Class #4
"Using Accounting Earnings for Valuation"

aka "EBO Valuation" or
"Abnormal Earnings Valuation" or
"Residual Income Valuation"

Where have we been & where are we going?

- Where have we been?
  - Valuation Basics
  - Calculating Cash flows
- Today
  - Overview of Dell Abnormal Earnings Valuation
  - Quickly discuss accounting and real options
- What we still need?
  - Other techniques: Multiples Valuation (Next Class)
  - Forecasting earnings and cashflows
  - Avoid being fooled by financial statements

Discussion of E-Assignment #1: Dell Valuation

- Approach to teaching *Financial Valuation & Analysis*:
  - First, we define the problem we are facing, then knowing the context, we build a set of tools to solve the problem.
- We are starting to see the issues:
  - Must estimate earnings, cashflows, balance sheet items.
  - Must avoid the pitfalls of “misleading” financial reports … managers may want to fool you.
  - Must estimate risk, growth, etc.
  - Yahoo! data and analysts’ estimates are a “crutch” right now.

Aside … What is "Value Added" in Performance Measurement?

- *What is Value Added?*
  - Can we determine if company has invested capital wisely?
- Starting Point: Market Value Added (MVA)
  - MVA for All Investors (Debt+Equity)
    - MVA = Market Value (D+E) – Invested Capital (D+E)
  - MVA for Equityholders (just Equity)
    - MVA = Market Value (Equity) – Invested Capital (Equity)
  - Qualifications?
    - Invested Capital is from the past! Market Value is from Today!

What is Value Added in Valuation?

- The "value added methodologies" are used to measure the profits (or losses) generated by a firm for a given level of capital investment & the risk of these investments:
  - Also called *residual income* or *abnormal earnings*
- Value Added (for all investors … Debt + Equity):
  = Net Operating Profit after tax – Capital charge
  - *NOPAT = Net Operating Profit after Tax*
  - *Capital charge = r_{assets} * Value of Assets at start of year*
- Residual Income for Equityholders:
  = Net Income – Capital charge
  - *Capital charge = r_{equity} * Value of Equity at start of year*

Why "Abnormal Earnings" or "Residual Income" Valuation?

- REMINDER! Valuation ultimately boils down to DCF (or discounted dividends).
- Big Problem: Estimating future FCF's or dividends.
  - Does there exist a *meaningful* way to map accounting numbers into equity value given that cash is real?
  - Traditional answer: NO, given that …
    - Accrual-based accounting numbers do not take into account the timing of cash flows.
    - Earnings do not perfectly reflect investments in the same way as FCF does.
    - (*Most of all)* Accounting numbers can be manipulated.
- BUT: DCF is based on forecasting accruals (sales, profit margins, earnings) and then unraveling them….

Starting Point for “AE" Valuation:

Intuition:

– The value of the firm (or equity in the firm) can be the sum of three components:

1) Original Invested Capital
   - What is the starting value of funds originally contributed by investors (equityholders).
2) Normal rate of return on Invested Capital
   - Basically determined by cost of capital (“r”).
3) Abnormal return on Invested Capital
   - Abnormal earnings (residual income) above normal rate of return.

The Model

- Use this idea to express current equity value of the firm as a function of book value of the firms and *abnormal earnings:*

$$\text{Equity Value}_0 = BV_0 + \sum_{t=1}^{\infty} [AE_t/(1+r)^t]$$

where: BV_t = Book value of equity at beginning of year t

r = Cost of equity capital

AE_t = Expected value of abnormal earnings in year t
= Projected earnings in yr t - (r * BV of equity at beginning of year t)

Where does model come from?

- Basically a rearrangement of the discounted dividend or FCF valuation models.
- Combines “current value” on the balance sheet with the present value of future “abnormal earnings”.
- In theory, should give the same answer as discounted dividend and DCF (or free cash flow) valuation models.
- Uses accounting numbers (which are easy to observe) and future projections of earnings (which are easier to project … analysts).

Overview of Steps of Abnormal Earnings Valuation

Step 1: Forecast earnings in each year t=1,...,T in the forecast horizon.

Step 2: Estimate "r", the cost of equity capital.

Example using CAPM:

$r = Rf + \beta^* [E(R_M) - Rf]$ where

Rf = "Riskless" return

β = Beta on common stock

$E(R_M) – Rf$ = Expected risk premium on market portfolio

Steps - Continued

Step 3: Estimate expected abnormal earnings in each yr t = 1,..,T in forecast horizon:

$$AE_t = E_t - (r * BV_{t-1})$$

Step 4: Use "r" to estimate the PV of abnormal earnings during the forecast horizon:

$$AE_1/(1+r)^1 + AE_2/(1+r)^2 + ... + AE_T/(1+r)^T$$

Step 5: Estimate the PV of expected abnormal earnings beyond the forecast horizon:

- Use perpetuity
- Use growing perpetuity

Steps – Terminal Values

- PERPETUITY METHOD
  - Estimate AE in year T+1
  - Assume AE constant beyond year T+1

$$\text{PV of AE beyond yr T} = [AE_{T+1} / r] / (1+r)^T$$

- GROWING PERPETUITY METHOD
  - Estimate AE in year T+1
  - Assume AE grow beyond year T+1 forever at rate g/year

$$\text{PV of AE beyond yr T} = [AE_{T+1} / (r - g)] / (1+r)^T$$

Steps – Final Step

Step 6: Computer equity value by summing together the parts:

Equity Value = BV of equity at beginning of yr 1
+ PV of AE during forecast horizon (Step 4)
+ PV of AE beyond forecast horizon (Step 5)

EBO Valuation using Dell Computer Example.

- Inputs:
  - BV_0 = \$1.80 (Book value of equity per share at the end of the 3rd quarter of fiscal year. From latest financials on Yahoo!
    http://biz.yahoo.com/z/a/d/dell.html
    - 2003 year end is NOW!
    - Therefore, small adjustment to BV_0
    - Use estimate of current (4th quarter earnings = \$0.23)
    - Therefore, updated $BV_0 = BV_0 + EPS_{4thQ} = 1.80 + 0.23 =$ \$2.03
  - Take Yahoo! earnings forecasts for 2004:
    E_1 = \$0.99

EBO Valuation using Dell Computer Example.

- Inputs:
  - % 5 year growth in EPS is projected to be: 15%
    - $E_2 = E_1*(1+g) = \$0.99*(1.15) = \$1.14$
    - $E_3 = E_2*(1+g) = \$1.14*(1.15) = \$1.31$
    - $E_4 = E_3*(1+g) = \$1.31*(1.15) = \$1.51$
    - $E_5 = E_4*(1+g) = \$1.51*(1.15) = \$1.73$
  - Cost of Capital (from CAPM)

    R = Rf + Beta*(Rm-Rf)

    = 5% + 1.79*(8%) = 19.3%

EBO Valuation using Dell Computer Example.

- Calculations:

$BV_1 = BV_0 + (E_1 - DIV_1) = 2.03 + (0.99 - 0) = \$3.02$
$BV_2 = BV_1 + (E_2 - DIV_2) = 3.02 + (1.14 - 0) = \$4.16$
$BV_3 =$
$BV_4 =$
$BV_5 =$

$AE_1 = E_1 - r*BV_0 = 0.99 - (0.193)*2.03 = \$0.60$
$AE_2 = E_2 - r*BV_1 = 1.14 - (0.193)*3.02 = \$0.55$
$AE_3 = ?$
$AE_4 = ?$
$AE_5 = ?$

EBO Valuation using Dell Computer Example.

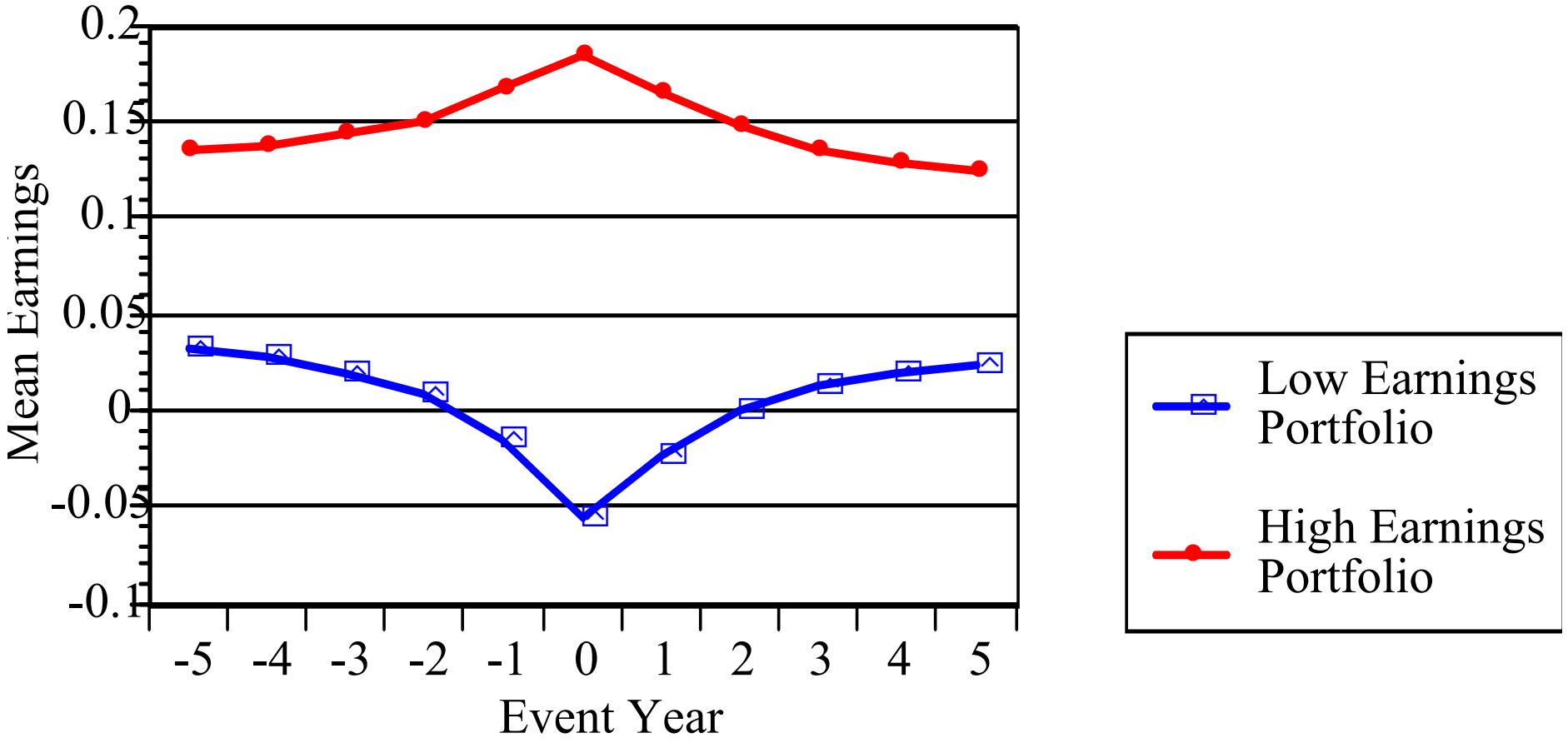
- Final Calculation:

$$P = BV_0 + AE_1/(1+r) + AE_2/(1+r)^2 + \text{PV of future AE?}$$

In this case, let's assume AE → 0 in year 9:

$$P = 2.03 + 0.60/(1+r) + 0.56/(1+r)^2 + 0.51/(1+r)^3 + 0.45/(1+r)^4 + 0.38/(1+r)^5 + \ldots.$$

Extreme Earnings Reverts to "Normal Rate of Return"



How Will Abnormal Earnings Evolve in the Future?

- By their very definition, AE are hard to sustain:
  - Positive abnormal earnings – Competitors enter
  - Negative abnormal earnings – Takeover, management fired, restructuring, etc.
- Potential Problems:
  - What if Book Value of Equity (BV) is incorrectly measured?
  - Why might BV be too low?

Final Calculations for DELL

Predicted Price of Dell based on abnormal earnings valuation is:

P = _____

What is current price of DELL? Around $23.00

Is our assumption about future AE valid? Why?

Comparison with DCF – Equivalent?

- Simpler than DCF:
  - Forecast accounting variables directly
  - Cost of capital calculation is easier (than WACC)
  - Terminal value is less important than in DCF-context … Easier to implementation assumption about future earnings (or *abnormal* earnings). Compare this with your DCF analysis for DELL!
  - Terminal value represents only stream of *abnormal* earnings beyond the forecast horizon

Problems with Residual Income Valuation

- If the balance sheet does not recognize the current value of assets (or fails to recognize them at all), then what does this imply for abnormal earnings?
  - Book value fails to account for certain assets that do generate cashflows!
  - $AE_t = E_t - r*BV_{t-1}$
  - Implications for future AE?
  - Intangibles: patents, R&D, trademarks, brandnames, etc.

Intangibles

- If the balance sheet does not recognize intangible assets, then what does this imply for abnormal earnings?
  - Measured “abnormal earnings” may persist forever.
- Intangibles:
  - Patents, trademarks, brandnames, etc.
  - Account for “investments” in a factory?
  - Account for “investments” R&D, advertising, employee training?

Real Options

- Most valuation approaches (DCF, AE, etc) fail to account for real options:
  - Option to abandon poorly-performing businesses
  - Option to expand the “winners”
  - Option to redeploy or adapt assets to superior use
  - Option to wait before investing (gold-mine example)

Real Options: Practical Issues

- How do you take into account real options?
  - Practical approach #1: Consider P/E ratio or M/B ratio for valuation. If firm is earning losses then which should you use?
  - Berger, Ofek and Swary (JFE 1995)
    - Consider the type of assets on the balance sheet – tangible versus intangible (cash versus brand-name)
    - What type of assets are valuable if firm "crashes"?
    - The "Worst Case Scenario" valuation of assets on balance sheet …. Explains why balance sheets often have "conservative" valuation of assets (Historical cost).

Where Next?

- Next Class – “Comparative Analysis”
  - Priced Based Financial Ratios
  - Accounting Based Ratios
- Skim Section F of Course Reader (“Introduction to Profitability and Risk Analysis”).
- Assignment #1 is due in class on Tuesday, February 25, 2003.