

# IB Handout

Investment Bank- an institution that advises and raises money for companies, governments, and wealthy individuals.

## Accounting - Read Paragraph Below

It is crucial to understand the links between the three financial statements. **Review the appendix to see these links highlighted before you attempt these questions.** We may ask the questions below, we may change the numbers, and we may make up our own. **Do not try to memorize these questions & answers, as they only serve to illustrate the concepts we will be asking about.** If you understand the links & write out your answers you will have no problems answering them. Don't be discouraged if you miss the first few questions; it takes time to learn the concepts.

When answering these accounting questions, it is helpful to use a pen and paper to keep track of numbers. Start with the Income Statement, then move to the Cash Flow Statement, then you will be able to see if your Balance Sheet balances.

### I. The Financial Statements

- A. The three main financial statements are the Income Statement, the Cash Flow Statement, and the Balance Sheet.
- B. **Income Statement** shows revenues and expenses over a period of time.
  1. Revenues - Cost of Goods Sold = Gross Margin
  2. Gross Margin - Operating Expenses = Operating Income (EBIT)
  3. EBIT - Other Expenses = Pre-tax Income
  4. Pretax Income - Taxes = Net Income
- C. **Cash Flow Statement** shows cash inflows and outflows over a period of time through 3 main activities: Operating, Investing, and Financing.
  1. Cash inflows are positive, cash outflows are - or (parentheses)
  2. Operating: Net Income + Depreciation & Amortization, - increase in Net Working Capital + other non-cash expenses +/- adjustments for write ups/writedowns
  3. Investing: (Capital Expenditures), (Acquisitions), Divestitures

4. Financing: Issuances of Debt or Equity, (Debt Principal Repayments, Not Interest Expense), (Stock repurchases), (Dividends/distributions)

**D. Balance Sheet** is a snapshot in time of the company's assets, liabilities, and equity. BS must balance with  $\text{Assets} = \text{Liabilities} + \text{Equity}$

1. Current Assets: Cash, Inventory, Accounts Receivable, Prepaid Expenses, Other, etc.
2. Long Term Assets: Property, Plant, & Equipment, Goodwill, Intangibles
3. Current Liabilities: Accounts Payable, Accrued Expenses, Current Portion of Long-Term Debt, Other, etc.
4. Long Term Liabilities: Long-Term Debt (notes payable), Other
5. Equity: Beginning Equity + Net Income - Dividends (Retained Earnings) = Ending Equity

## **II. Know the main links between the statements**

**A. See Appendix**

**III. If a company incurs \$100 (pretax) of depreciation expense, how does that affect the three financial statements?**

- A. Income Statement: Depreciation is an expense so operating income (EBIT) declines \$100. Assuming a tax rate of 40%, net income declines \$60.
- B. Cash flow Statement: Net Income (NI) decreased \$60 and Depreciation increased \$100 so cash flow from operations increased \$40.
- C. Balance Sheet: Cumulative depreciation increases \$100 so Net PP&E decreases \$100. We know from the cash flow statement that cash increased \$40. The \$60 reduction of Net Income causes retained earnings to decrease by \$60. Note that the balance sheet is now balanced. Assets decreased \$60 (PP&E -100 and Cash +40) and Shareholders' Equity decreased \$60.

**IV. A company makes a \$50 cash purchase of equipment on Dec. 31. How does this impact the three statements this year and next year?**

A. First year:

1. Income Statement: It's a Cap Exp. & no Depreciation, so no effect.
2. Cash Flow Statement: No change to Net Income & CF from Operations. CF from Investing: \$50 decrease, no change in CF from Financing. Net decrease of \$50.
3. Balance Sheet: \$50 decrease in Cash and PP&E up \$50.

B. Second year:

1. Income Statement: Assume straight-line Depreciation over 5 years & 40% taxes, so \$6 less in NI.
2. Cash flow: NI down \$6 & Depr. up \$10. Net effect is cash up \$4.
3. Balance Sheet: Cash up \$4, PP&E down \$10. Retained Earnings (SE) down \$6.

**V. A company makes a \$100 purchase of equipment by issuing debt on Dec. 31. How does this impact the three statements this year and next year?**

A. First year

1. Income Statement: No Depreciation, there is no effect.
2. Cash Flow Statement: No change to Net Income & CF from Operations. CF from Investing: \$100 decrease. CF from Financing: \$100 increase in debt. Net is 0.
3. Balance Sheet: PP&E up \$100 & debt (liability) up \$100.

B. Second year

1. Income Statement: Same as last question, but also 10% debt interest. \$20 of Depr. + \$10 Int. Exp. \$18 reduction to net income ( $\$30 \times (1 - 40\%)$ ).
2. Cash Flow Statement: NI down \$18 & Depr. up \$20. Net effect is cash up \$2.
3. Balance Sheet: Cash up \$2, PP&E down \$20, and RE down \$18.

**VI. On January 1 of Year 3 the equipment breaks and is deemed worthless. Bank calls in the loan. What happens in Year 3?**

- A. Company must write down equipment to \$0. At beginning of Year 3 equipment is at \$80.
- B. Income Statement: \$80 write-down decreases NI by \$48.
- C. Cash Flow Statement: NI down \$48, but write-down is non-cash so add \$80. CF from Financing decreases \$100 to pay back the loan. Net cash down \$68.
- D. Balance Sheet: Cash down \$68, PP&E down \$80, Debt down \$100, RE down \$48.

**VII. How can you tell whether or not an expense should appear on the Income Statement?**

- A. Two conditions MUST be true for an expense to appear on the IS:
  1. It must correspond to something in the **current period**.
  2. It must be **tax-deductible**.

- VIII. If Depreciation is a non-cash expense, why does it affect the cash balance?**
- A. Although Depreciation is a non-cash expense, it is **tax-deductible**.  
Therefore, an increase in Depreciation will reduce the amount of taxes you pay, which boosts your cash balance.
- IX. Let's say Microsoft sells a computer for \$100 with a COGS of \$50. Assume a 20% tax rate. How does that affect the 3 financial statements?**
- A. EBT is up \$50. NI is up \$40 due to tax.
- B. NI flows to top line of CF from Ops. However, inventory fell by \$50 because they converted inventory into a sale. This is a decrease in NWC which we add to CF. So overall CF from Ops is up \$90, therefore Cash is up \$90.
- C. Cash on B/S is up \$90 and Inventory is down \$50. Overall assets up \$40. Equity up \$40 from RE. We balance.
- X. If inventory increases by \$10 but no inventory is sold, what happens to the statements?**
- A. Nothing happens on the Income Statement, because the inventory hasn't been sold (if it was sold it would be captured in COGS).
- B. The \$10 increase in inventory increases Net Working Capital \$10. The \$10 change in NWC is captured in the Operating Activities of the Cash Flow Statement. You subtract increases and add decreases in NWC. Therefore, Cash is down \$10.
- C. The current asset Inventory is increased on the Balance Sheet by \$10, Cash is down \$10, therefore you balance.
- D. FYI - Change in NWC is (the year-over-year change in Current non-cash Assets - Current non-debt Liabilities)
- XI. If you can only look at two statements, look at the Income Statement and the Balance Sheet. From those two, you can create the Cash Flow Statement.**

# Valuation

- I. Three main valuation methodologies**
  - A. Comparable Companies Analysis, Precedent Transactions Analysis, Discounted Cash Flow (DCF)
  - B. Others include Sum-of-Parts, Leveraged Buyout (LBO), Net Asset Value, etc.
- II. Valuation Results**
  - A. First, the Precedent Transactions method is likely to give a higher valuation than the Comparable Companies method because when companies are purchased, the target's shareholders are typically paid a price higher than the target's current stock price, the "control premium".
  - B. DCF valuations tend to be more variable because the DCF is so sensitive to a multitude of inputs or assumptions.
  - C. Common valuation metrics: EV/EBITDA, EV/Sales, EV/EBIT, P/E, and P/B
- III. Attributes of similar companies (used in comparable transactions and multiples method)**
  - A. Same industry, same time in industry/economic cycle, similar capital structure (% debt to % equity), similar size, similar region/geography, similar cost structure (fixed vs. variable; lease vs. own), similar age
- IV. Why can't you use Enterprise Value (EV)/Earnings or Price/EBITDA as valuation metrics?**
  - A. Because EV incorporates all of debt and equity, it is NOT dependent on the choice of capital structure (the percentage of debt and equity). If we use EV in the numerator of our valuation metric, we must use an unlevered metric in the denominator, such as Sales, EBIT, or EBITDA. These metrics are not dependent on capital structure because they do not include interest expense.
  - B. Price/EBITDA is inconsistent because Price is dependent on capital structure while EBITDA is unlevered. Price/Earnings is fine because they are both levered.
- V. Equity Value**
  - A. Equity Value is simply the market cap.
  - B. Equity Value = Share Price \* Number of Shares Outstanding
- VI. Enterprise Value**
  - A.  $EV = \text{Equity Value} + \text{Debt} + \text{Preferred Stock} + \text{Minority Interest} - \text{Cash}$

- B. Enterprise Value represents the value of the operations of a company attributable to all providers of capital while Equity Value represents only the proportion of value attributable to shareholders.

**VII. Free Cash Flow**

- A.  $FCF = EBIT - \text{taxes} + D\&A - \text{Capital expenditures} - \text{Change in NWC}$

**VIII. DCF:**

- A. First, we need to project free cash flow for a period of time (say, five years). This is unlevered or debt-free because it doesn't include interest and so is independent of debt and capital structure.
- B. Next, predict the Terminal Value, the value of the company/assets for the years beyond the projection period (5 years). We can use one of two methods:
  - 1. Gordon Growth Method - choose an appropriate rate by which the company can grow forever. This growth rate should be modest (like the average long-term expected GDP growth or inflation)
    - a)  $\text{Terminal Value} = \text{Year 5 FCF} * (1 + \text{growth rate}) / (\text{discount rate} - \text{growth rate})$
  - 2. Terminal Multiple Method - Take an operating metric for year 5 and multiply it by an appropriate valuation multiple, usually EBITDA.
    - a)  $\text{Terminal Value} = \text{EV/EBITDA multiple} * \text{Year 5 EBITDA}$
- C. Calculate the "Present Value (PV)" at the appropriate discount rate, (WACC).
- D.  $\text{DCF Value} = \text{PV of the projected cash flows} + \text{PV of the terminal value}$ 
  - 1. Because we used unlevered cash flows and WACC as our discount rate, the DCF value is Enterprise Value, not Equity Value.

**IX. Cost of Debt is less expensive than the cost of Cash.**

- A. Interest on debt is tax deductible and debt is senior to equity in a firm's capital structure (debt holders get paid first).

**X. What is WACC and how do you calculate it?**

- A. Weighted Average Cost of Capital is the discount rate used in a DCF analysis to present value projected free cash flows and terminal value.
- B. It represents the blended opportunity cost to lenders & investors or set of assets with similar risk profile.

	Debt	+	Equity
WACC =	After-tax Cost of Debt $\times$ % of Debt in the Capital Structure		Cost of Equity $\times$ % of Equity in the Capital Structure
WACC =	$(r_d \times (1 - t)) \times \frac{D}{D + E}$		$r_e \times \frac{E}{D + E}$

**XI. How do you calculate the cost of equity?**

- A. Use Capital Asset Pricing Model (CAPM).

$$r_e = r_f + \beta_L \times (r_m - r_f) + SP$$

- B. Rf: risk-free rate is usually the yield on 10 or 20 year T-bond.  
 C. Beta: riskiness of a stock relative to the broader market (Market is 1.0).  
 D. Equity risk premium is the amount that stocks are expected to outperform the risk-free rate over the long-term (used to be 4 or 5%, now higher).  
 E. SP: size premium. The smaller the size, the higher the premium.

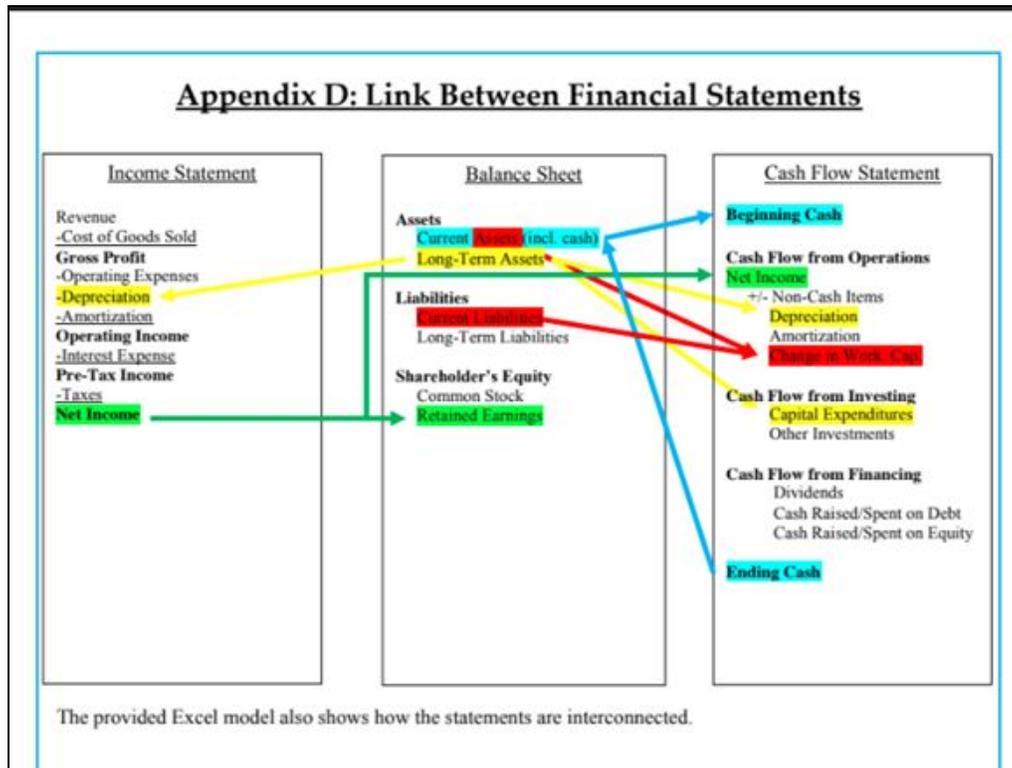
**II. What is the difference between Levered & Unlevered Free Cash flows/Why does Unlevered start with EBIT?**

- A. Levered cash flow is cash available for equity holders after debtholders have been satisfied. Using levered Free Cash Flow in a DCF will give you the Equity Value of the company.
1. The cash for debtholders is the Interest Expense line on the IS
  2. To calculate Levered FCF, start with NI rather than EBIT, then follow the same process for calculating Unlevered FCF.
- B. Unlevered FCF is cash available to both Debt & Equity holders. Using this in a DCF will give you Enterprise Value. You start with EBIT rather than NI, because Interest is tax-deductible, and the interest is cash for debtholders.

## Other Material

- I. **If a company with a low P/E acquires a company with high P/E in an all stock deal, will it be accretive or dilutive?**
  - A. It will be dilutive to acquirer's EPS because the acquirer has to pay more for each dollar of earnings than the market values its own earnings.
- II. **Goodwill**
  - A. Goodwill is an intangible asset that reflects the value of a company not attributed to other assets and liabilities.
  - B. Goodwill in a transaction is equity purchase price – target's fair market value
  - C. Goodwill is not amortized because it is an intangible asset. It can be tested annually for a revision.
- III. **Why do you subtract cash in the Enterprise Value Formula?**
  - A. Cash is considered a non-operating asset and it is already implicitly accounted for within equity value.
- IV. **Net Working Capital**
  - A.  $NWC = \text{Current Assets (excl. Cash)} - \text{Current Liabilities (excl. ST-Debt)}$
- V. **What are some differences between a strategic acquisition and a financial sponsor acquisition?**
  - A. Strategic acquisitions occur when one industry incumbent buys another. They can be horizontal (Ford buying Toyota) or vertical (Ford buying a tire maker).
    1. The financial objectives of these deals are to obtain synergies, and to be accretive to net income
    2. The strategic objectives are to expand geographic presence, acquire a new customer base, acquire a new technology, etc. In short, to gain a competitive edge.
  - B. Financial sponsor deals often use an outsized amount of debt (leverage). These deals are often called Leveraged Buyouts or LBOs. The goal of a financial sponsor is purely to earn a return, so they aren't as focused on accretion/dilution or synergies. The firm wants to buy the business, improve it, then sell it and make their money back & a nice profit (a return).

# Appendix



- First**, Net Income from the bottom of the Income Statement becomes the top line of the Cash Flow Statement.
- Second**, you add back non-cash expenses from the Income Statement (and flip the signs of items such as Gains and Losses).
- Third**, you reflect changes in *operational* Balance Sheet line items – if an Asset goes **up**, cash flow goes **down** and vice versa; if a Liability goes **up**, cash flow goes **up** and vice versa.
- Fourth**, you reflect Purchases and Sales of Investments and PP&E in Cash Flow from Investing.
- Fifth**, you reflect Dividends, Debt issued or repurchased, and Shares issued or repurchased in Cash Flow from Financing.
- Sixth**, you calculate the net change in cash at the bottom of the CFS, and then link this into cash at the top of the *next* period's Balance Sheet.
- Seventh**, you update the Balance Sheet to reflect changes in Cash, Debt, Equity, Investments, PP&E, and anything else that came from the Cash Flow Statement.



Cash Flow Statement		
	Year 1	Year 2
<b>Operating Activities:</b>		
<b>Net Income:</b>	\$ 576	\$ 627
<b>Non-Cash Expenses &amp; Other Adjustments:</b>		
Depreciation:	20	25
Stock-Based Compensation:	10	15
Amortization of Intangibles:	15	20
(Gain) / Loss on Sale of PP&E:	(1)	-
<b>Changes in Operating Assets &amp; Liabilities:</b>		
Accounts Receivable:	5	(2)
Prepaid Expenses:	(2)	3
Inventory:	(3)	2
Accounts Payable:	4	(5)
Accrued Expenses:	1	(3)
Deferred Revenue:	9	5
<b>Cash Flow from Operations:</b>	<b>634</b>	<b>687</b>
<b>Investing Activities:</b>		
Purchase Short-Term Investments:	(2)	(1)
Sell Short-Term Investments:	3	5
Purchase Long-Term Investments:	(4)	(5)
Sell Long-Term Investments:	1	2
Capital Expenditures:	(10)	(15)
PP&E Sale Proceeds:	5	2
<b>Cash Flow from Investing:</b>	<b>(7)</b>	<b>(12)</b>
<b>Financing Activities:</b>		
Dividends Issued:	(10)	(11)
Issue Long-Term Debt:	4	5
Repay Long-Term Debt:	(1)	(2)
Issue Short-Term Debt:	2	3
Repay Short-Term Debt:	(1)	(2)
Repurchase Shares:	(5)	(5)
Issue New Shares:	6	6
<b>Cash Flow from Financing:</b>	<b>(5)</b>	<b>(6)</b>
<b>Beginning Cash:</b>	<b>\$ 100</b>	<b>\$ 722</b>
<b>Increase / Decrease in Cash:</b>	<b>\$ 622</b>	<b>\$ 669</b>
<b>Cash &amp; Cash Equivalents:</b>	<b>\$ 722</b>	<b>\$ 1,391</b>

Balance Sheet		
	Year 1	Year 2
<b>Assets:</b>		
<b>Current Assets:</b>		
Cash & Cash-Equivalents:	\$ 722	\$ 1,391
Short-Term Investments:	99	95
Accounts Receivable:	95	97
Prepaid Expenses:	102	99
Inventory:	103	101
<b>Total Current Assets:</b>	<b>1,121</b>	<b>1,783</b>
<b>Long-Term Assets:</b>		
Plants, Property & Equipment (PP&E):	986	974
Other Intangible Assets:	185	165
Long-Term Investments:	103	106
Goodwill:	100	100
<b>Total Long-Term Assets:</b>	<b>1,374</b>	<b>1,345</b>
<b>Total Assets:</b>	<b>\$ 2,495</b>	<b>\$ 3,128</b>
<b>Liabilities &amp; Equity:</b>		
<b>Current Liabilities:</b>		
Revolver (Short-Term Debt):	\$ 101	\$ 102
Accounts Payable:	204	199
Accrued Expenses:	201	198
<b>Total Current Liabilities:</b>	<b>506</b>	<b>499</b>
<b>Long-Term Liabilities:</b>		
Deferred Revenue:	209	214
Deferred Tax Liability:	200	200
Long-Term Debt:	103	106
<b>Total Long-Term Liabilities:</b>	<b>512</b>	<b>520</b>
<b>Total Liabilities:</b>	<b>\$ 1,018</b>	<b>\$ 1,019</b>
<b>Shareholders' Equity:</b>		
Common Stock & APIC:	616	637
Treasury Stock:	(105)	(110)
Retained Earnings:	866	1,482
Accumulated Other Compr. Income:	100	100
<b>Total Shareholders' Equity:</b>	<b>1,477</b>	<b>2,109</b>
<b>Total Liabilities &amp; Equity:</b>	<b>\$ 2,495</b>	<b>\$ 3,128</b>

Income Statement		
	Year 1	Year 2
<b>Revenue:</b>	<b>\$ 1,300</b>	<b>\$ 1,500</b>
Cost of Goods Sold (COGS):	100	150
<b>Gross Profit:</b>	<b>1,200</b>	<b>1,350</b>
<b>Operating Expenses:</b>		
Depreciation:	20	25
Stock-Based Compensation:	10	15
Amortization of Intangibles:	15	20
<b>Operating Income:</b>	<b>955</b>	<b>1,040</b>
Interest Income:	5	6
(Interest Expense):	(3)	(4)
Gain / (Loss) on Sale of PP&E:	1	-
Other Income / (Expense):	2	3
<b>Pre-Tax Income:</b>	<b>960</b>	<b>1,045</b>
Income Tax Provision:	384	418
<b>Net Income:</b>	<b>\$ 576</b>	<b>\$ 627</b>