodwill is an asset, so net assets = 300. The 40% of XYZ that ABC did not buy is non-controlling (minority) interest, which is part of shareholders' equity: $220 + 80 = 300$.

For the partial goodwill method, the 21 of goodwill is an asset, so net assets = 286. The 40% of XYZ's net assets that ABC did not buy is non-controlling (minority) interest, which is part of shareholders' equity: $220 + 66 = 286$.

Shareholders' equity increases by three pieces.

- ! The issue of new shares (40).
- ! The full fair value of XYZ's net assets (165).
- ! The goodwill, either full (35) or partial (21).

Part of shareholders' equity is the non-controlling (minority) interest, which is 80 for full goodwill and 66 for partial goodwill.

- ! For full goodwill: $180 + 40 + 165 + 35 + 80 - 200 = 300$.
- ! For partial goodwill: $180 + 40 + 165 + 21 + 66 - 200 = 300$.

The debt is the interest bearing debt of $480 + 40 + 110 = 630$.

Shareholders' equity differs for full goodwill vs partial goodwill. Shareholders' equity = total assets – total liabilities for both goodwill methods.

- ! Full goodwill = 35, and partial goodwill = $60\% \times 35 = 21$; the difference is 14.
- ! Total assets are 14 higher for the full goodwill method, so shareholders' equity is also 14 higher.