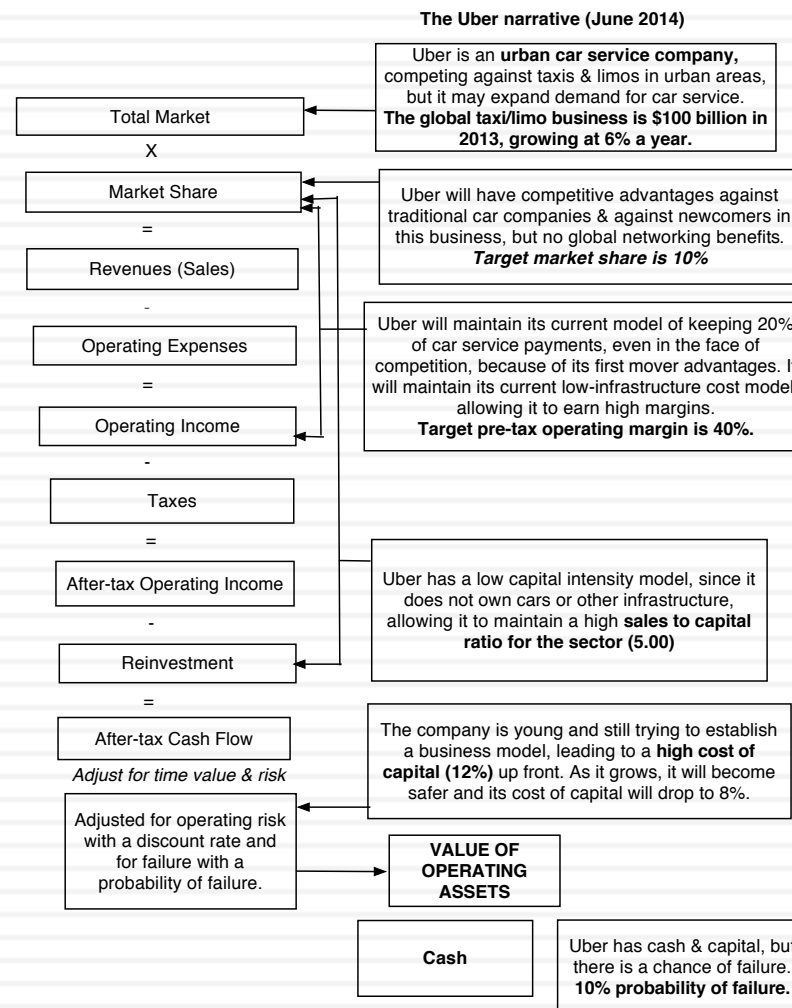


# The Improbable: Willy Wonkitis

## Tesla: Summary 15-year DCF Analysis (DCF valuation as of mid-year 2013)

	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	
Unit Volume	24,298	36,883	64,684	86,713	149,869	214,841	291,861	384,747	466,559	550,398	643,850	726,655	820,645	922,481	1,034,215	1,137,780	
% Growth		52%	75%	34%	73%	43%	36%	32%	21%	18%	17%	13%	13%	12%	12%	10%	
Automotive Revenue Per Unit (\$)	93,403	85,342	83,432	78,932	65,465	58,258	56,407	55,553	55,991	56,586	56,969	57,540	58,138	58,603	59,002	59,554	
% Growth		-9%	-2%	-5%	-17%	-11%	-3%	-2%	1%	1%	1%	1%	1%	1%	1%	1%	
Automotive Sales	2,462	3,321	5,613	7,051	10,025	12,720	16,685	21,595	26,347	31,357	36,897	42,022	47,949	54,283	61,221	67,980	
Development Service Sales	16	40	42	44	46	49	51	54	56	59	62	65	68	72	75	79	
Total Sales	2,478	3,361	5,655	7,095	10,072	12,768	16,736	21,648	26,403	31,416	36,959	42,087	48,017	54,355	61,296	68,059	
% Growth		36%	68%	25%	42%	27%	31%	29%	22%	19%	18%	14%	14%	13%	13%	11%	
EBITDA	148	417	920	1,042	1,586	2,150	3,138	4,066	4,857	5,723	6,328	7,182	8,144	9,688	10,874	12,099	
% Margin	6.0%	12.4%	16.3%	14.7%	15.7%	16.8%	18.7%	18.8%	18.4%	18.2%	17.1%	17.1%	17.0%	17.8%	17.7%	17.8%	
D&A	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661	
% of Capex	41%	79%	55%	65%	62%	69%	78%	86%	79%	77%	75%	76%	76%	76%	76%	77%	
EBIT	45	259	748	839	1,285	1,796	2,749	3,529	4,252	5,027	5,517	6,244	7,056	8,429	9,423	10,439	
% Margin	1.8%	7.7%	13.2%	11.8%	12.8%	14.1%	16.4%	16.3%	16.1%	16.0%	14.9%	14.8%	14.7%	15.5%	15.4%	15.3%	
Net Interest Income (Expense)	(27)	(1)	9	33	47	90	108	155	199	278	358	445	542	651	784	934	
Other Income	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pretax Income	46	258	758	872	1,332	1,886	2,857	3,684	4,451	5,305	5,875	6,688	7,598	9,080	10,207	11,373	
Income Taxes	3	2	14	34	86	262	462	641	807	1,003	1,134	1,317	1,470	1,761	2,028	2,323	
% Effective Rate	6%	1%	2%	4%	6%	14%	16%	17%	18%	19%	19%	20%	19%	19%	20%	20%	
Net Income	44	256	744	839	1,246	1,624	2,395	3,043	3,644	4,303	4,741	5,372	6,128	7,319	8,179	9,050	
Plus																	
After-tax Interest Expense (Income)	27	1	(9)	(33)	(47)	(90)	(108)	(154)	(199)	(278)	(357)	(444)	(541)	(650)	(782)	(932)	
Depreciation of PP&E	103	158	172	203	301	353	389	537	606	696	811	938	1,088	1,260	1,451	1,661	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Less																	
Change in Working Capital	(155)	(14)	(157)	(167)	(172)	(325)	(163)	(81)	(28)	(299)	(356)	(328)	(219)	(329)	(365)	(376)	
% of Change in Sales		-2%	-7%	-12%	-6%	-12%	-4%	-2%	-1%	-6%	-6%	-6%	-6%	-5%	-5%	-6%	
Capital Expenditures	250	200	312	312	486	510	497	623	765	906	1,078	1,236	1,437	1,660	1,898	2,149	
% of Sales	10%	6%	6%	4%	5%	4%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unlevered Free Cash Flow	78	229	750	863	1,186	1,702	2,343	2,884	3,314	4,113	4,472	4,959	5,456	6,597	7,315	8,005	
														EBITDA			12,099
														Sales			68,059
														Net Debt (Cash)			(260)
														Tesla Diluted Shares			142
Exit EBITDA High							12.0 x		Exit PPG High		5.0%		Exit P/Sales High		180%		
Exit EBITDA Low							8.0 x		Exit PPG Low		3.0%		Exit P/Sales Low		130%		
									Discount Rate High		13.0%		FY Month of Valuation		1.0 (Beginning of this Month)		
									Discount Rate Low		9.0%		Month of FY End		12.0 (End of this Month)		

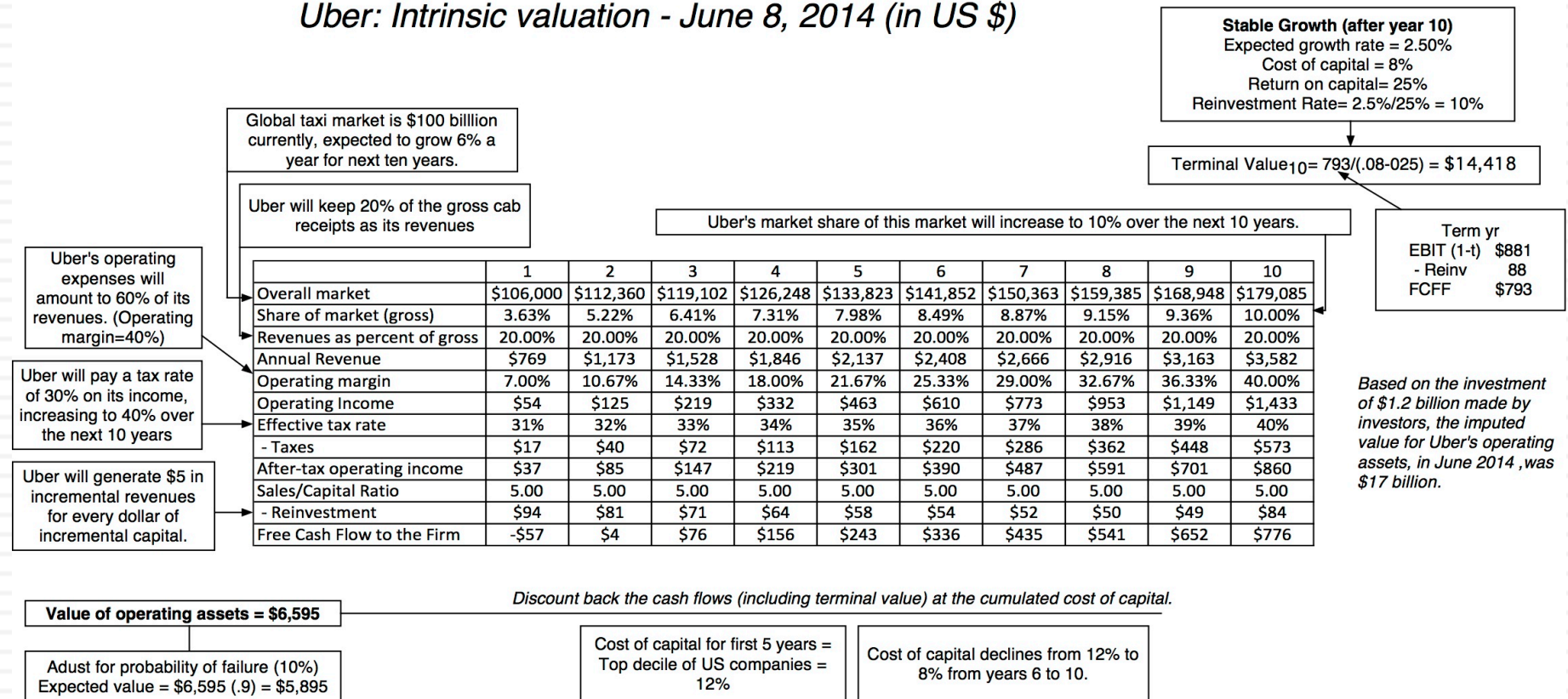
# Step 4: Connect your narrative to key drivers of value



# Step 4: Value the company (Uber)

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



## Step 5: Keep the feedback loop

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1. Not just car service company.: Uber is a car company, not just a car service company, and there may be a day when consumers will subscribe to a Uber service, rather than own their own cars. It could also expand into logistics, i.e., moving and transportation businesses.
2. Not just urban: Uber can create new demands for car service in parts of the country where taxis are not used (suburbia, small towns).
3. Global networking benefits: By linking with technology and credit card companies, Uber can have global networking benefits.

# Valuing Bill Gurley's Uber narrative

	<i>Uber (Gurley)</i>	<i>Uber (Gurley Mod)</i>	<i>Uber (Damodaran)</i>
Narrative	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage</u> to gain a <u>dominant market share</u> , while maintaining its revenue slice at 20%.	Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, and use its <u>networking advantage</u> to gain a <u>dominant market share</u> , while cutting prices and margins (to 10%).	Uber will expand the car service market moderately, primarily in urban environments, and use its <u>competitive advantages</u> to get a <u>significant but not dominant market share</u> 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)

# Different narratives, Different Numbers

<i>Total Market</i>	<i>Growth Effect</i>	<i>Network Effect</i>	<i>Competitive Advantages</i>	<i>Value of Uber</i>
A4. Mobility Services	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$90,457
A3. Logistics	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$65,158
A4. Mobility Services	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$52,346
A2. All car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$47,764
A1. Urban car service	B4. Double market size	C5. Strong global network effects	D4. Strong & Sustainable	\$31,952
A3. Logistics	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$14,321
A1. Urban car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$7,127
A2. All car service	B3. Increase market by 50%	C3. Strong local network effects	D3. Semi-strong	\$4,764
A4. Mobility Services	B1. None	C1. No network effects	D1. None	\$1,888
A3. Logistics	B1. None	C1. No network effects	D1. None	\$1,417
A2. All car service	B1. None	C1. No network effects	D1. None	\$1,094
A1. Urban car service	B1. None	C1. No network effects	D1. None	\$799

# Step 6: Be ready to modify narrative as events unfold

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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

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- 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.
  - After 2009: 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.

# The Valuation Set up

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- With each company that I value in this next section, I will try to start with a story about the company and use that story to construct a valuation.
- With each valuation, rather than focus on all of the details (which will follow the blueprint already laid out), I will focus on a specific component of the valuation that is unique or different.

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# Training Wheels On?

Stocks that look like Bonds, Things Change and  
Market Valuations

**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

*Training Wheels valuation:  
Con Ed in August 2008*

**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 =  $4.1\% + 0.8 (4.5\%) = 7.70\%$

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

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

**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%

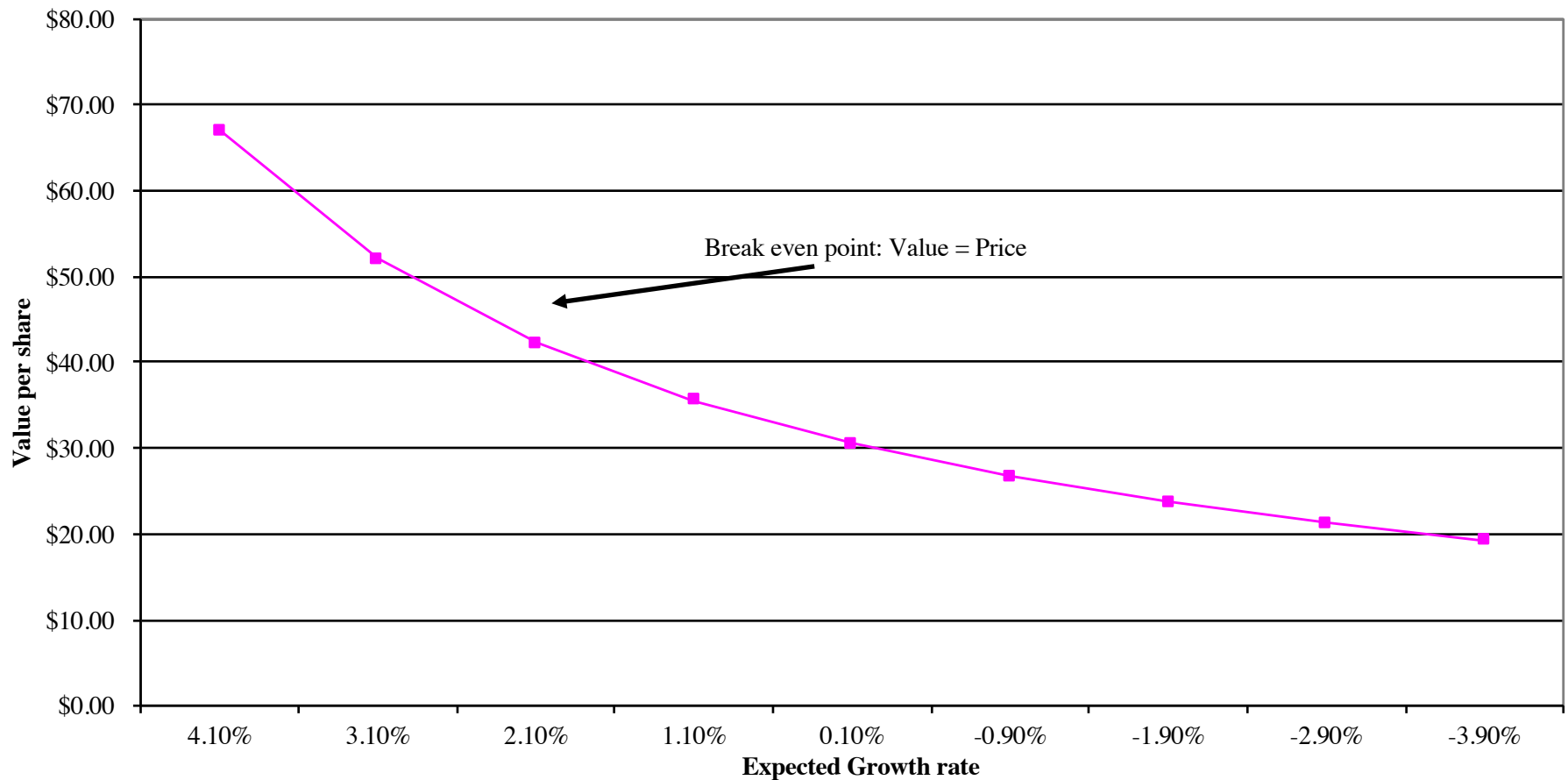
2. Why equity: Company's debt ratio has been stable at about 70% equity, 30% debt for decades.

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...

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*Con Ed: Value versus Growth Rate*



## From DCF value to target price and returns...

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- 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 ( $2.32 \times 1.021$ ) 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)?

### 3M: A Pre-crisis valuation

**Current Cashflow to Firm**  
 EBIT(1-t)= 5344 (1-.35)= 3474  
 - Nt CpX= 350  
 - Chg WC 691  
 = FCFF 2433  
 Reinvestment Rate = 1041/3474  
 =29.97%  
 Return on capital = 25.19%

Reinvestment Rate  
30%

**Expected Growth in EBIT (1-t)**  
 $.30 \times .25 = .075$   
 7.5%

Return on Capital  
25%

**Stable Growth**  
 g = 3%; Beta = 1.10;  
 Debt Ratio= 20%; Tax rate=35%  
 Cost of capital = 6.76%  
 ROC= 6.76%;  
 Reinvestment Rate=3/6.76=44%

First 5 years

Terminal Value<sub>5</sub> = 2645 / (.0676 - .03) = 70,409

Op. Assets 60607  
 + Cash: 3253  
 - Debt 4920  
 =Equity 58400

Year	1	2	3	4	5
EBIT (1-t)	\$3,734	\$4,014	\$4,279	\$4,485	\$4,619
- Reinvestment	\$1,120	\$1,204	\$1,312	\$1,435	\$1,540
= FCFF	\$2,614	\$2,810	\$2,967	\$3,049	\$3,079

Term Yr  
 \$4,758  
 \$2,113  
 \$2,645

Value/Share \$ 83.55

Cost of capital = 8.32% (0.92) + 2.91% (0.08) = 7.88%

**Cost of Equity**  
8.32%

**Cost of Debt**  
 $(3.72\% + .75\%)(1 - .35)$   
 = 2.91%

**Weights**  
 E = 92% D = 8%

On September 12, 2008, 3M was trading at \$70/share

**Riskfree Rate:**  
 Riskfree rate = 3.72%

+

**Beta**  
1.15

x

**Risk Premium**  
4%

Unlevered Beta for Sectors: 1.09

D/E=8.8%

Lowered base operating income by 10%

### 3M: Post-crisis valuation

Reduced growth rate to 5%

Did not increase debt ratio in stable growth to 20%

#### Current Cashflow to Firm

$EBIT(1-t) = 4810 (1-.35) = 3,180$   
 $- Nt CpX = 350$   
 $- Chg WC = 691$   
 $= FCFF = 2139$   
 $Reinvestment Rate = 1041/3180 = 33\%$   
 $Return on capital = 23.06\%$

Reinvestment Rate  
25%

Return on Capital  
20%

Expected Growth in  
EBIT (1-t)  
 $.25 \times .20 = .05$   
5%

#### Stable Growth

$g = 3\%$ ;  $Beta = 1.00$ ;  $ERP = 4\%$   
 $Debt Ratio = 8\%$ ;  $Tax rate = 35\%$   
 $Cost of capital = 7.55\%$   
 $ROC = 7.55\%$ ;  
 $Reinvestment Rate = 3/7.55 = 40\%$

First 5 years

Terminal Value<sub>5</sub> =  $2434 / (.0755 - .03) = 53,481$

Op. Assets 43,975  
 + Cash: 3253  
 - Debt 4920  
 = Equity 42308

Value/Share \$ 60.53

Year	1	2	3	4	5	Term Yr
EBIT (1-t)	\$3,339	\$3,506	\$3,667	\$3,807	\$3,921	\$4,038
- Reinvestment	\$835	\$877	\$1,025	\$1,288	\$1,558	\$1,604
= FCFF	\$2,504	\$2,630	\$2,642	\$2,519	\$2,363	\$2,434

Cost of capital =  $10.86\% (0.92) + 3.55\% (0.08) = 10.27\%$

Cost of Equity  
10.86%

Higher default spread for next 5 years

Cost of Debt  
 $(3.96\% + 1.5\%) (1-.35)$   
 $= 3.55\%$

Weights  
E = 92% D = 8%

On October 16, 2008,  
MMM was trading at  
\$57/share.

Riskfree Rate:  
Riskfree rate = 3.96%

Increased risk premium to 6% for next 5 years

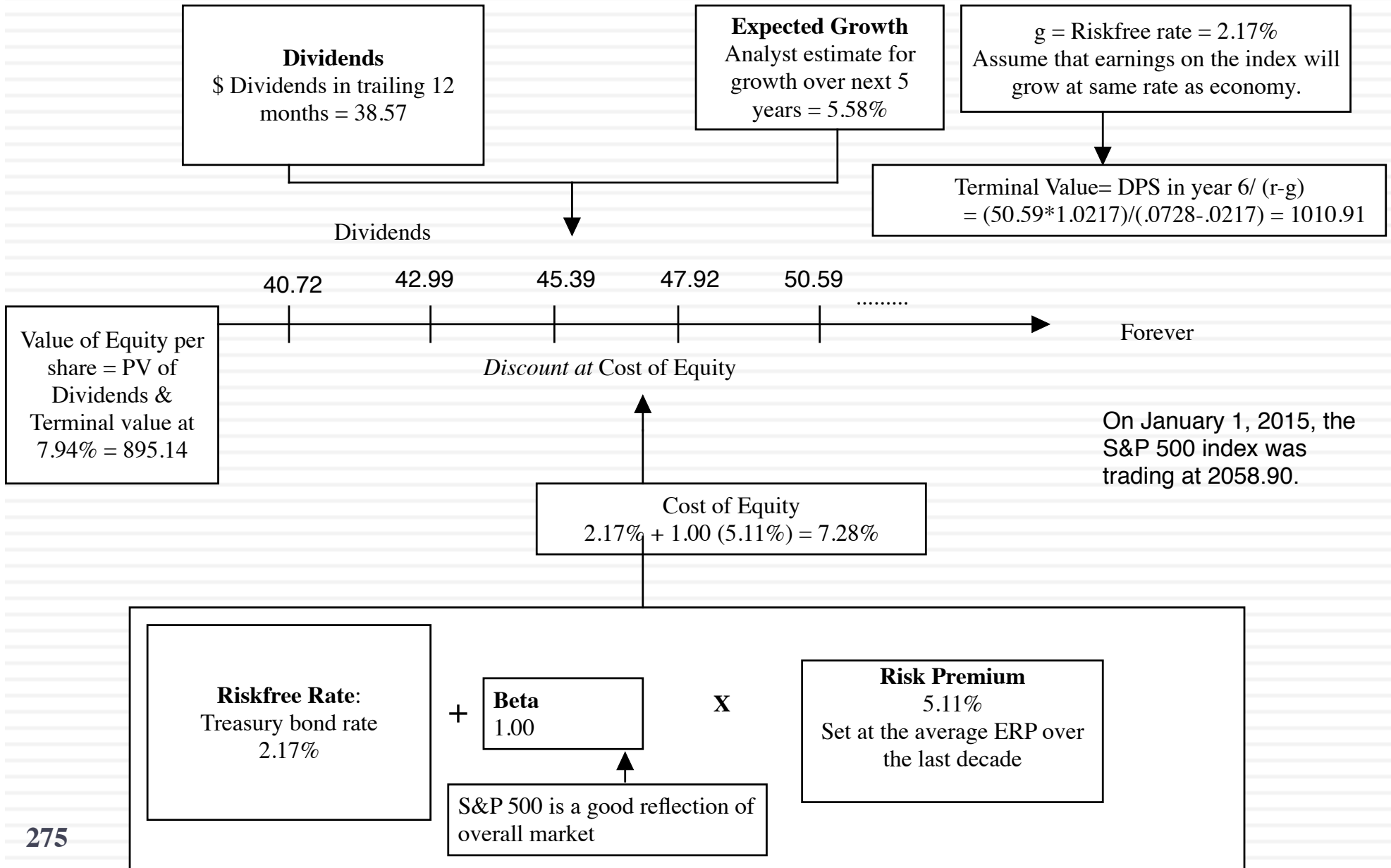
$+ \text{Beta } 1.15 \times \text{Risk Premium } 6\%$   
 $\uparrow$   
 Unlevered Beta for Sectors: 1.09      D/E=8.8%

# From a Company to the Market: Valuing the S&P 500: Dividend Discount Model in January 2015

## Rationale for model

Why dividends? Because it is the only tangible cash flow, right?

Why 2-stage? Because the expected growth rate in near term is higher than stable growth rate.

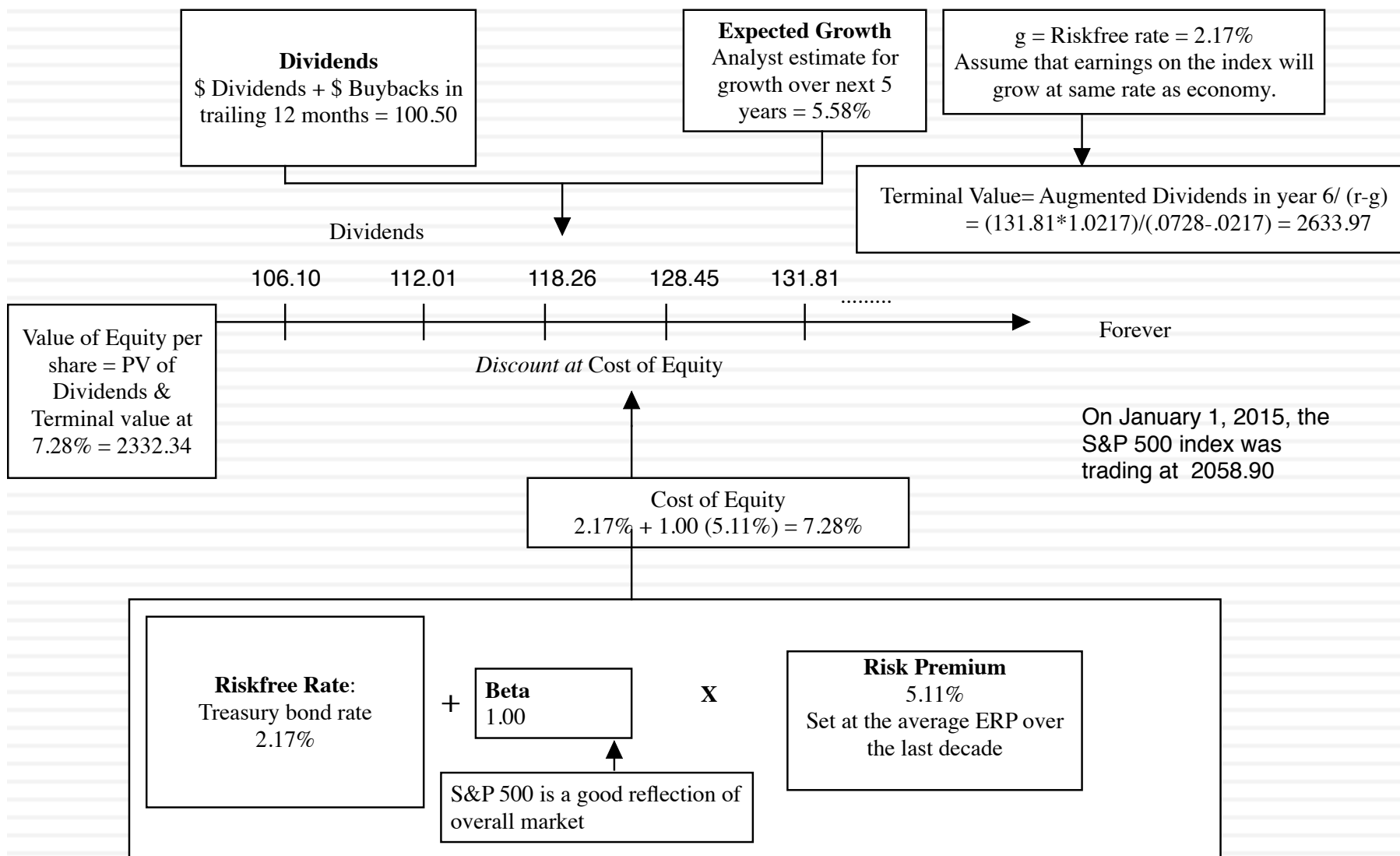


## From a Company to the Market: Valuing the S&P 500: Augmented Dividend Discount Model in January 2015

### Rationale for model

Why augmented dividends? Because companies are increasing returning cash in the form of stock buybacks

Why 2-stage? Because the expected growth rate in near term is higher than stable growth rate.



## Valuing the S&P 500: Augmented Dividends and Fundamental Growth January 2015

### Rationale for model

Why augmented dividends? Because companies are increasing returning cash in the form of stock buybacks

Why 2-stage? Why not?

