

Ratio Analysis

$$\text{ROE} = \frac{\text{NetIncome}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{BookShareholder'sEquity}_{\text{BOP}}} = \frac{\text{NetIncome}}{\text{BookShareholder'sEquity}_{\text{BOP}}}$$

- ROE is a measure of efficiency
- If need BOP equity, use Net Worth – Net Income
- BOP = Beginning of Period

$$\text{Sustainable growth rate in sales} = \text{ROE}_{\text{BOP}} (1 - \text{payout rate}) + (\text{new equity})$$

- ROE_{BOP} is the return on beginning of the period equity
- Payout rate is the firm's dividend payout ratio, defined as dividends divided by earnings
- Sustainable growth assumes that ratios in DuPont equation are constant
- Binding only if you cannot or will not raise equity or let D/E ratio increase
- What to do when actual growth exceeds sustainable growth (need more cash)
 - Sell new equity
 - Increase financial leverage
 - Reduce the dividend payout
 - Prune away marginal activities
 - Outsource some or all of production
 - Increase Prices
 - Merge with "Cash Cow"

$$\text{ROA} = \frac{\text{EBIT} - \text{tax}}{\text{Assets}}$$

- Differs from ROE in that it measures profit as a percentage of money provided by owners and creditors as opposed to only the money provided by owners.

$$\text{Profit Margin} = \frac{\text{NetIncome}}{\text{Sales}}$$

$$\text{Acid test} = \frac{\text{Cash} + \text{AR} + \text{STInvestments}}{\text{CurrentLiabilities}}$$

**doesn't include inventories

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Assets}}$$

$$\text{Interest coverage} = \frac{\text{EBIT}}{\text{InterestExpense}}$$

$$\text{Financial Leverage} = \frac{\text{Assets}}{\text{Shareholder'sEquity}}$$

$$\text{Days receivable} = \frac{\text{AR} \times 365}{\text{Sales}}$$

$$\text{Inventory Turnover} = \frac{\text{COGS}}{\text{EndingInventory}}$$

$$\text{Days inventory} = \frac{\text{AverageInventory} \times 365}{\text{COGS}}$$

$$\text{Times Interest Earned} = \frac{\text{EBIT}}{\text{InterestExpense}}$$

$$\text{Days payable} = \frac{\text{AP} \times 365}{\text{Purchases}}$$

$$\text{Current ratio} = \frac{\text{CurrentAssets}}{\text{CurrentLiabilities}}$$

$$\text{Collection period} = \frac{\text{AR} \times 365}{\text{CreditSales}}$$

$$\text{Earnings per share} = \frac{NI}{\text{AvgShares}}$$

$$\text{Dividend payout ratio} = \frac{\text{Dividends}}{NI}$$

Ratio Analysis

- (1) Compare to the ratio rules of thumb
- (2) Compare them to industry averages
- (3) Look for changes in ratios over time
- (4) Find impact and consequences of changes
- (5) Ask why
- (6) Use sensitivity analysis

Valuation

- DCF (APV, FCF, EVA)
- Earnings multiples
- Asset multiples
- Comparables
- Contingent claims

Discounted Cash Flow Techniques

FCF_F

- $EBIT(1 - t) + \text{Depreciation} - \text{CapEx} - \Delta(\text{Working Capital}) + \Delta(\text{Accrued Taxes}) + \text{Extras}$
- If use real CF, use real discount rate; if use nominal CF, use nominal discount rate
- Working capital = current assets – current liabilities
- $\text{CapEx} = \Delta \text{ net fixed assets (PP\&E and other fixed)} + \text{depreciation}$
- $\text{WACC} = (1 - t) * k_D * (\%D) + k_E * (\%E)$
 - MARKET value of debt and equity
 - Tax shield is in WACC
- CAPM: $k_E = (\text{long governments} - 1\%) + \beta * (\text{risk premium})$ **risk premium = 8%
- compare k_D (market rate, not historic) to rates of various rated bonds – see if it is realistic
- use twin firm to get numbers that don't know – β , target capital structure, etc.
- use *project's* cash flows, *project's* cost of capital, *project's* capital structure
- $\beta_U = \frac{E}{TC} \beta_E + \frac{D}{TC} \beta_D$ ** β_D usually is 0
- $\beta_L = \left[\beta_U - \frac{D}{TC} \beta_D \right] \times \frac{TC}{E}$
- Unlever β_E so that it assumes no debt, no financial risk, only operating/systematic risk and relever at target capital structure for *project* (MARKET value of equity, BOOK value of debt – *get all interest-bearing debt*)
- Assumes linear approximation for risk
- Asset beta measures the business risk, while the equity beta reflects the combined effect of business and financial risk
- Use sensitivity analysis to determine how essential each number is and how it affects the calculations
- WACC assumptions:
 - Constant debt-to-equity ratio
 - Perpetual debt – it is never paid down
 - k_D is the market rate (counter example: industrial revenue bonds)
 - As value of firm increases, value of debt increases in order to keep D/E constant

- Does not take into account other securities such as preferred stock
- Assumes financial and operating risk are constant
- Can adjust capital structure in k_o

$$FCF_D = \text{Interest} + \text{Sinking Funds} + \text{Debt Repayments}$$

$$FCF_E = \text{NI} + \text{Depreciation} - \text{CapEx} - \Delta \text{Working Capital} + \Delta \text{Accrued Taxes} + \text{Extras} - \text{Sinking Funds} - \text{Debt Repayments}$$

Terminal Value

- Random tips
 - Finding breakeven point is useful
 - Consider tax write off although there may be no salvage value at year end
 - *Make sure to discount back to present*
- Perpetuity
 - $TV_F = \frac{FCF_F(1+g)}{k_o - g}$ **discount back to PV
- Liquidation/book value
 - $TV_F = \text{PP\&E} + \text{net working capital} + \text{goodwill} + \text{other assets}$ ** remove liabilities if want V_E
 - If $ROTC = \frac{EBIT \times (1-t)}{\text{BookValue}} > k_o$, then asset market value > book value
 - If $ROE > k_E$, then sell equity sells above net worth
- Earnings multiple
 - $\frac{P}{E} \times NI$ yields TV_E – to get TV_F , add in TV_D ; more debt decreases P/E multiple; may need to subtract capital gains taxes
 - Do this ratio for a comparable company: $\frac{MV_F}{EBIT}$ then multiply the ratio by the company of interest to get approximate MV_F

APV

- Values project as if it is all-equity financed
- Adds back $PV(\text{tax shields}) = PV(k_D * D * t)$
- FCF_F is the same as the WACC method
- Discount FCF_F at unlevered cost of capital
- If debt is stable and one-time, use k_D
If D/V_F is constant, use risk of the firm because debt and tax shields vary with value of firm
- Capital structure can change
- Uses hybrid securities
- Interest rates don't need to be market
- Varying discount rate can be disadvantageous
- Doesn't pick up additional cost of financial distress with leverage

Strategy

- A change in product market strategy should correspond to an appropriate change in financial policies.

Sources and Uses

- If an asset goes down or liability goes up it is a source of funds
- If an asset goes up or a liability goes down it is a use of funds

Financing Options

- Right amount of debt – look at internal (what CFs support), external (ratings), and cross-sectional (industry)
- Set a target capital structure: if it is too low, vulnerable to takeover; if it is too high, cost of financial distress, bankruptcy
- Bank debt
- Private placement
- Long term debt (rate, maturity, covenants, sinking funds, call provisions)
- Equity – common and preferred
- Convertible debt
- Convertible preferred
- Capital market execution

Various Equations:

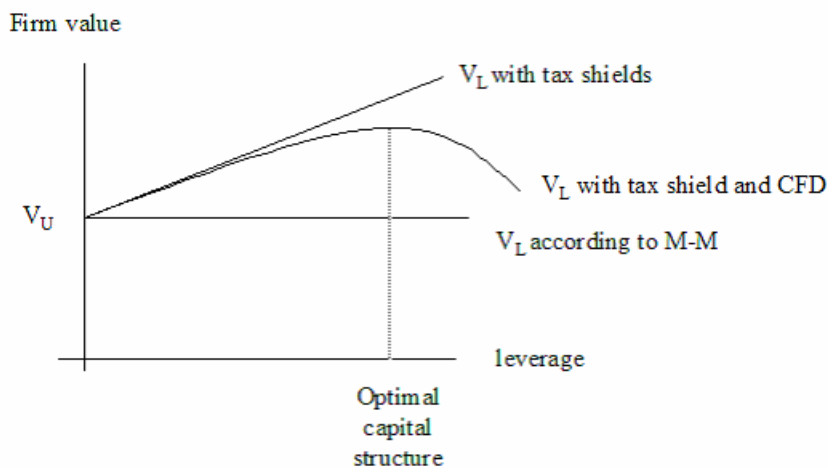
- Working capital = current assets – current liabilities
- Capex = PP&E this time period + other LT assets this time period + depreciation – PP&E last time period – other LT assets this time period
- Accrued taxes = Last time period's taxes + new taxes (IS) – payment
- End inventory = starting inventory + production – COGS
- New shareholder's equity (RE) = Last time period's SE (RE) + NI
- Total liabilities + NW w/o bank + [bank loan] = total assets w/o cash + [cash]
- Assets + [cash] = liabilities + common stock + RE + [bank loan]
- $NW = ROE * (1 - \text{dividends})$
- $EBIT * (1-t) = NI + (1-t) * \text{interest}$
- Dividends = NI - ΔNW
- $\Delta NW = \Delta WC + \Delta PP\&E - \Delta D$
- $V_F = V_D + V_E$
- $FCF_F \neq FCF_D + FCF_E$
- External Funding Required = Total Assets – (Liabilities + Owner's Equity)

Capital Structure Notes

- Modigliani Miller Theorem (1958)
 - Ignores taxes, cost of financial distress, transaction costs, asymmetric information, manager's decisions
 - Assumes complete markets (wanted asset is always available), market efficiency
 - Hold constant the firm's investment policies
 - *Choice of capital structure is irrelevant for firm value*
- Miller Modigliani Theorem (1961)
 - *Dividend policy is irrelevant*
- Modigliani Miller Theorem (1963)
 - Interest payments are tax exempt for the firm
 - Dividends and earnings are taxed for the firm
 - Assumes no personal taxes
 - Debt increases firm value by reducing the tax burden
 - Size of the pie stays the same, but IRS gets a slice of the pie

- V_F (w/debt) = V_F (all equity) + PV[tax shield]
 $PV[\text{tax shield}] = t^*D$
- Caveat: not all firms face full marginal tax rate
- *Tax shield of debt matters and affects capital structure*

- Remarks
 - *Excess cash = negative debt*
 - Investors don't save when they receive interest – they prefer capital gains
- Cost of financial distress:
 - Legal costs
 - Scare off customers and suppliers
 - Agency costs (cash in and run, delay liquidation, excessive risk taking)
 - Debt overhang (shareholders of firms with high leverage are reluctant to fund +NPV investments if benefits go to creditors)
 - Covenants, junior debt issues, and bankruptcy can help to alleviate some of these CFDs
- *Static trade-off theory: optimal target capital structure is determined by balancing tax shield of debt and expected costs of financial distress*
- Asymmetric information: managers have more information about the firm than outside investors
- Signaling:
 - Cash in = negative signal (cut dividends, issue equity)
 - Cash out = positive signal (increase dividends, repurchase stock)
- Free cash flow problem: managers in firms with lots of free cash flow and bad investment opportunities may be reluctant to simply give the excess cash back to shareholders
- LBOs increase efficiency through improved managerial incentives and better monitoring by creditors
- Optimal capital structure graph:



Various Cases

Wilson Lumber

- Ratios
- Sources and uses
- Financing with debt considerations
- Cash cycle
- Pro formas

Massey Ferguson

- With merger, assume debt – wait until after bankruptcy so as not to assume debt
- Align product market strategy with financial market strategy
- Costs of financial distress
- Total risk = BBR + financial risk

Play Time Toy Company

- Use sensitivity analysis to determine how essential the numbers are to making a profit
- With a change in the amount of loans from one project to another, take into account the greater or less interest expense
- With a change in the amount of cash from one project to another, take into account the greater or less interest income
- Inventory is less secure than AR
- Risk-return tradeoff

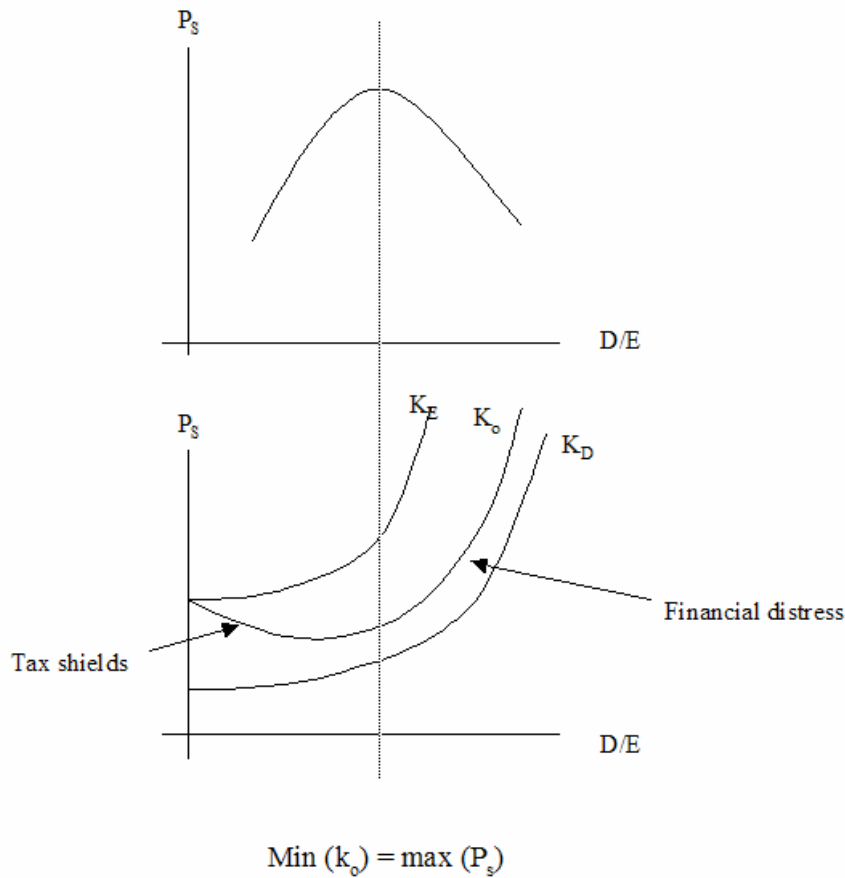
Sure Cut Shears

- Pro formas
- Analyze sources and uses and differences between actual and expected

Marriot

- Negative working capital is a source of interest-free financing
- $k_d < k_e$ (generally)
- $D \uparrow \rightarrow (D/E) \uparrow \rightarrow k_d \uparrow \rightarrow \beta \uparrow \rightarrow k_e \uparrow \rightarrow EPS \uparrow \rightarrow (P/E) \downarrow$
 $P_s = f(k_e, EPS)$
if k_e constant, $\Delta EPS = \Delta P_s$
if $k_e \uparrow$, $\Delta P_s < \Delta EPS \rightarrow P_s/E \downarrow$
- Too much debt: financial distress, violate covenants, ratings decrease, competitive attack
Too little debt: cost of capital increases, stock price decreases, LBO target
- Maturity of product market strategy = maturity of financial market strategy
- Preferred stock behaves like debt
- Convertible – bond and an option, lower interest rate, pays on upside, for volatile firms
- Too much cash (ROE > growth):
 - Increase dividends
 - Buy back stock
 - Acquire
 - Pay down debt
 - Reinvest in projects/grow faster
- Open market purchase – need to announce, cheaper and slower than tender offer
- *Always a price which makes an investment look bad; usually one that makes it look good*

- Graphs:



AT&T

- Reluctance to issue equity:
 - Financial slack
 - Internal cap market
 - Sustainable growth
 - Debt ratio – want access
 - Costs of false signaling
- In determining financing, compare to competitors, debt maturity \geq product market strategy
- Financial policies
- Pecking order theory: rely on internal, then debt, then equity/dividends

Intel

- Various types of repurchases
- Consider when money goes in and out, for a given financing option

Harris Seafoods

- Industrial revenue bonds
- 3 pieces to investment decision:
 - strategy
 - valuation
 - execution

Dixon

- WACC
- APV method
- APT
- Fama-French factors

Diamond

- Lessons learned:
 - Cash is king
 - Ignore fictional accounting accrual flows (non-cash)
 - Ignore sunk costs
 - Ignore CFs of unrelated projects
 - Capture impact of projects CFs anywhere it occurs in company
 - Capture real timing of CFs
 - Remember TV and abandonment costs
 - Human nature and politics will sometime override correct analysis
 - Use NPV, not IRR, payback, or EPS
 - Real CFs at real discount rate or nominal CFs at nominal CF
- If option can only be used for one project at a time, then cost is to be incurred by that project; otherwise, if it can be used by multiple projects at once, then do not include it is cash flows
- Real options have value

Arundel

- Real options

Congoleum

- LBO – take company private and finance with debt
- Value created
 - interest tax shield
 - depreciation tax shield
 - management incentive

Kennecott

- Valuing firm using FCF_F and FCF_E
- Goodwill
- How to limit managerial discretion:
 - proxy fight
 - lawsuit
 - stock price decreases
 - takeover
 - board of directors

My Additions

$$\text{NumberofShares} = \frac{\text{NetIncome}}{\text{EPS}}$$

Convertible debt allows you to sort of use “backdoor” equity. Call it debt but really its equity. This keeps from having the price of your stock decrease like it would if you offered equity.