5. Be circumspect about defining debt for cost of capital purposes…

- General Rule: Debt generally has the following characteristics:
  - Commitment to make fixed payments in the future
  - The fixed payments are tax deductible
  - Failure to make the payments can lead to either default or loss of control of the firm to the party to whom payments are due.
- Defined as such, debt should include
  - All interest bearing liabilities, short term as well as long term
  - All leases, operating as well as capital
- Debt should not include
  - Accounts payable or supplier credit
- Be wary of your conservative impulses which will tell you to count everything as debt. That will push up the debt ratio and lead you to understate your cost of capital.

Book Value or Market Value

- You are valuing a distressed telecom company and have arrived at an estimate of $ 1 billion for the enterprise value (using a discounted cash flow valuation). The company has $ 1 billion in face value of debt outstanding but the debt is trading at 50% of face value (because of the distress). What is the value of the equity to you as an investor?
  a. The equity is worth nothing (EV minus Face Value of Debt)
  b. The equity is worth $ 500 million (EV minus Market Value of Debt)

- Would your answer be different if you were told that the liquidation value of the assets of the firm today is $1.2 billion and that you were planning to liquidate the firm today?

But you should consider other potential liabilities when getting to equity value

- If you have under funded pension fund or health care plans, you should consider the under funding at this stage in getting to the value of equity.
  - If you do so, you should not double count by also including a cash flow line item reflecting cash you would need to set aside to meet the unfunded obligation.
  - You should not be counting these items as debt in your cost of capital calculations….
- If you have contingent liabilities - for example, a potential liability from a lawsuit that has not been decided - you should consider the expected value of these contingent liabilities
  - Value of contingent liability = Probability that the liability will occur * Expected value of liability

6. Equity Options issued by the firm..

- Any options issued by a firm, whether to management or employees or to investors (convertibles and warrants) create claims on the equity of the firm.
- By creating claims on the equity, they can affect the value of equity per share.
- Failing to fully take into account this claim on the equity in valuation will result in an overstatement of the value of equity per share.

Why do options affect equity value per share?

- It is true that options can increase the number of shares outstanding but dilution per se is not the problem.
- Options affect equity value at exercise because
  - Shares are issued at below the prevailing market price. Options get exercised only when they are in the money.
  - Alternatively, the company can use cashflows that would have been available to equity investors to buy back shares which are then used to meet option exercise. The lower cashflows reduce equity value.
- Options affect equity value before exercise because we have to build in the expectation that there is a probability and a cost to exercise.

A simple example…

- XYZ company has $ 100 million in free cashflows to the firm, growing 3% a year in perpetuity and a cost of capital of 8%. It has 100 million shares outstanding and $ 1 billion in debt. Its value can be written as follows:

Value of firm = 100 / (.08-.03)	= 2000
Debt	= 1000
= Equity	= 1000
Value per share	= 1000/100 = $10

Now come the options…

- XYZ decides to give 10 million options at the money (with a strike price of $10) to its CEO. What effect will this have on the value of equity per share?
  a. None. The options are not in-the-money.
  b. Decrease by 10%, since the number of shares could increase by 10 million
  c. Decrease by less than 10%. The options will bring in cash into the firm but they have time value.

Dealing with Employee Options: The Bludgeon Approach

- The simplest way of dealing with options is to try to adjust the denominator for shares that will become outstanding if the options get exercised.
- In the example cited, this would imply the following:

Value of firm = 100 / (.08-.03)	= 2000
Debt	= 1000
= Equity	= 1000
Number of diluted shares	= 110
Value per share	= 1000/110 = $9.09

Problem with the diluted approach

- The diluted approach fails to consider that exercising options will bring in cash into the firm. Consequently, they will overestimate the impact of options and understate the value of equity per share.
- The degree to which the approach will understate value will depend upon how high the exercise price is relative to the market price.
- In cases where the exercise price is a fraction of the prevailing market price, the diluted approach will give you a reasonable estimate of value per share.

The Treasury Stock Approach

- The treasury stock approach adds the proceeds from the exercise of options to the value of the equity before dividing by the diluted number of shares outstanding.
- In the example cited, this would imply the following:

Value of firm = 100 / (.08-.03)	= 2000
Debt	= 1000
= Equity	= 1000
Number of diluted shares	= 110
Proceeds from option exercise	= 10 * 10 = 100
Value per share	= (1000+ 100)/110 = $ 10

Problems with the treasury stock approach

- The treasury stock approach fails to consider the time premium on the options. In the example used, we are assuming that an at the money option is essentially worth nothing.
- The treasury stock approach also has problems with out-of-the-money options. If considered, they can increase the value of equity per share. If ignored, they are treated as non-existent.

Dealing with options the right way…

- Step 1: Value the firm, using discounted cash flow or other valuation models.
- Step 2: Subtract out the value of the outstanding debt to arrive at the value of equity. Alternatively, skip step 1 and estimate the of equity directly.
- Step 3:Subtract out the market value (or estimated market value) of other equity claims:
  - Value of Warrants = Market Price per Warrant * Number of Warrants
    : Alternatively estimate the value using option pricing model
  - Value of Conversion Option = Market Value of Convertible Bonds - Value of Straight Debt Portion of Convertible Bonds
  - Value of employee Options: Value using the average exercise price and maturity.
- Step 4:Divide the remaining value of equity by the number of shares outstanding to get value per share.

Valuing Equity Options issued by firms… The Dilution Problem

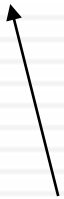
- Option pricing models can be used to value employee options with four caveats –
  - Employee options are long term, making the assumptions about constant variance and constant dividend yields much shakier,
  - Employee options result in stock dilution, and
  - Employee options are often exercised before expiration, making it dangerous to use European option pricing models.
  - Employee options cannot be exercised until the employee is vested.
- These problems can be partially alleviated by using an option pricing model, allowing for shifts in variance and early exercise, and factoring in the dilution effect. The resulting value can be adjusted for the probability that the employee will not be vested.

Back to the numbers… Inputs for Option valuation

- Stock Price = $ 10
- Strike Price = $ 10
- Maturity = 10 years
- Standard deviation in stock price = 40%
- Riskless Rate = 4%

Valuing the Options

- Using a dilution-adjusted Black Scholes model, we arrive at the following inputs:
  - N (d1) = 0.8199
  - N (d2) = 0.3624
  - Value per call = $ 9.58 (0.8199) - $10 exp-(0.04) (10) (0.3624) = $5.42



Dilution adjusted Stock price

Value of Equity to Value of Equity per share

- Using the value per call of $5.42, we can now estimate the value of equity per share after the option grant:

Value of firm = 100 / (.08-.03)	= 2000
Debt	= 1000
= Equity	= 1000
Value of options granted	= $ 54.2
= Value of Equity in stock	= $945.8
/ Number of shares outstanding	/ 100
= Value per share	= $ 9.46

To tax adjust or not to tax adjust…

- In the example above, we have assumed that the options do not provide any tax advantages. To the extent that the exercise of the options creates tax advantages, the actual cost of the options will be lower by the tax savings.
- One simple adjustment is to multiply the value of the options by (1- tax rate) to get an after-tax option cost.

Option grants in the future…

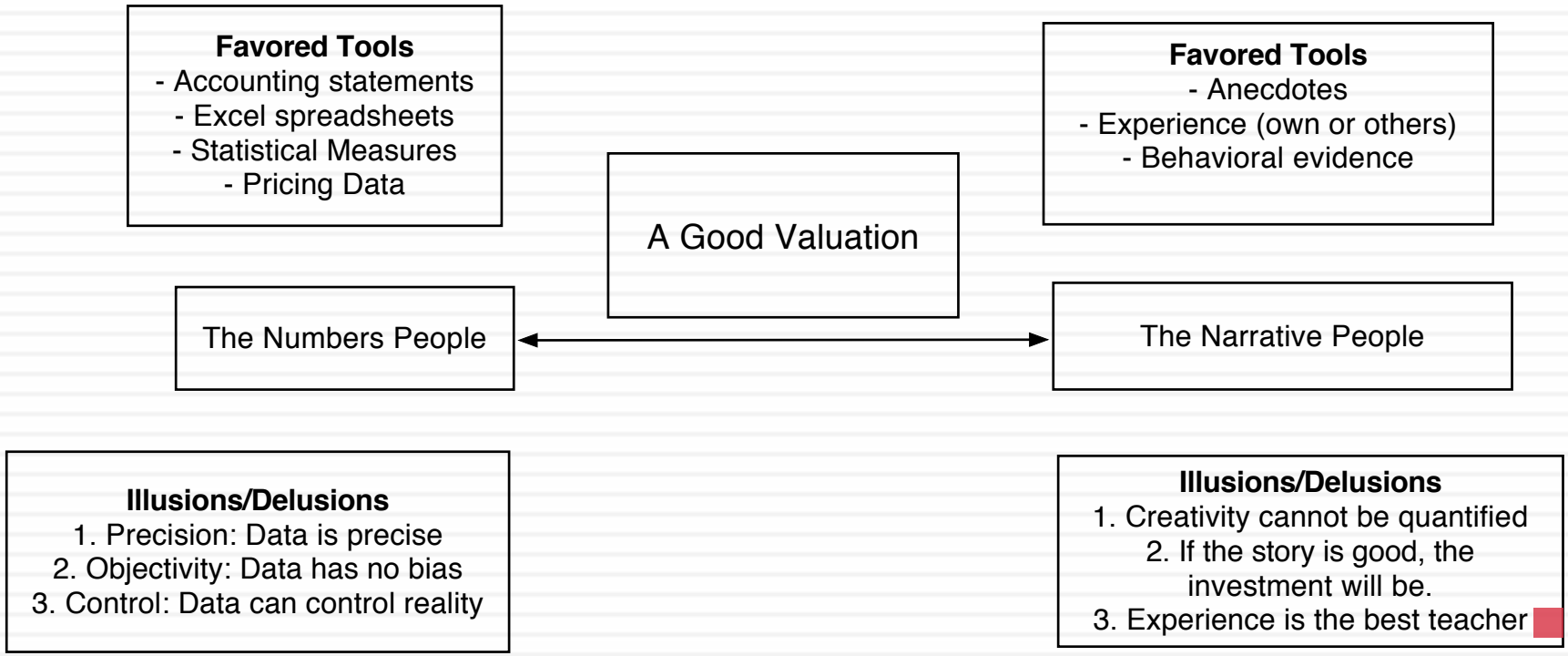
- Assume now that this firm intends to continue granting options each year to its top management as part of compensation. These expected option grants will also affect value.
- The simplest mechanism for bringing in future option grants into the analysis is to do the following:
  - Estimate the value of options granted each year over the last few years as a percent of revenues.
  - Forecast out the value of option grants as a percent of revenues into future years, allowing for the fact that as revenues get larger, option grants as a percent of revenues will become smaller.
  - Consider this line item as part of operating expenses each year. This will reduce the operating margin and cashflow each year.

When options affect equity value per share the most…

- Option grants affect value more
  - The lower the strike price is set relative to the stock price
  - The longer the term to maturity of the option
  - The more volatile the stock price
- The effect on value will be magnified if companies are allowed to revisit option grants and reset the exercise price if the stock price moves down.

NARRATIVE AND NUMBERS: VALUATION AS A BRIDGE

Bridging the Gap

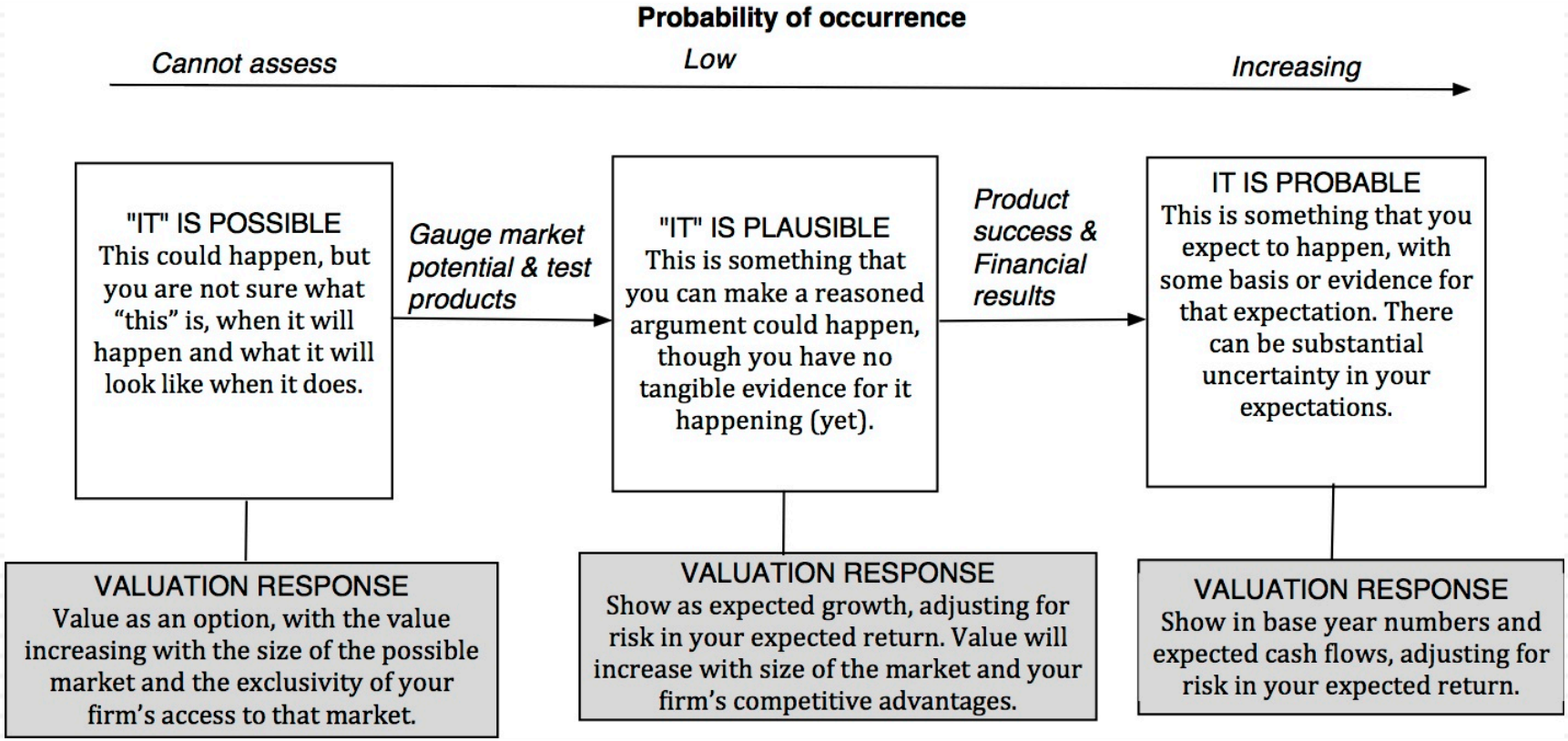


Step 1: Create a narrative

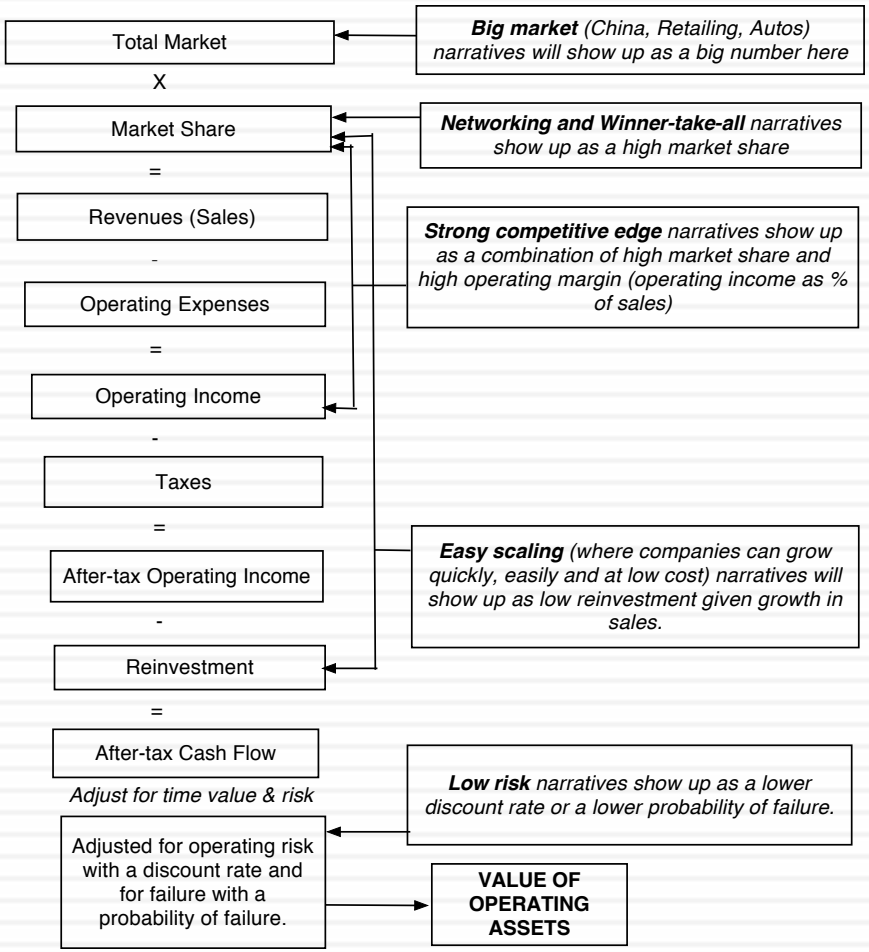
- Every valuation starts with a narrative, a story that you see unfolding for your company in the future.
- In developing this narrative, you will be making assessments of your company (its products, its management), the market or markets that you see it growing in, the competition it faces and will face and the macro environment in which it operates.

My narrative for Uber: Uber will expand the car service market moderately, primarily in urban environments, and use its competitive advantages to get a significant but not dominant market share and maintain its profit margins.

Step 2: Check the narrative against history, economic first principles & common sense



Step 3: Connect your narrative to key drivers of value



Step 4: Value the company

Uber: Intrinsic valuation - June 8, 2014 (in US $)

Stable Growth (after year 10)
Expected growth rate = 2.50%
Cost of capital = 8%
Return on capital= 25%
Reinvestment Rate= 2.5%/25% = 10%

Terminal Value$_{10}$= 793/(.08-025) = $14,418

Term yr
EBIT (1-t) $881
- Reinv 88
FCFF $793

Global taxi market is $100 billlion currently, expected to grow 6% a year for next ten years.

Uber will keep 20% of the gross cab receipts as its revenues

Uber's market share of this market will increase to 10% over the next 10 years.

Uber's operating expenses will amount to 60% of its revenues. (Operating margin=40%)

Uber will pay a tax rate of 30% on its income, increasing to 40% over the next 10 years

Uber will generate $5 in incremental revenues for every dollar of incremental capital.

	1	2	3	4	5	6	7	8	9	10
Overall market	$106,000	$112,360	$119,102	$126,248	$133,823	$141,852	$150,363	$159,385	$168,948	$179,085
Share of market (gross)	3.63%	5.22%	6.41%	7.31%	7.98%	8.49%	8.87%	9.15%	9.36%	10.00%
Revenues as percent of gross	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Annual Revenue	$769	$1,173	$1,528	$1,846	$2,137	$2,408	$2,666	$2,916	$3,163	$3,582
Operating margin	7.00%	10.67%	14.33%	18.00%	21.67%	25.33%	29.00%	32.67%	36.33%	40.00%
Operating Income	$54	$125	$219	$332	$463	$610	$773	$953	$1,149	$1,433
Effective tax rate	31%	32%	33%	34%	35%	36%	37%	38%	39%	40%
- Taxes	$17	$40	$72	$113	$162	$220	$286	$362	$448	$573
After-tax operating income	$37	$85	$147	$219	$301	$390	$487	$591	$701	$860
Sales/Capital Ratio	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
- Reinvestment	$94	$81	$71	$64	$58	$54	$52	$50	$49	$84
Free Cash Flow to the Firm	-$57	$4	$76	$156	$243	$336	$435	$541	$652	$776

Based on the investment of $1.2 billion made by investors, the imputed value for Uber's operating assets, in June 2014 ,was $17 billion.

Value of operating assets = $6,595

Adust for probability of failure (10%)
Expected value = $6,595 (.9) = $5,895

Discount back the cash flows (including terminal value) at the cumulated cost of capital.

Cost of capital for first 5 years = Top decile of US companies = 12%

Cost of capital declines from 12% to 8% from years 6 to 10.

Step 5: Keep the feedback loop

	Uber (Gurley)	*Uber (Gurley Mod)*	*Uber (Damodaran)*
Narrative	Uber will expand the car service market substantially, bringing in mass transit users & non-users from the suburbs into the market, and use its networking advantage to gain a dominant market share, while maintaining its revenue slice at 20%.	Uber will expand the car service market substantially, bringing in mass transit users & non-users from the suburbs into the market, and use its networking advantage to gain a dominant market share, while cutting prices and margins (to 10%).	Uber will expand the car service market moderately, primarily in urban environments, and use its competitive advantages to get a significant but not dominant market share and maintain its revenue slice at 20%.
Total Market	$300 billion, growing at 3% a year	$300 billion, growing at 3% a year	$100 billion, growing at 6% a year
Market Share	40%	40%	10%
Uber's revenue slice	20%	10%	20%
Value for Uber	$53.4 billion + Option value of entering car ownership market ($10 billion+)	$28.7 billion + Option value of entering car ownership market ($6 billion+)	$5.9 billion + Option value of entering car ownership market ($2-3 billion)

Step 6: Be ready to modify narrative as events unfold

Narrative Break/End	Narrative Shift	Narrative Change (Expansion or Contraction)
Events, external (legal, political or economic) or internal (management, competitive, default), that can cause the narrative to break or end.	Improvement or deterioration in initial business model, changing market size, market share and/or profitability.	Unexpected entry/success in a new market or unexpected exit/failure in an existing market.
Your valuation estimates (cash flows, risk, growth & value) are no longer operative	Your valuation estimates will have to be modified to reflect the new data about the company.	Valuation estimates have to be redone with new overall market potential and characteristics.
Estimate a probability that it will occur & consequences	Monte Carlo simulations or scenario analysis	Real Options

LET THE GAMES BEGIN… TIME TO VALUE COMPANIES..

Let’s have some fun!

Equity Risk Premiums in Valuation

- The equity risk premiums that I have used in the valuations that follow reflect my thinking (and how it has evolved) on the issue.
  - Pre-1998 valuations: In the valuations prior to 1998, I use a risk premium of 5.5% for mature markets (close to both the historical and the implied premiums then)
  - Between 1998 and Sept 2008: In the valuations between 1998 and September 2008, I used a risk premium of 4% for mature markets, reflecting my belief that risk premiums in mature markets do not change much and revert back to historical norms (at least for implied premiums).
  - Valuations done in 2009: After the 2008 crisis and the jump in equity risk premiums to 6.43% in January 2008, I have used a higher equity risk premium (5-6%) for the next 5 years and will assume a reversion back to historical norms (4%) only after year 5.
  - In 2010, 2011 & 2012: In 2010, I reverted back to a mature market premium of 4.5%, reflecting the drop in equity risk premiums during 2009. In 2011, I used 5%, reflecting again the change in implied premium over the year. In 2012 and 2013, stayed with 6%, reverted to 5% in 2014 and will be using 5.75% in 2015.

Training Wheels valuation: Con Ed in August 2008

Test 1: Is the firm paying dividends like a stable growth firm?
Dividend payout ratio is 73%
In trailing 12 months, through June 2008
Earnings per share = $3.17
Dividends per share = $2.32

Test 2: Is the stable growth rate consistent with fundamentals?
Retention Ratio = 27%
ROE =Cost of equity = 7.7%
Expected growth = 2.1%

Growth rate forever = 2.1%

Value per share today= Expected Dividends per share next year / (Cost of equity - Growth rate)
= 2.32 (1.021)/ (.077 - ,021) = $42.30

Cost of Equity = 4.1% + 0.8 (4.5%) = 7.70%

On August 12, 2008 Con Ed was trading at $ 40.76.

Riskfree rate
4.10%
10-year T.Bond rate

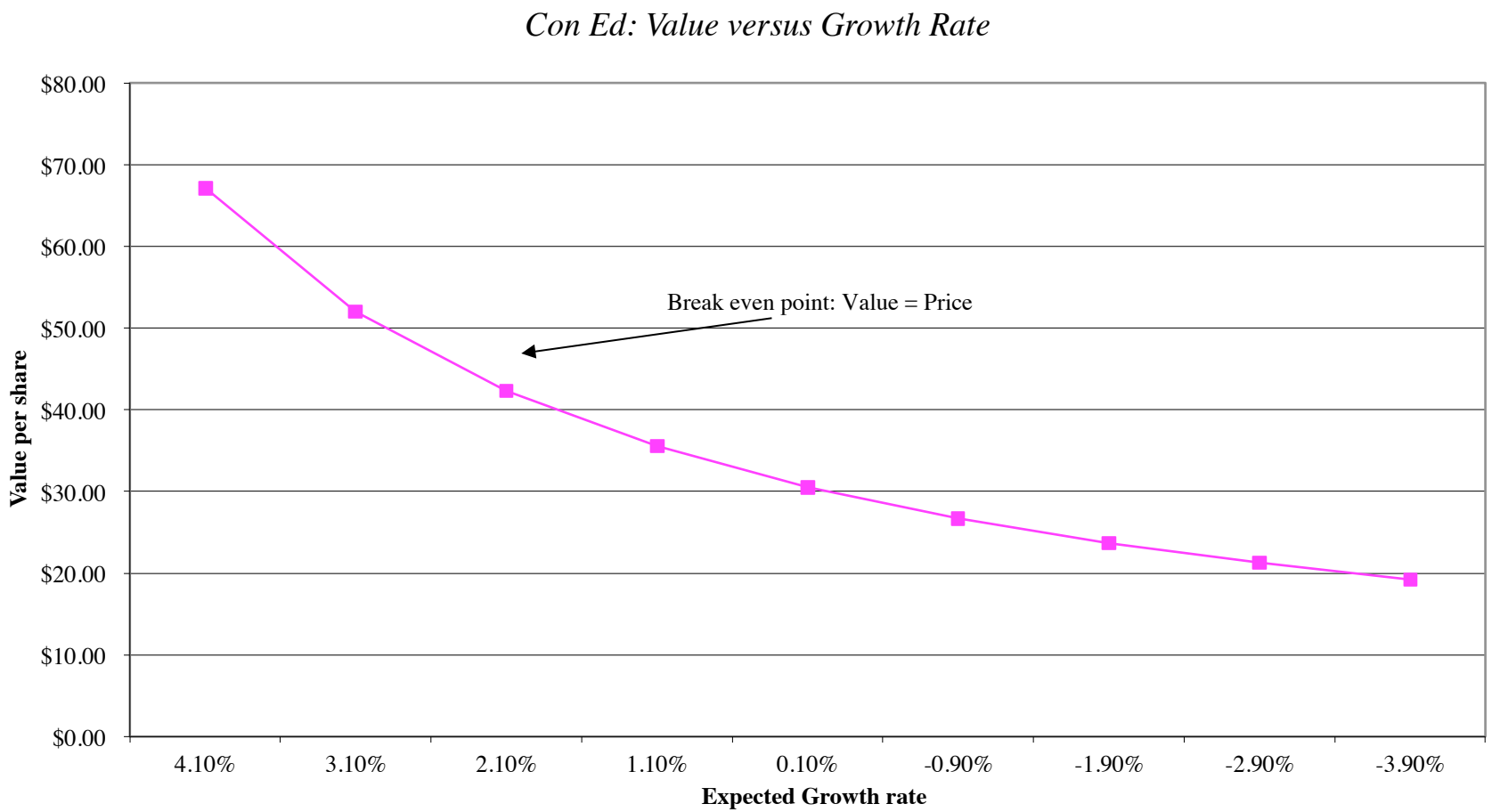
Beta
0.80
Beta for regulated power utilities

Equity Risk Premium
4.5%
Implied Equity Risk Premium - US market in 8/2008

Test 3: Is the firm's risk and cost of equity consistent with a stable growth firm?
Beta of 0.80 is at lower end of the range of stable company betas: 0.8 -1.2

Why a stable growth dividend discount model?
1. Why stable growth: Company is a regulated utility, restricted from investing in new growth markets. Growth is constrained by the fact that the population (and power needs) of its customers in New York are growing at very low rates.
Growth rate forever = 2%
2. Why equity: Company's debt ratio has been stable at about 70% equity, 30% debt for decades.
3. Why dividends: Company has paid out about 97% of its FCFE as dividends over the last five years.

A break even growth rate to get to market price…



From DCF value to target price and returns…

- Assume that you believe that your valuation of Con Ed ($42.30) is a fair estimate of the value, 7.70% is a reasonable estimate of Con Ed's cost of equity and that your expected dividends for next year (2.32*1.021) is a fair estimate, what is the expected stock price a year from now (assuming that the market corrects its mistake?)

- If you bought the stock today at $40.76, what return can you expect to make over the next year (assuming again that the market corrects its mistake)?