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.
  - **After 2009**: I have used **updated implied equity risk premiums**, as of the time that I did the valuations.

THE VALUATION SET UP

- 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.
- Finally, while the valuations are scattered over time, they all represent valuations done in real time, with decisions that followed, and without the benefit of hindsight.

TRAINING WHEELS ON?

Stocks that look like Bonds, Things Change and Market Valuations

Aswath Damodaran

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 growith firm?
Beta of 0.80 is at lower end of the range of stable company betas: 0.8 -1.2

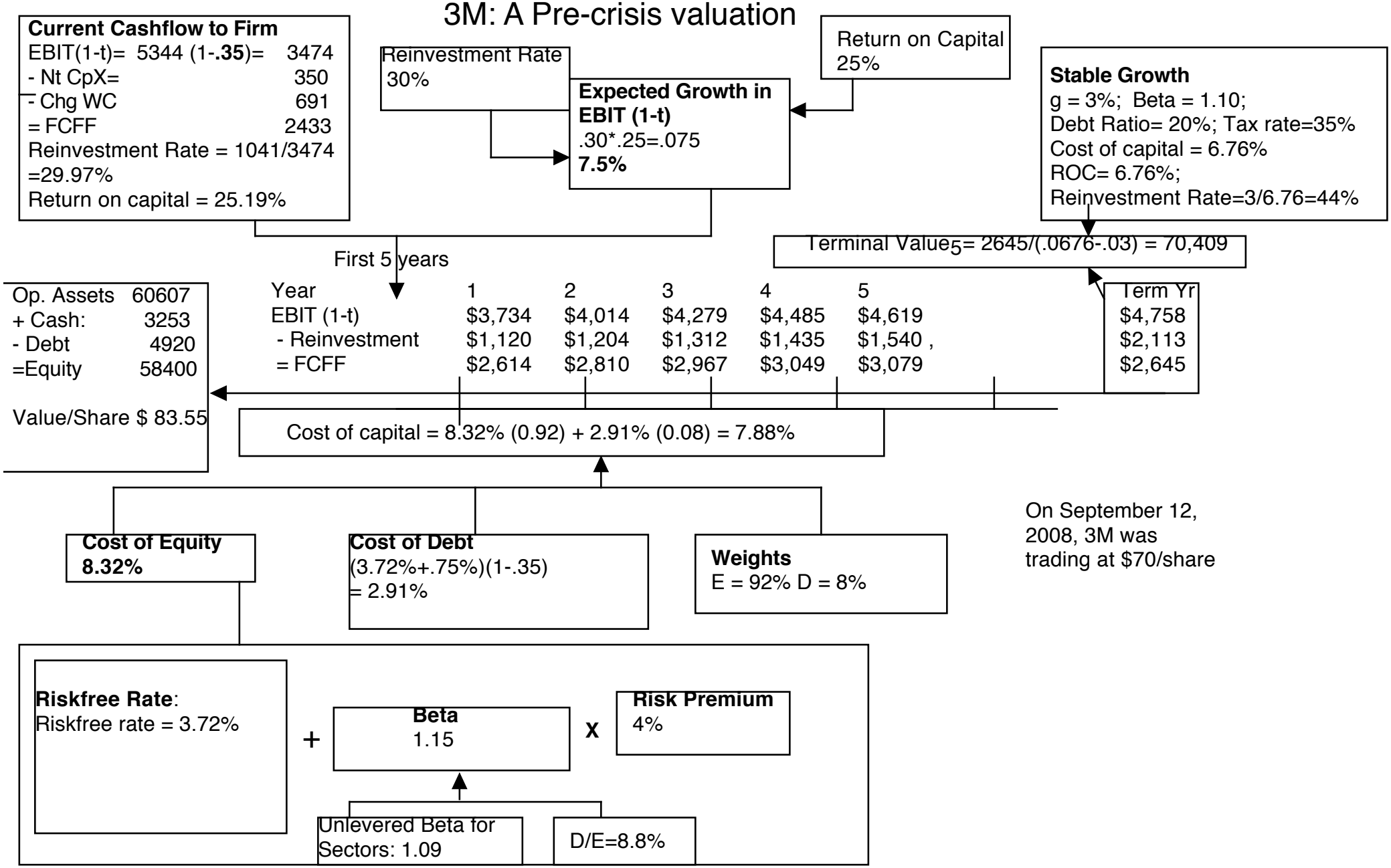
Why a stable growth dividend discount model?
1. Why stable growth: Company is a regulated utility, restricted from investing in new growth markets. Growth is constrained by the fact that the population (and power needs) of its customers in New York are growing at very low rates.
Growth rate forever = 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.

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)?

3M: A Pre-crisis valuation



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

3M: Post-crisis valuation

Lowered base operating income by 10%

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%

Reduced growth rate to 5%

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

Return on Capital 20%

Did not increase debt ratio in stable growth to 20%

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%

Terminal Value$_5$= 2434/(.0755-.03) = 53,481

First 5 years

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

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

Value/Share $ 60.53

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

Higher default spread for next 5 years

Cost of Equity
10.86%

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%

+

Beta
1.15

Unlevered Beta for Sectors: 1.09

D/E=8.8%

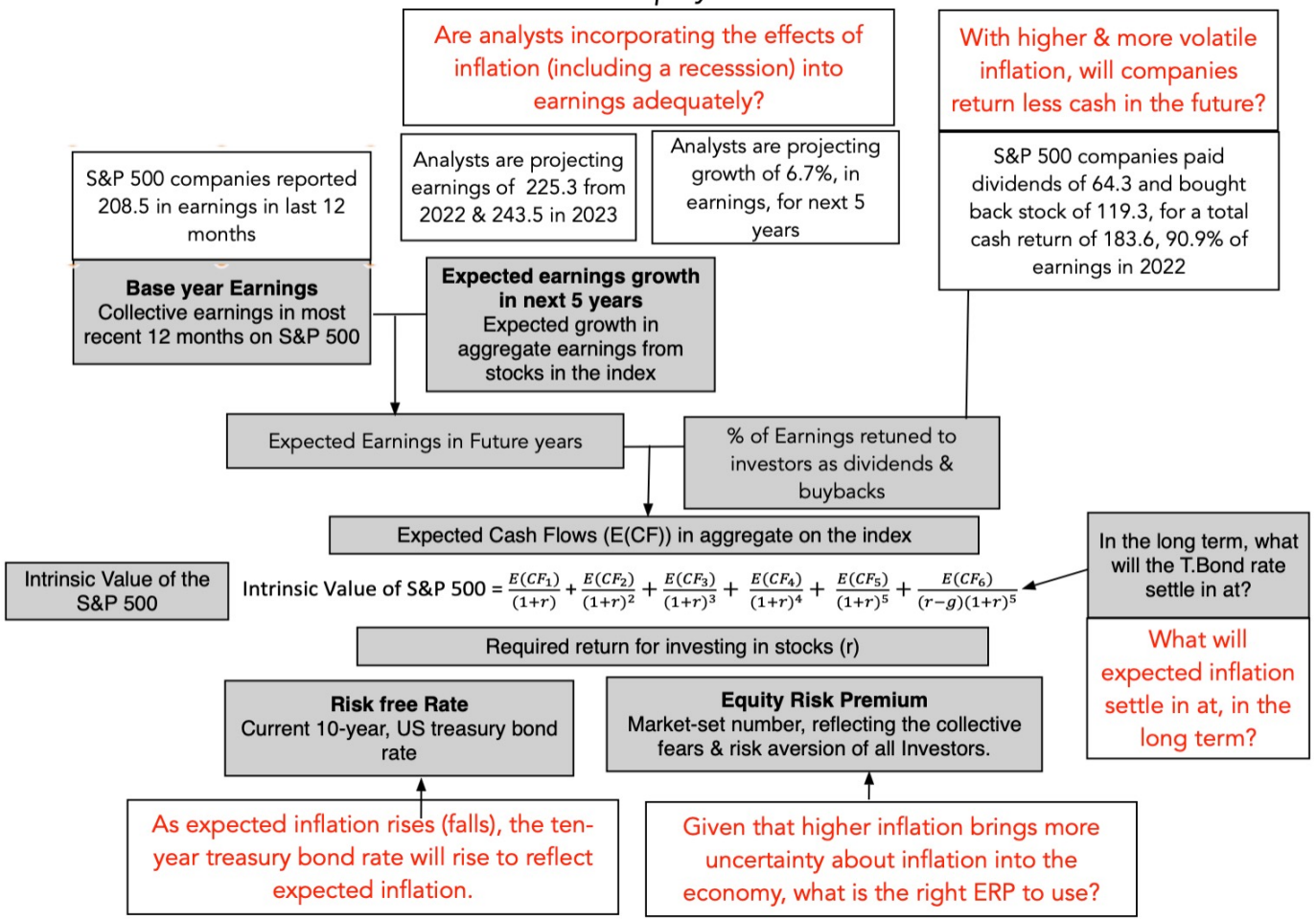
x

Risk Premium
6%

Increased risk premium to 6% for next 5 years

VALUING THE S&P 500 INDEX (SEPTEMBER 2022)

Inflation and Equity Value: The Drivers



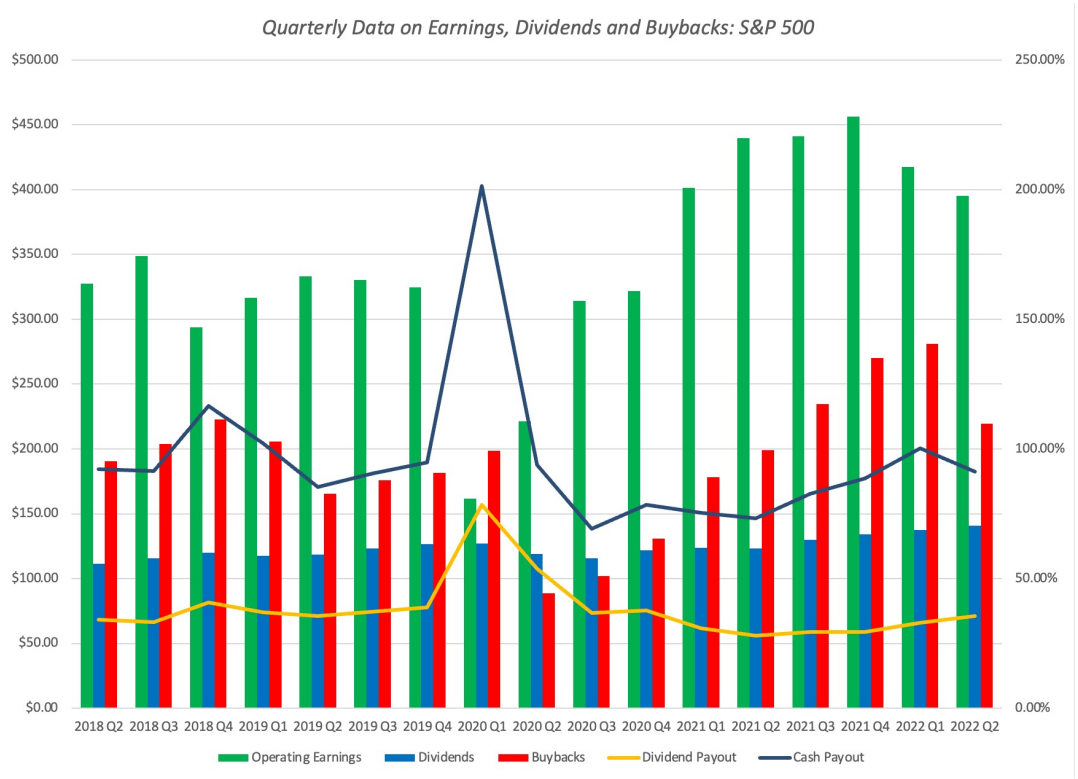
1. EARNINGS

Start of Month	Expected Earnings in 2022	% Change over prior month	% Change over start of year	Expected Earnings in 2023	% Change over prior month	% Change over start of year
01/01/22	223.34			244.94		
02/01/22	223.78	0.20%	0.20%	245.93	0.40%	0.40%
03/01/22	225.43	0.74%	0.94%	247.94	0.82%	1.22%
04/01/22	227.3	0.83%	1.77%	249.52	0.64%	1.87%
05/01/22	227.29	0.00%	1.77%	250.11	0.24%	2.11%
06/01/22	228.03	0.33%	2.10%	248.96	-0.46%	1.64%
07/01/22	229.57	0.68%	2.79%	251.99	1.22%	2.88%
08/01/22	228.27	-0.57%	2.21%	248.35	-1.44%	1.39%
09/01/22	225.36	-1.27%	0.90%	243.64	-1.90%	-0.53%
09/20/22	225.34	-0.01%	0.90%	243.46	-0.07%	-0.60%

2. CASH RETURN

S&P 500 Aggregate Earnings, Dividends and Buybacks: 2001-2021

Year	Earnings	Dividends	Buybacks	Dividend Payout	Cash Payout
2001	38.85	15.74	14.34	40.51%	77.43%
2002	46.04	15.96	13.87	34.67%	64.78%
2003	54.69	17.88	13.70	32.69%	57.74%
2004	67.68	19.01	21.59	28.09%	59.99%
2005	76.45	22.34	38.82	29.23%	80.01%
2006	87.72	25.04	48.12	28.55%	83.40%
2007	82.54	28.14	67.22	34.09%	115.53%
2008	49.51	28.45	39.07	57.46%	136.37%
2009	56.86	21.97	15.46	38.64%	65.82%
2010	83.77	22.65	32.88	27.04%	66.28%
2011	96.44	26.53	44.75	27.51%	73.91%
2012	96.82	31.25	44.65	32.28%	78.39%
2013	104.92	34.90	53.23	33.26%	84.00%
2014	116.16	39.55	62.44	34.04%	87.79%
2015	100.48	43.41	64.94	43.20%	107.83%
2016	106.26	45.70	62.32	43.01%	101.66%
2017	124.51	48.93	60.85	39.30%	88.17%
2018	152.78	54.39	96.11	35.60%	98.51%
2019	157.18	58.50	87.81	37.22%	93.08%
2020	139.76	57.00	61.66	40.78%	84.90%
2021	205.35	60.65	104.61	29.53%	80.48%
Average				35.56%	85.05%
1st Quartile				29.53%	73.91%
Median				34.09%	83.40%
3rd Quartile				39.30%	93.08%



MY S&P 500 STORY

An Intrinsic (and Personal) Valuation of the S&P 500 on September 23, 2022

My Earnings Estimates

Analysts are underestimating the effect of a recession on future earnings, and I am reducing their 2023 estimates by 15%, with ripple effects on earnings beyond. (I am leaving 2022 estimates untouched, because the bulk of the year is behind us.

Cash Return

While companies have collectively returned 90.5% of earnings as dividends and buybacks in the most recent 12 months, recession fears and uncertainty will lead them to reduce this cash returns to 80% of earnings (consistent with growth in long term), over time.

Intrinsic Value Estimate (based on your choice of ERP)							
	2021	2022	2023	2024	2025	2026	*Terminal Year*
Analyst Estimate of Earnings	208.53	225.34	243.46	259.79	273.70	284.65	296.03
My Estimate of Earnings	$208.53	225.34	206.94	225.03	243.13	252.85	262.97
Expected Earnings Growth Rate		8.06%	-8.16%	6.71%	5.35%	4.00%	4.00%
Expected cash payout as % of earnings	90.50%	90.50%	87.88%	85.25%	82.63%	80.00%	80.00%
Expected Dividends + Buybacks =	$188.72	$203.93	$181.85	$191.84	$200.89	$202.28	210.37
Expected Terminal Value =						$4,207.49	
Riskfree Rate	3.69%	3.75%	3.81%	3.88%	3.94%	4.00%	4.00%
Required Return on Stocks	8.69%	8.75%	8.81%	8.88%	8.94%	9.00%	9.00%
Present Value =		$187.52	$153.67	$148.90	$143.12	$2,882.41	
Intrinsic Value of Index =	**3515.63**						
Actual Index level =	**3693.23**						
% Under or Over Valuation =	**-4.81%**						

Ten-year Treasury Bond Rate

I will assume that the bulk of the rise in rates has already occurred, and that the T.Bond rate will converge to 4%, over the next five years.

Equity Risk Premium

The equity risk premium is 5%, close to both the historical average risk premium earned on stocks from 1928 - 2022 and the average implied equity risk premium over the last decade. Adding it to the ten-year bond rate yields the required return on stocks.

In my overarching story for equities, I am building in the assumption that there will be a recession that creates both short term & long term damage to corporate earnings, but helps in restraining inflation, bringing it down from 2022 levels to about 3% in the long term (above the 2011-2021 average of 1.73%).

WHAT IF?

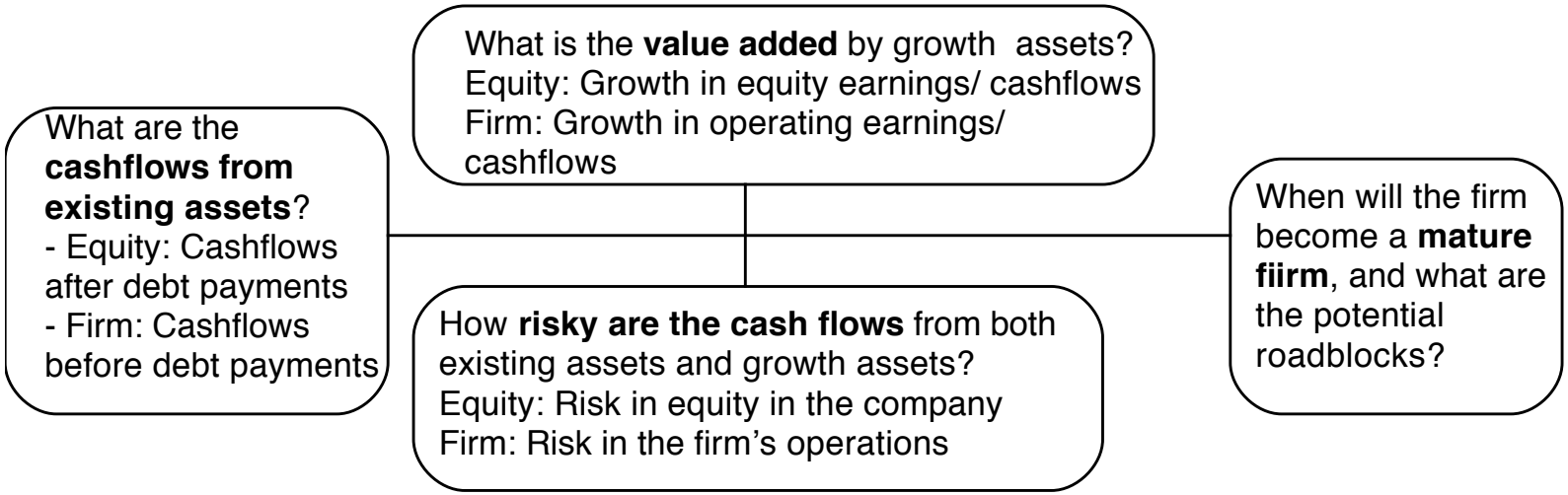
	Valuing the S&P 500 on Sept 23, 2022								
	Earnings = 30% below Estimates			*Earnings = 15% below Estimates*			*Earnings = Estimates*		
Riskfree Rate	*ERP =4%*	*ERP =5%*	*ERP =6%*	*ERP =4%*	*ERP =5%*	*ERP =6%*	*ERP =4%*	*ERP =5%*	*ERP =6%*
2%	4276	3416	2842	4677	3737	3110	5449	4348	3615
3%	4132	3303	2750	4519	3613	3009	5169	4129	3436
4%	3979	3183	2653	4352	3482	2903	4889	3910	3257
5%	3819	3058	2551	4176	3345	2790	4609	3690	3078
6%	3650	2926	2443	3991	3200	2672	4328	3471	2899
Index was trading at 3693 on 9/23/22. Shaded cells are higher than 3693									

THE DARK SIDE OF VALUATION

Anyone can value a company that is stable, makes money and has an established business model!

Aswath Damodaran

THE FUNDAMENTAL DETERMINANTS OF VALUE...



THE DARK SIDE OF VALUATION...

- Valuing stable, money making companies with consistent and clear accounting statements, a long and stable history and lots of comparable firms is easy to do.
- The true test of your valuation skills is when you have to value "difficult" companies. In particular, the challenges are greatest when valuing:
  - **Young companies**, early in the life cycle, in young businesses
  - Companies that **don't fit the accounting mold**
  - Companies that **face substantial truncation risk** (default or nationalization risk)

DIFFICULT TO VALUE COMPANIES...

- Across the life cycle:
  - **Young, growth firms**: Limited history, small revenues in conjunction with big operating losses and a propensity for failure make these companies tough to value.
  - **Mature companies in tran**sition: When mature companies change or are forced to change, history may have to be abandoned and parameters have to be reestimated.
  - Declining and Distressed firms: A long but irrelevant history, declining markets, high debt loads and the likelihood of distress make them troublesome.
- Across markets
  - **Emerging market companies** are often difficult to value because of the way they are structured, their exposure to country risk and poor corporate governance.
- Across sectors
  - **Financial service firms**: Opacity of financial statements and difficulties in estimating basic inputs leave us trusting managers to tell us what's going on.
  - **Commodity and cyclical firms**: Dependence of the underlying commodity prices or overall economic growth make these valuations susceptible to macro factors.
  - **Firms with intangible assets**: Accounting principles are left to the wayside on these firms.

I. THE CHALLENGE WITH YOUNG COMPANIES...

Making judgments on revenues/ profits difficult becaue you cannot draw on history. If you have no product/ service, it is difficult to gauge market potential or profitability. The company;s entire value lies in future growth but you have little to base your estimate on.

Cash flows from existing assets non-existent or negative.

What are the cashflows from existing assets?

Different claims on cash flows can affect value of equity at each stage.

What is the value of equity in the firm?

What is the value added by growth assets?

How risky are the cash flows from both existing assets and growth assets?

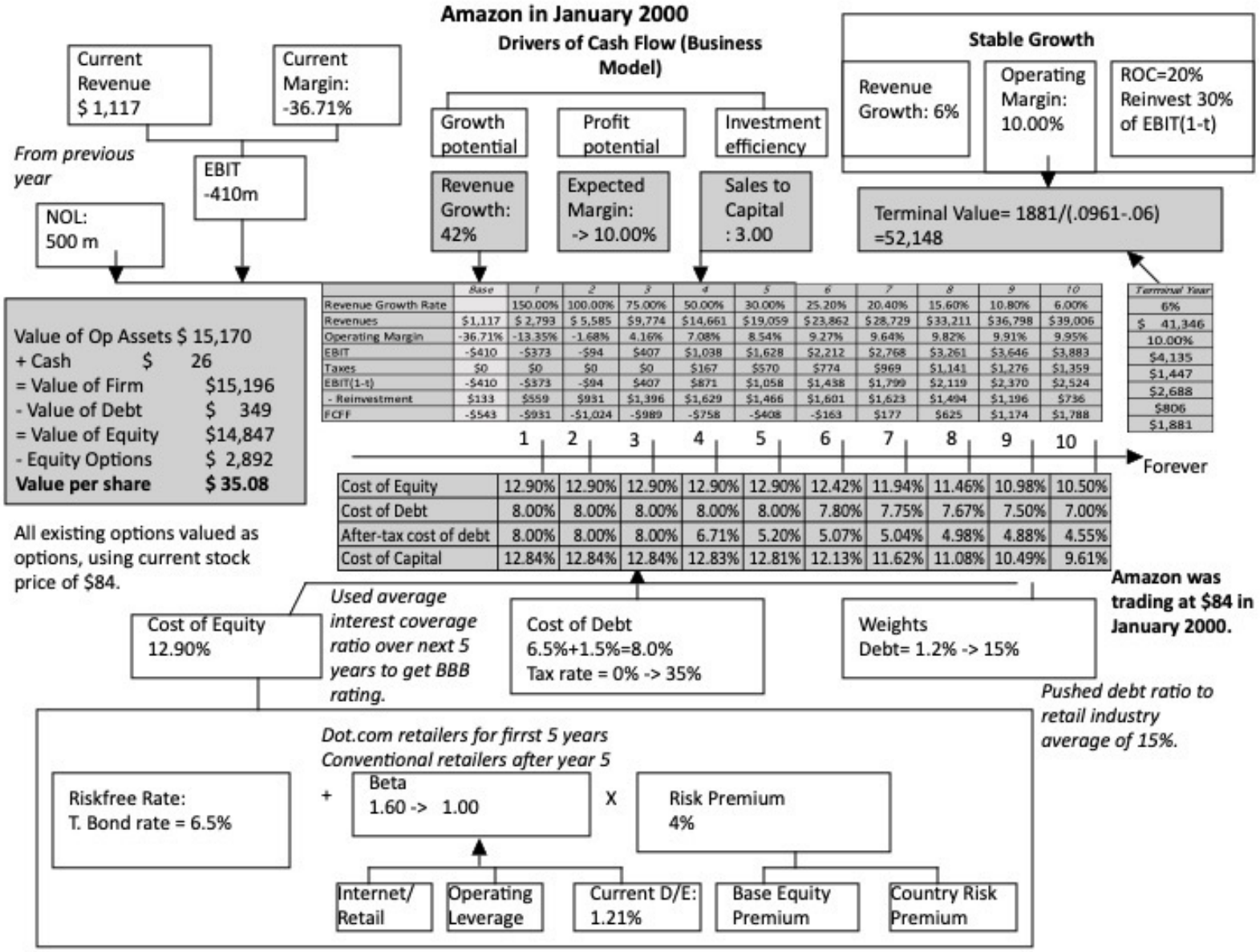
Limited historical data on earnings, and no market prices for securities makes it difficult to assess risk.

When will the firm become a mature fiirm, and what are the potential roadblocks?

Will the firm will make it through the gauntlet of market demand and competition. Even if it does, assessing when it will become mature is difficult because there is so little to go on.

UPPING THE ANTE.. YOUNG COMPANIES IN YOUNG BUSINESSES...

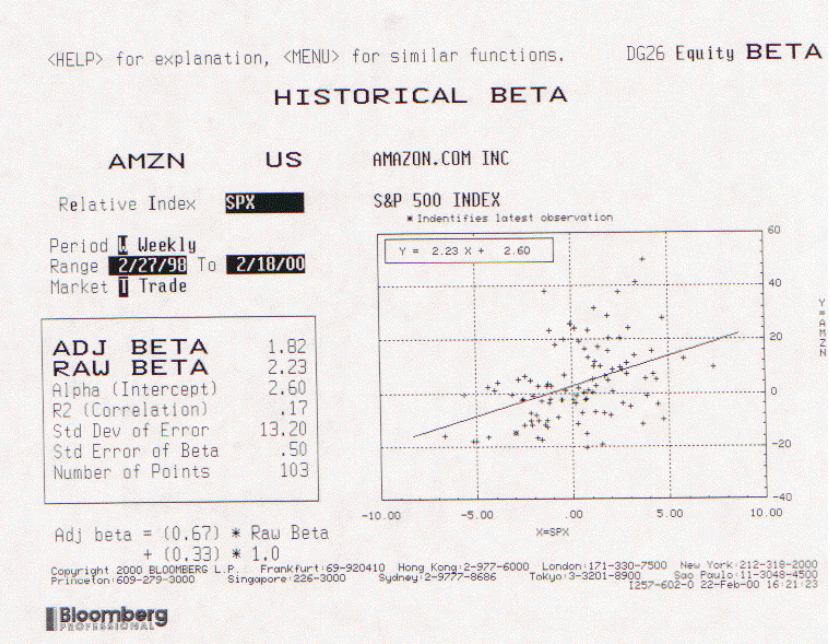
- When valuing a business, we generally draw on three sources of information
  - The firm's **current financial statements**
    - How much did the firm sell?
    - How much did it earn?
  - The firm's **financial history**, usually summarized in its financial statements.
    - How fast have the firm's revenues and earnings grown over time?
    - What can we learn about cost structure and profitability from these trends?
    - Susceptibility to macro-economic factors (recessions and cyclical firms)
  - The industry and **peer group firms**
    - What happens to firms as they mature?
- It is when valuing these companies that you find yourself tempted by the dark side, where
  - "Paradigm shifts" happen…
  - New metrics are invented …
  - The story dominates and the numbers lag…



	Base	1	2	3	4	5	6	7	8	9	10	Terminal Year
Revenue Growth Rate		150.00%	100.00%	75.00%	50.00%	30.00%	25.20%	20.40%	15.60%	10.80%	6.00%	6%
Revenues	$1,117	$ 2,793	$ 5,585	$9,774	$14,661	$19,059	$23,862	$28,729	$33,211	$36,798	$39,006	$ 41,346
Operating Margin	-36.71%	-13.35%	-1.68%	4.16%	7.08%	8.54%	9.27%	9.64%	9.82%	9.91%	9.95%	10.00%
EBIT	-$410	-$373	-$94	$407	$1,038	$1,628	$2,212	$2,768	$3,261	$3,646	$3,883	$4,135
Taxes	$0	$0	$0	$0	$167	$570	$774	$969	$1,141	$1,276	$1,359	$1,447
EBIT(1-t)	-$410	-$373	-$94	$407	$871	$1,058	$1,438	$1,799	$2,119	$2,370	$2,524	$2,688
- Reinvestment	$133	$559	$931	$1,396	$1,629	$1,466	$1,601	$1,623	$1,494	$1,196	$736	$806
FCFF	-$543	-$931	-$1,024	-$989	-$758	-$408	-$163	$177	$625	$1,174	$1,788	$1,881

	1	2	3	4	5	6	7	8	9	10
Cost of Equity	12.90%	12.90%	12.90%	12.90%	12.90%	12.42%	11.94%	11.46%	10.98%	10.50%
Cost of Debt	8.00%	8.00%	8.00%	8.00%	8.00%	7.80%	7.75%	7.67%	7.50%	7.00%
After-tax cost of debt	8.00%	8.00%	8.00%	6.71%	5.20%	5.07%	5.04%	4.98%	4.88%	4.55%
Cost of Capital	12.84%	12.84%	12.84%	12.83%	12.81%	12.13%	11.62%	11.08%	10.49%	9.61%

LESSON 1: DON'T SWEAT THE SMALL STUFF

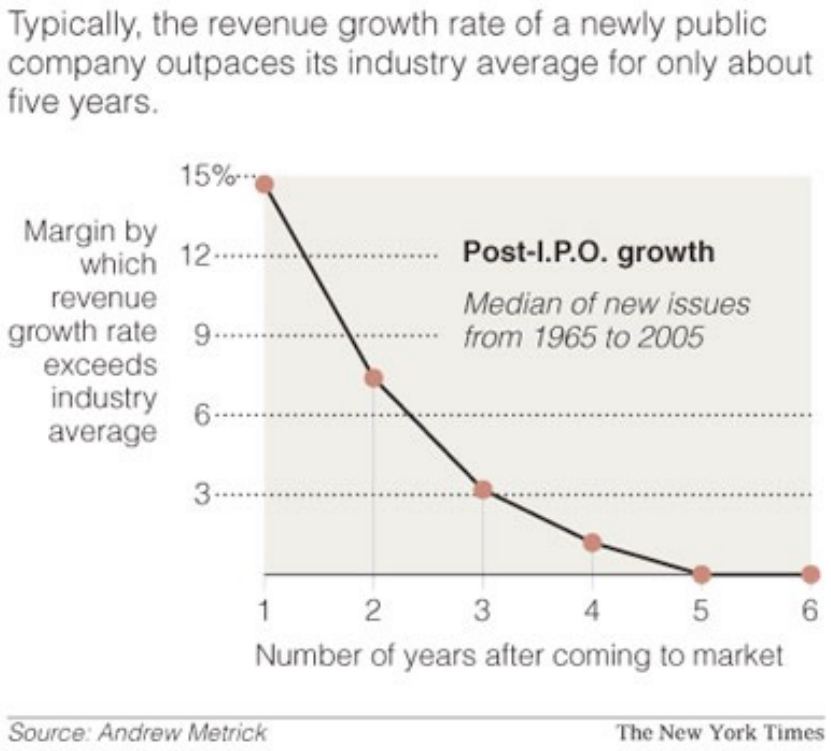


- Spotlight the business the company is in & use the beta of that business.
- Don't try to incorporate failure risk into the discount rate.
- Let the cost of capital change over time, as the company changes.
- If you are desperate, use the cross section of costs of capital to get your estimation going (use the 90th or 95th percentile across all companies).

LESSON 2: WORK BACKWARDS AND KEEP IT SIMPLE...

Year	Revenue Growth	Sales	Operating Margin	EBIT	EBIT (1-t)
Tr 12 mths		$1,117	-36.71%	-$410	-$410
1	150.00%	$2,793	-13.35%	-$373	-$373
2	100.00%	$5,585	-1.68%	-$94	-$94
3	75.00%	$9,774	4.16%	$407	$407
4	50.00%	$14,661	7.08%	$1,038	$871
5	30.00%	$19,059	8.54%	$1,628	$1,058
6	25.20%	$23,862	9.27%	$2,212	$1,438
7	20.40%	$28,729	9.64%	$2,768	$1,799
8	15.60%	$33,211	9.82%	$3,261	$2,119
9	10.80%	$36,798	9.91%	$3,646	$2,370
10	6.00%	$39,006	9.95%	$3,883	$2,524
TY	6.00%	$41,346	10.00%	$4,135	$2,688

LESSON 3: SCALING UP IS HARD TO DO & FAILURE IS COMMON



- Lower revenue growth rates, as revenues scale up.
- Keep track of dollar revenues, as you go through time, measuring against market size.
- If you set your growth period to be much longer than ten years, you are already building in the expectation that your firm is an exceptional firm.

LESSON 4: DON'T FORGET TO PAY FOR GROWTH...

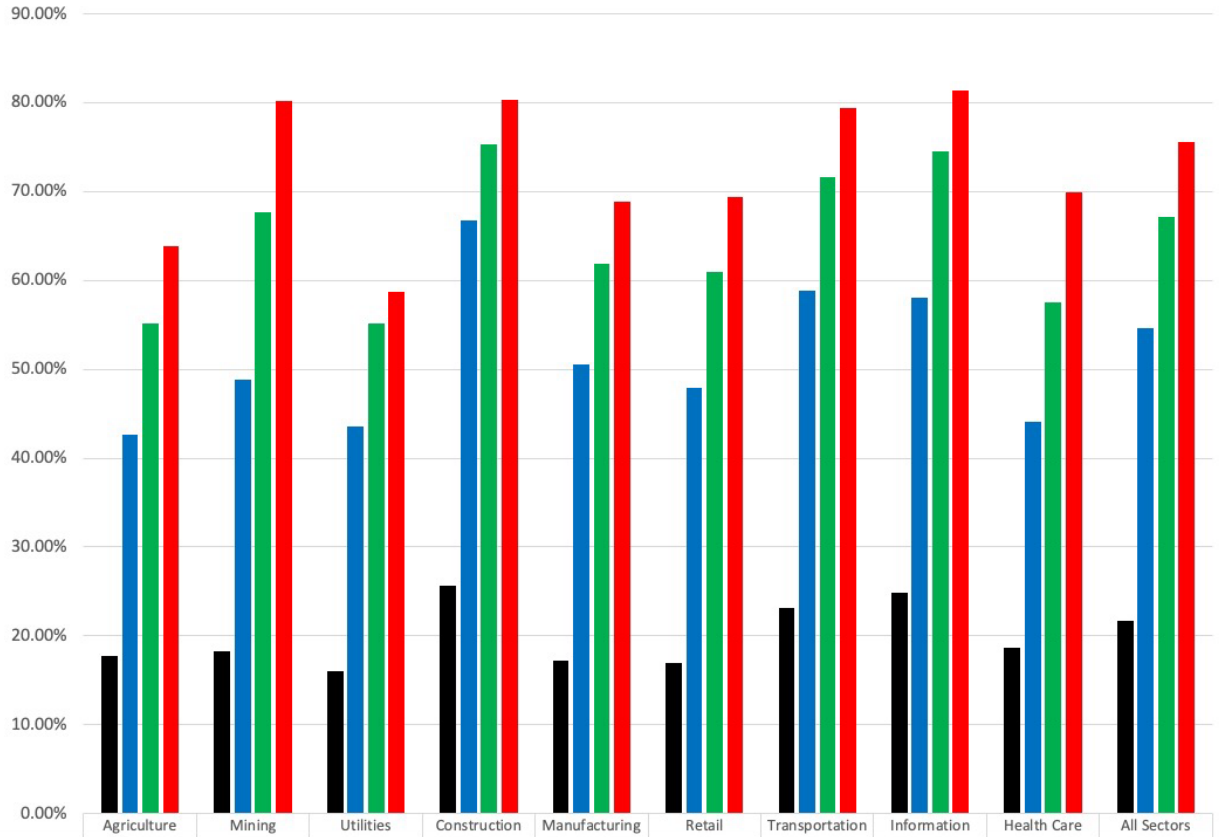
Year	Revenues	Δ Revenue	Sales/Cap	Δ Investment	Invested Capital	EBIT (1-t)	Imputed ROC
Tr 12 mths	$1,117				$ 487	-$410	
1	$2,793	$1,676	3.00	$559	$ 1,045	-$373	-76.62%
2	$5,585	$2,793	3.00	$931	$ 1,976	-$94	-8.96%
3	$9,774	$4,189	3.00	$1,396	$ 3,372	$407	20.59%
4	$14,661	$4,887	3.00	$1,629	$ 5,001	$871	25.82%
5	$19,059	$4,398	3.00	$1,466	$ 6,467	$1,058	21.16%
6	$23,862	$4,803	3.00	$1,601	$ 8,068	$1,438	22.23%
7	$28,729	$4,868	3.00	$1,623	$ 9,691	$1,799	22.30%
8	$33,211	$4,482	3.00	$1,494	$ 11,185	$2,119	21.87%
9	$36,798	$3,587	3.00	$1,196	$ 12,380	$2,370	21.19%
10	$39,006	$2,208	3.00	$736	$ 13,116	$2,524	20.39%
TY	$41,346	$2,340	NA		Assumed to be =		20.00%

LESSON 5: THE DILUTION IS TAKEN CARE OFF..

- With young growth companies, it is almost a given that **the number of shares outstanding will increase over time** for two reasons:
  - To grow, the company will have to **issue new shares** either to raise cash to take projects or to offer to target company stockholders in acquisitions
  - Many young, growth companies **also offer options to managers as compensation and these options will get exercised**, if the company is successful.
- Both effects are **already incorporated into the value per share**, even though we use the current number of shares in estimating value per share
  - The **need for new equity issues is captured in negative cash flows in the earlier years**. The present value of these negative cash flows will drag down the current value of equity and this is the effect of future dilution. In the Amazon valuation, the value of equity is reduced by $3.09 billion (the present value of negative FCFF in the first 6 years), about a 16% reduction. That takes care of new issues in the future.
  - The **existing options are valued and netted out against the current value**, taking care of the option overhang. The future earnings are after stock based compensation expenses (don't fall for the "its not a cash expense" ploy) to take care of future option grants.

LESSON 6: IF YOU ARE WORRIED ABOUT FAILURE, INCORPORATE INTO VALUE

Figure 2.7: Failure Rate by Sector (2006 Cohort of US start-ups)



	Agriculture	Mining	Utilities	Construction	Manufacturing	Retail	Transportation	Information	Health Care	All Sectors
Failure Rate through Year 1	17.70%	18.20%	16.00%	25.70%	17.20%	16.90%	23.10%	24.80%	18.60%	21.70%
Failure Rate through Year 5	42.60%	48.80%	43.50%	66.80%	50.60%	47.90%	58.90%	58.10%	44.10%	54.60%
Failure Rate through Year 10	55.10%	67.70%	55.10%	75.30%	61.90%	61.00%	71.60%	74.50%	57.50%	67.20%
Failure Rate through Year 15	63.90%	80.20%	58.70%	80.30%	68.90%	69.40%	79.40%	81.40%	69.90%	75.60%

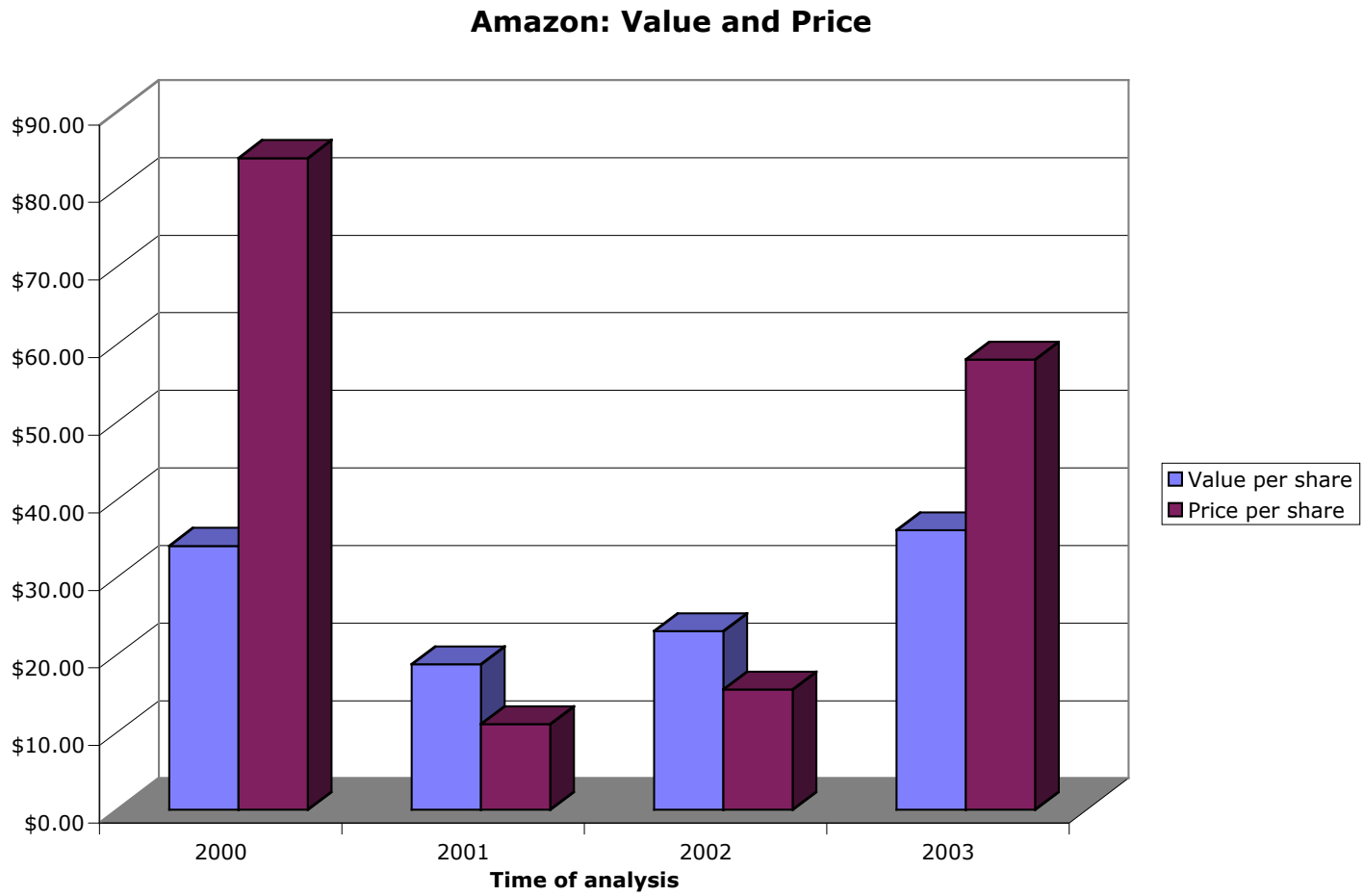
LESSON 7: THERE ARE ALWAYS SCENARIOS WHERE THE MARKET PRICE CAN BE JUSTIFIED...

	6%	8%	10%	12%	14%
30%	$ (1.94)	$ 2.95	$ 7.84	$ 12.71	$ 17.57
35%	$ 1.41	$ 8.37	$ 15.33	$ 22.27	$ 29.21
40%	$ 6.10	$ 15.93	$ 25.74	$ 35.54	$ 45.34
45%	$ 12.59	$ 26.34	$ 40.05	$ 53.77	$ 67.48
50%	$ 21.47	$ 40.50	$ 59.52	$ 78.53	$ 97.54
55%	$ 33.47	$ 59.60	$ 85.72	$ 111.84	$ 137.95
60%	$ 49.53	$ 85.10	$ 120.66	$ 156.22	$ 191.77

LESSON 8: YOU WILL BE WRONG 100% OF THE TIME AND IT REALLY IS NOT YOUR FAULT...

- No matter how careful you are in getting your inputs and how well structured your model is, **your estimate of value will change** both as new information comes out about the company, the business and the economy.
- As **information comes out**, you will have to adjust and adapt your model to reflect the information. Rather than be defensive about the resulting changes in value, recognize that this is the essence of risk.
- **A test: If your valuations are unbiased, you should find yourself increasing estimated values as often as you are decreasing values. In other words, there should be equal doses of good and bad news affecting valuations (at least over time).**

AND THE MARKET IS OFTEN "MORE WRONG"....



ASSESSING MY 2000 FORECASTS, IN 2014

	Revenues		Operating Income		Operating Margin	
Year	My forecast (2000)	Actual	My forecast (2000)	Actual	My forecast (2000)	Actual
2000	$2,793	$2,762	-$ 373	-$ 664.00	-13.35%	-24.04%
2001	$5,585	$3,122	-$ 94	-$ 231.00	-1.68%	-7.40%
2002	$9,774	$3,932	$ 407	$ 106.00	4.16%	2.70%
2003	$14,661	$5,264	$ 1,038	$ 271.00	7.08%	5.15%
2004	$19,059	$6,921	$ 1,628	$ 440.00	8.54%	6.36%
2005	$23,862	$8,490	$ 2,212	$ 432.00	9.27%	5.09%
2006	$28,729	$10,711	$ 2,768	$ 389.00	9.63%	3.63%
2007	$33,211	$14,835	$ 3,261	$ 655.00	9.82%	4.42%
2008	$36,798	$19,166	$ 3,646	$ 842.00	9.91%	4.39%
2009	$39,006	$24,509	$ 3,883	$ 1,129.00	9.95%	4.61%
2010	$41,346	$34,204	$ 4,135	$ 1,406.00	10.00%	4.11%
2011	$43,827	$48,077	$ 4,383	$ 862.00	10.00%	1.79%
2012	$46,457	$61,093	$ 4,646	$ 676.00	10.00%	1.11%
2013	$49,244	$74,452	$ 4,925	$ 745.00	10.00%	1.00%
2014 (LTM)	$51,460	$85,247	$ 5,146.35	$ 97.00	10.00%	0.11%

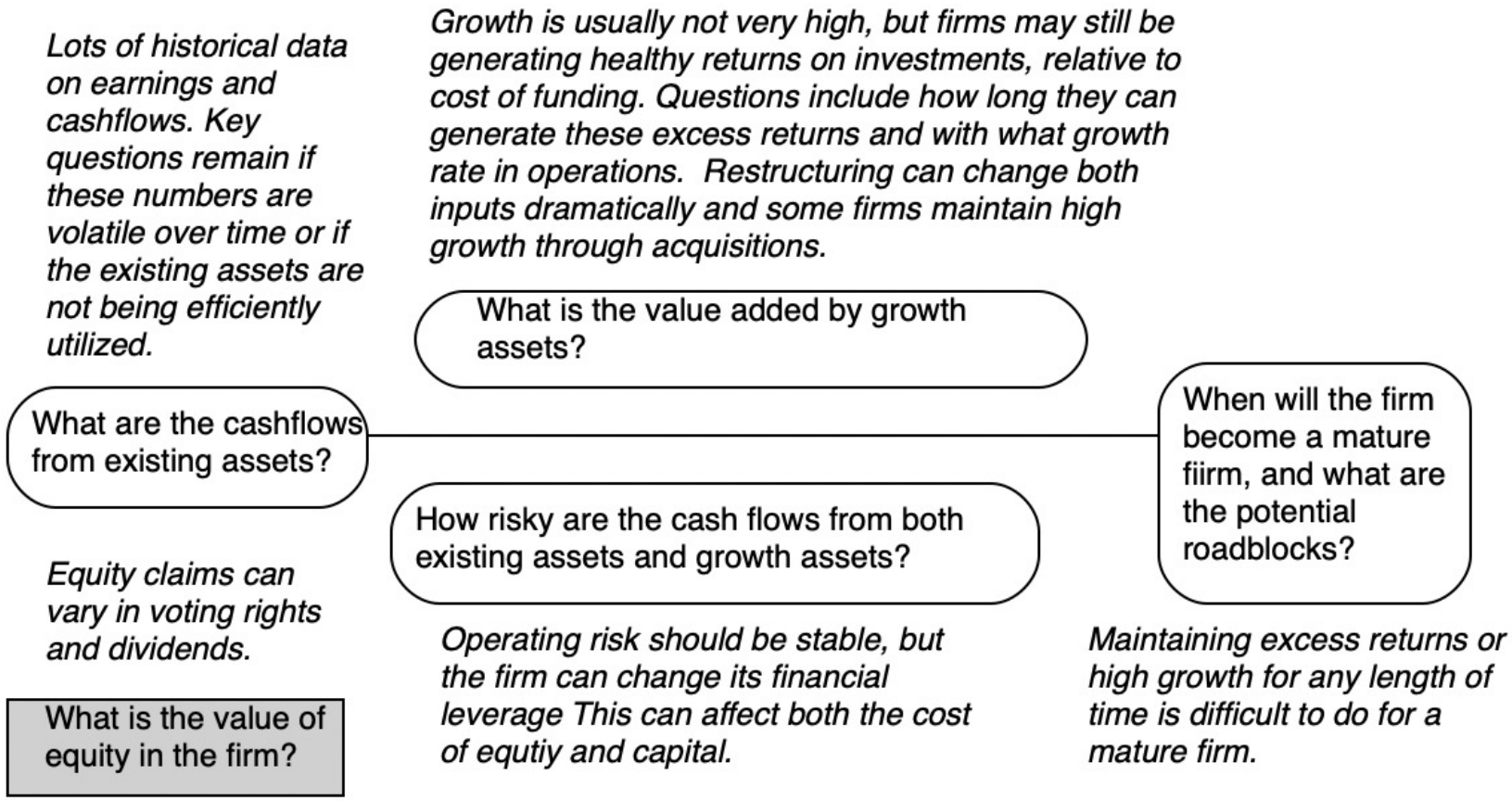
Amazon						Feb-22
The Disruption Platform Rolls on						
Amazon continues on its transformation from online retailer to disruption platform, willling to enter any business that it perceives as inefficiently run, and changing it. Along the way, it will invest large amounts of capital and wait for long periods to attain profitability. *In 2020 and 2021, Amazon benefited from the COVID shut down to increase growth and improve its profitability, making its dominant position even more dominant.*						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$469,822.00	15.0%	15.00%	3.00%	3.00%	Disruption platform in multiple businesses
Operating margin (b)	9.60%	10.0%	10.00%	12.50%	12.50%	Margins improve, aided by cloud business & continued economies of scale.
Tax rate	12.60%		12.60%	25.00%	25.00%	Global/US marginal tax rate over time
Reinvestment (c)		1.69	1.69	1.69	25.00%	Maintined at Amazon's current level
Return on capital	14.17%	Marginal ROIC =	23.66%		12.00%	Stronge competitive edges
Cost of capital (d)			6.74%	6.11%	6.11%	Cost of capital close to median company
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$540,295.30	10.00%	$54,029.53	$47,221.81	$41,723.60	$5,498.21
2	$621,339.60	10.50%	$65,240.66	$57,020.33	$47,982.14	$9,038.19
3	$714,540.53	10.75%	$76,813.11	$67,134.66	$55,179.46	$11,955.19
4	$821,721.61	11.00%	$90,389.38	$79,000.32	$63,456.38	$15,543.94
5	$944,979.86	11.25%	$106,310.23	$92,915.14	$72,974.84	$19,940.31
6	$1,064,047.32	11.34%	$120,655.80	$102,460.90	$70,493.69	$31,967.21
7	$1,172,580.14	11.63%	$136,365.15	$112,419.43	$64,256.68	$48,162.75
8	$1,264,041.40	11.92%	$150,669.48	$120,475.31	$54,149.48	$66,325.83
9	$1,332,299.63	12.21%	$162,671.54	$126,037.91	$40,412.17	$85,625.74
10	$1,372,268.62	12.50%	$171,533.58	$128,650.18	$23,663.57	$104,986.61
Terminal year	$1,413,436.68	12.50%	$176,679.58	$132,509.69	$33,127.42	$99,382.27
The Value						
Terminal value			$3,195,571.27			
PV(Terminal value)			$1,694,040.21			
PV (CF over next 10 years)			$244,983.86			
Value of operating assets =			$1,939,024.07			
Adjustment for distress			$0.00		Probability of failure =	0.00%
- Debt & Minority Interests			$139,439.00			
+ Cash & Other Non-operating assets			$96,049.00			
Value of equity			$1,895,634.07			
- Value of equity options			$0.00			
Number of shares			506.00			
Value per share			$3,746.31		Stock was trading at =	$3,068.57

Aswath Damodaran

II. MATURE COMPANIES IN TRANSITION..

- Mature companies are **generally the easiest group to value**. They have long, established histories that can be mined for inputs. They have investment policies that are set and capital structures that are stable, thus making valuation more grounded in past data.
- However, **this stability in the numbers can mask real problems at the company**. The company may be set in a process, where it invests more or less than it should and does not have the right financing mix. In effect, the policies are consistent, stable and bad.
- If you **expect these companies to change** or as is more often the case to have change thrust upon them, you will have to revalue the firm, with the changes built in.

THE PERILS OF VALUING MATURE COMPANIES...



Hormel Foods: The Value of Control Changing

Hormel Foods sells packaged meat and other food products and has been in existence as a publicly traded company for almost 80 years. In 2008, the firm reported after-tax operating income of $315 million, reflecting a compounded growth of 5% over the previous 5 years.

The Status Quo

Run by existing management, with conservative reinvestment policies (reinvestment rate = 14.34% and debt ratio = 10.4%.

Anemic growth rate and short growth period, due to reinvestment policy

Low debt ratio affects cost of capital

Year	Operating income after taxes	Expected growth rate	ROC	Reinvestment Rate	Reinvestment	FCFF	Cost of capital	Present Value
Trailing 12 months	$315							
1	$324	2.75%	14.34%	19.14%	$62	$262	6.79%	$245
2	$333	2.75%	14.34%	19.14%	$64	$269	6.79%	$236
3	$342	2.75%	14.34%	19.14%	$65	$276	6.79%	$227
Beyond	$350	2.35%	7.23%	32.52%	$114	$4,840	7.23%	$3,974
Value of operating assets								$4,682
(Add) Cash								$155
(Subtract) Debt								$491
(Subtract) Management Options								$53
Value of equity in common stock								$4,293
Value per share								$31.91

New and better management

More aggressive reinvestment which increases the reinvestment rate (to 40%) and tlength of growth (to 5 years), and higher debt ratio (20%).

Operating Restructuring (1)
Expected growth rate = ROC * Reinvestment Rate
Expected growth rae (status quo) = 14.34% * 19.14% = 2.75%
Expected growth rate (optimal) = 14.00% * 40% = 5.60%
ROC drops, reinvestment rises and growth goes up.

Financial restructuring (2)
Cost of capital = Cost of equity (1-Debt ratio) + Cost of debt (Debt ratio)
Status quo = 7.33% (1-.104) + 3.60% (1-.40) (.104) = 6.79%
Optimal = 7.75% (1-.20) + 3.60% (1-.40) (.20) = 6.63%
Cost of equity rises but cost of capital drops.

Year	Operating income after taxes	Expected growth rate	ROC	Reinvestment Rate	Reinvestment	FCFF	Cost of capital	Present Value
Trailing 12 months	$315							
1	$333	5.60%	14.00%	40.00%	$133	$200	6.63%	$187
2	$351	5.60%	14.00%	40.00%	$141	$211	6.63%	$185
3	$371	5.60%	14.00%	40.00%	$148	$223	6.63%	$184
4	$392	5.60%	14.00%	40.00%	$260	$235	6.63%	$182
5	$414	5.60%	14.00%	40.00%	$223	$248	6.63%	$180
Beyond	$423	2.35%	6.74%	34.87%	$148	$6,282	6.74%	$4,557
Value of operating assets								$5,475
(Add) Cash								$155
(Subtract) Debt								$491
(Subtract) Management Options								$53
Value of equity in common stock								$5,085
Value per share								$37.80

Probability of management change = 10% (3)
Expected value =$31.91 (.90) + $37.80 (.10) = $32.50 (4)

FINANCIAL LEVERAGE IS A DOUBLE-EDGED SWORD..

Exhibit 7.1: Optimal Financing Mix: Hormel Foods in January 2009

As debt ratio increases, equity becomes riskier.(higher beta) and cost of equity goes up. (1)

As firm borrows more money, its ratings drop and cost of debt rises (2)

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	0.78	7.00%	AAA	3.60%	40.00%	2.16%	7.00%	$4,523
10%	0.83	7.31%	AAA	3.60%	40.00%	2.16%	6.80%	$4,665
10.39%	**0.83**	**7.33%**	**AAA**	**3.60%**	**40.00%**	**2.16%**	**6.79%**	**$4,680**
20%	0.89	7.70%	AAA	3.60%	40.00%	2.16%	6.59%	$4,815
30%	0.97	8.20%	A+	4.60%	40.00%	2.76%	6.57%	$4,834
40%	1.09	8.86%	A-	5.35%	40.00%	3.21%	6.60%	$4,808
50%	1.24	9.79%	B+	8.35%	40.00%	5.01%	7.40%	$4,271
60%	1.47	11.19%	B-	10.85%	40.00%	6.51%	8.38%	$3,757
70%	1.86	13.52%	CCC	12.35%	40.00%	7.41%	9.24%	$3,398
80%	2.70	18.53%	CC	14.35%	38.07%	8.89%	10.81%	$2,892
90%	5.39	34.70%	CC	14.35%	33.84%	9.49%	12.01%	$2,597

Current Cost of Capital

Optimal: Cost of capital lowest between 20 and 30%.

Debt ratio is percent of overall market value of firm that comes from debt financing.

At debt ratios > 80%, firm does not have enough operating income to cover interest expenses. Tax rate goes down to reflect lost tax benefits. (3)

As cost of capital drops, firm value rises (as operating cash flows remain unchanged)

III. DEALING WITH DECLINE AND DISTRESS...

Historial data often reflects flat or declining revenues and falling margins. Investments often earn less than the cost of capital.

Growth can be negative, as firm sheds assets and shrinks. As less profitable assets are shed, the firm's remaining assets may improve in quality.

What is the value added by growth assets?

What are the cashflows from existing assets?

When will the firm become a mature fiirm, and what are the potential roadblocks?

How risky are the cash flows from both existing assets and growth assets?

Underfunded pension obligations and litigation claims can lower value of equity. Liquidation preferences can affect value of equity

What is the value of equity in the firm?

Depending upon the risk of the assets being divested and the use of the proceeds from the divestuture (to pay dividends or retire debt), the risk in both the firm and its equity can change.

There is a real chance, especially with high financial leverage, that the firm will not make it. If it is expected to survive as a going concern, it will be as a much smaller entity.

A. DEALING WITH DECLINE

- **In decline, firms often see declining revenues and lower margins**, translating in negative expected growth over time.
  - If these firms are **run by good manag**ers, they will not fight decline. Instead, they will adapt to it and shut down or sell investments that do not generate the cost of capital. This can translate into negative net capital expenditures (depreciation exceeds cap ex), declining working capital and an overall negative reinvestment rate. The best case scenario is that the firm can shed its bad assets, make itself a much smaller and healthier firm and then settle into long-term stable growth.
  - As an investor, your worst case scenario is that these firms **are run by managers in denial** who continue to expand the firm by making bad investments (that generate lower returns than the cost of capital). These firms may be able to grow revenues and operating income but will destroy value along the way.

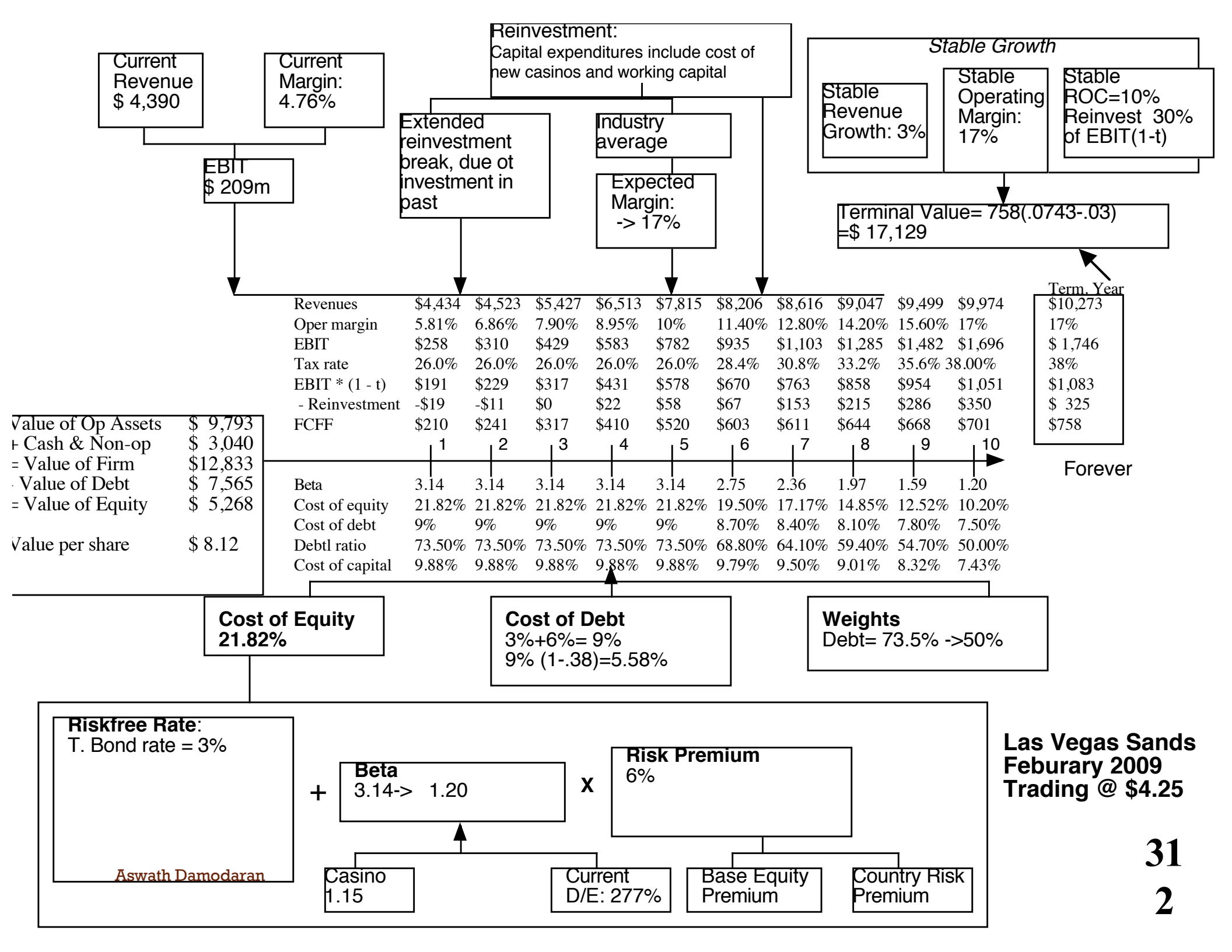
Bed, Bath & Beyond						Sep-22
Incredible Shrinking Store						
Bed Bath and Beyond is in a downward spiral, but we see a glimmer of hope, where the company shuts stores that require the most capital and get the least foot traffic over the next decade, shrinking already-shrunk revenues further, but seeing its operating margins improve to the US brick-and-mortar sector average margin, over the next five years. Along the way, the divestritures and shut downs will relase cash that can be returned and used to pay down debt. By the end of the forecast period, BB&B finds a niche market, albeit wiht a smaller footprint, growing at the same rate as the economy and earning no excess returns..						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
Revenues (a)	$7,868.00	-10.0%	-5.00% →	3.00%	3.00%	Disruption platform in multiple businesses
Operating margin (b)	-1.00%	-1.0%	-1.00% →	5.54%	5.54%	Margins improve, aided by cloud business & continued economies of scale.
Tax rate	25.00%		25.00% →	25.00%	25.00%	Global/US marginal tax rate over time
Reinvestment (c)		2.00	2.00	2.00	30.00%	Maintined at Amazon's current level
Return on capital	-2.80%	Marginal ROIC =	-57.31%		10.00%	Stronge competitive edges
Cost of capital (d)			8.79% →	7.50%	7.50%	Cost of capital close to median company
The Cash Flows						
	Revenues	*Operating Margin*	*EBIT*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	$7,081.20	-1.00%	-$70.81	-$70.81	$0.00	-$70.81
2	$6,727.14	1.62%	$108.72	$108.72	-$177.03	$285.75
3	$6,390.78	2.92%	$186.89	$186.89	-$168.18	$355.06
4	$6,071.24	4.23%	$256.96	$256.96	-$159.77	$416.73
5	$5,767.68	5.54%	$319.56	$244.23	-$151.78	$396.01
6	$5,571.58	5.54%	$308.69	$231.52	-$98.05	$329.57
7	$5,471.29	5.54%	$303.14	$227.35	-$50.14	$277.50
8	$5,460.35	5.54%	$302.53	$226.90	-$5.47	$232.37
9	$5,536.79	5.54%	$306.77	$230.07	$38.22	$191.85
10	$5,702.90	5.54%	$315.97	$236.98	$83.05	$153.92
Terminal year	$5,873.99	5.54%	$325.45	$244.09	$73.23	$170.86
The Value						
Terminal value			$3,796.89			
PV(Terminal value)			$1,695.10			
PV (CF over next 10 years)			$1,644.97			
Value of operating assets =			$3,340.07			
Adjustment for distress			$396.47		Probability of failure =	23.74%
- Debt & Minority Interests			$3,085.00			
+ Cash & Other Non-operating assets			$440.00			
Value of equity			$298.60			
- Value of equity options			$0.00			
Number of shares			92.50			
Value per share			$3.23		Stock was trading at =	$8.79

B. DEALING WITH THE "DOWNSIDE" OF DISTRESS

- **A DCF valuation values a firm as a going concern**. If there is a significant likelihood of the firm failing before it reaches stable growth and if the assets will then be sold for a value less than the present value of the expected cashflows (a distress sale value), DCF valuations will overstate the value of the firm.

  Value of Equity= DCF value of equity (1 - Probability of distress) + Distress sale value of equity (Probability of distress)

- There are three ways in which we can estimate the probability of distress:
  - **Use the bond rating** to estimate the cumulative probability of distress Estimate the probability of distress **with a probit**
  - Estimate the probability of distress by **looking at market value of bonds**..
- The **distress sale value of equity** is usually best estimated as a percent of book value (and this value will be lower if the economy is doing badly and there are other firms in the same business also in distress).


Current Revenue $ 4,390
Current Margin: 4.76%
EBIT $ 209m
Reinvestment: Capital expenditures include cost of new casinos and working capital
Extended reinvestment break, due ot investment in past
Industry average
Expected Margin: -> 17%
Stable Growth
Stable Revenue Growth: 3%
Stable Operating Margin: 17%
Stable ROC=10% Reinvest 30% of EBIT(1-t)
Terminal Value= 758(.0743-.03) =$ 17,129
Term. Year
Revenues $4,434 $4,523 $5,427 $6,513 $7,815 $8,206 $8,616 $9,047 $9,499 $9,974 $10,273
Oper margin 5.81% 6.86% 7.90% 8.95% 10% 11.40% 12.80% 14.20% 15.60% 17% 17%
EBIT $258 $310 $429 $583 $782 $935 $1,103 $1,285 $1,482 $1,696 $ 1,746
Tax rate 26.0% 26.0% 26.0% 26.0% 26.0% 28.4% 30.8% 33.2% 35.6% 38.00% 38%
EBIT * (1 - t) $191 $229 $317 $431 $578 $670 $763 $858 $954 $1,051 $1,083
- Reinvestment -$19 -$11 $0 $22 $58 $67 $153 $215 $286 $350 $ 325
FCFF $210 $241 $317 $410 $520 $603 $611 $644 $668 $701 $758
1 2 3 4 5 6 7 8 9 10
Forever
Value of Op Assets $ 9,793
+ Cash & Non-op $ 3,040
= Value of Firm $12,833
- Value of Debt $ 7,565
= Value of Equity $ 5,268
Value per share $ 8.12
Beta 3.14 3.14 3.14 3.14 3.14 2.75 2.36 1.97 1.59 1.20
Cost of equity 21.82% 21.82% 21.82% 21.82% 21.82% 19.50% 17.17% 14.85% 12.52% 10.20%
Cost of debt 9% 9% 9% 9% 9% 8.70% 8.40% 8.10% 7.80% 7.50%
Debtl ratio 73.50% 73.50% 73.50% 73.50% 73.50% 68.80% 64.10% 59.40% 54.70% 50.00%
Cost of capital 9.88% 9.88% 9.88% 9.88% 9.88% 9.79% 9.50% 9.01% 8.32% 7.43%
Cost of Equity 21.82%
Cost of Debt 3%+6%= 9% 9% (1-.38)=5.58%
Weights Debt= 73.5% ->50%
Riskfree Rate: T. Bond rate = 3%
+
Beta 3.14-> 1.20
X
Risk Premium 6%
Casino 1.15
Current D/E: 277%
Base Equity Premium
Country Risk Premium
Aswath Damodaran
Las Vegas Sands
Feburary 2009
Trading @ $4.25
31
2

ADJUSTING THE VALUE OF LVS FOR DISTRESS..

- Ratings based approach: In February 2009, Las Vegas Sands was rated B+, and based upon history (previous ten years), the **likelihood of default is 28.25**%.
- Bond Price based: In February 2009, LVS was rated B+ by S&P. Historically, 28.25% of B+ rated bonds default within 10 years. LVS has a 6.375% bond, maturing in February 2015 (7 years), trading at $529. If we discount the expected cash flows on the bond at the riskfree rate, we can back out the probability of distress from the bond price:

$$529 = \sum_{t=1}^{t=7} \frac{63.75(1-\Pi_{Distress})^t}{(1.03)^t} + \frac{1000(1-\Pi_{Distress})^7}{(1.03)^7}$$

$\pi_{Distress}$ = Annual probability of default = 13.54%

Cumulative probability of surviving 10 years = (1 - .1354)10 = 23.34%

Cumulative probability of distress over 10 years = 1 - .2334 = .7666 or 76.66%

- If LVS is becomes distressed:
  - Expected distress sale proceeds = $2,769 million < Face value of debt
  - Expected equity value/share = $0.00
- Expected value per share
  - With ratings-based approach: $8.12 (.7175) + $ 0 (.2825) = $5.83
  - With bond-based approach: $8.12 (1 - .7666) + $0.00 (.7666) = $1.92

IV. EMERGING MARKET COMPANIES

Estimation Issues - Emerging Market Companies

Big shifts in economic environment (inflation, itnerest rates) can affect operating earnings history. Poor corporate governance and weak accounting standards can lead to lack of transparency on earnings.

Growth rates for a company will be affected heavily be growth rate and political developments in the country in which it operates.

What is the value added by growth assets?

What are the cashflows from existing assets?

When will the firm become a mature fiirm, and what are the potential roadblocks?

How risky are the cash flows from both existing assets and growth assets?

Cross holdings can affect value of equity

Even if the company's risk is stable, there can be significant changes in country risk over time.

Economic crises can put many companies at risk. Government actions (nationalization) can affect long term value.

What is the value of equity in the firm?

LESSON 1: COUNTRY RISK HAS TO BE INCORPORATED... BUT WITH A SCALPEL, NOT A BLUDGEON

- Emerging market companies are undoubtedly exposed to additional country risk because they are incorporated in countries that are more exposed to political and economic risk.
- Not all emerging market companies are equally exposed to country risk and many developed markets have emerging market risk exposure because of their operations.
- You can use either the "weighted country risk premium", with the weights reflecting the countries you get your revenues from or the lambda approach (which may incorporate more than revenues) to capture country risk exposure.

LESSON 2: CURRENCY SHOULD NOT MATTER

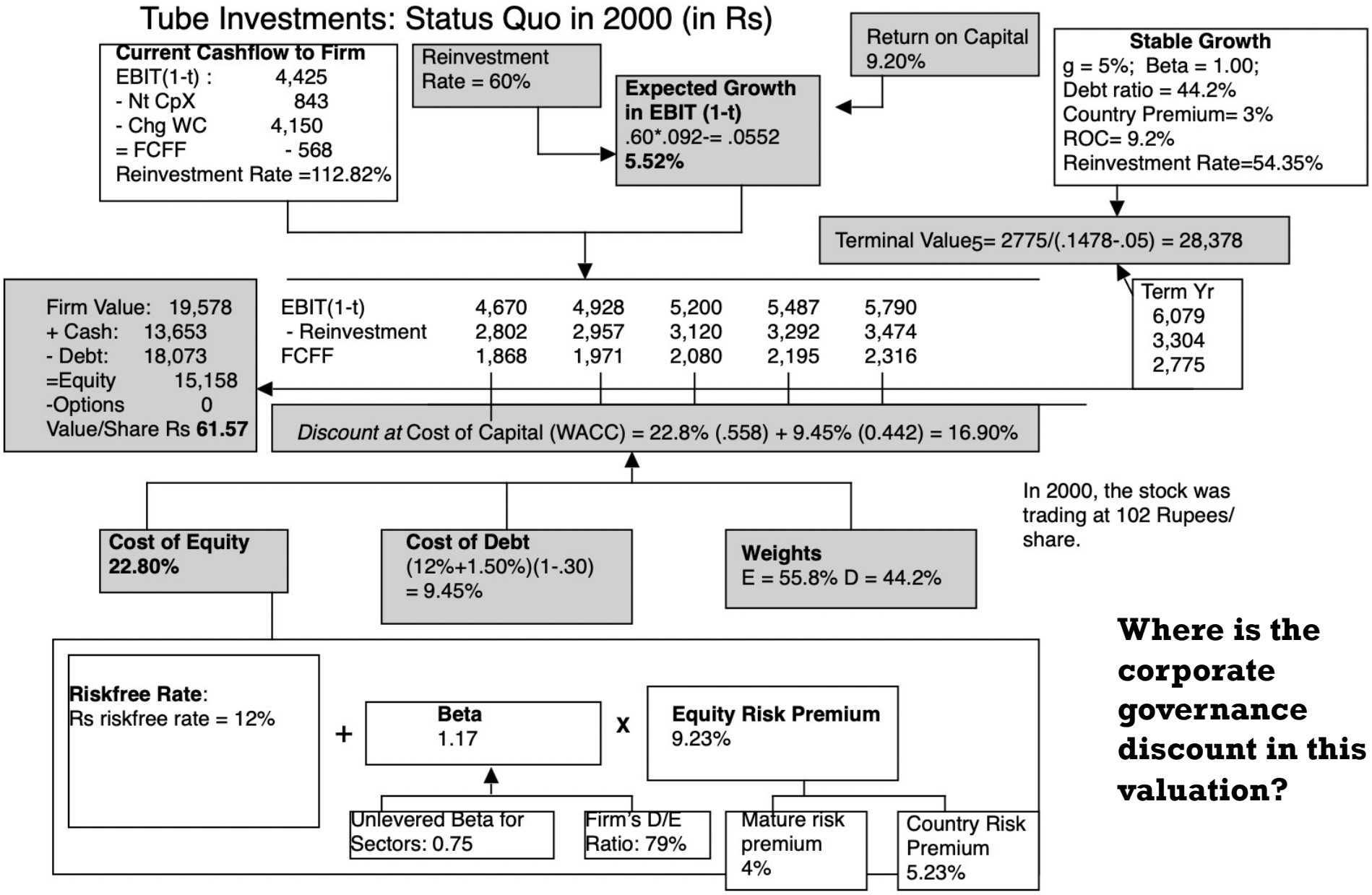
- You can value any company in any currency. Thus, you can value a Brazilian company in nominal reais, US dollars or Swiss Francs.
- For your valuation to stay invariant and consistent, your cash flows and discount rates have to be in the same currency. Thus, if you are using a high inflation currency, both your growth rates and discount rates will be much higher.
- For your cash flows to be consistent, you have to use expected exchange rates that reflect purchasing power parity (the higher inflation currency has to depreciate by the inflation differential each year).

VALUING INFOSYS: IN US$ AND INDIAN RUPEES

	In Indian Rupees	In US $
Risk free Rate	5.00%	2.00%
Expected inflation rate	4.00%	1.00%
Cost of capital - High Growth - Stable Growth	 12.50% 10.39%	 9.25% 7.21%
Expected growth rate - High Growth - Stable Growth	 12.01% 5.00%	 8.78% 2.00%
Return on Capital - High Growth - Stable Growth	 17.16% 10.39%	 13.78% 7.21%
Value per share	Rs 614	$12.79/share (roughly Rs 614 at current exchange rate)

LESSON 3: THE "CORPORATE GOVERNANCE" DRAG

- Stockholders in Asian, Latin American and many European companies have little or no power over the managers of the firm. In many cases, insiders own voting shares and control the firm and the potential for conflict of interests is huge.
- This weak corporate governance is often a reason for given for using higher discount rates or discounting the estimated value for these companies.
- Would you discount the value that you estimate for an emerging market company to allow for this absence of stockholder power?
- Yes
- No.

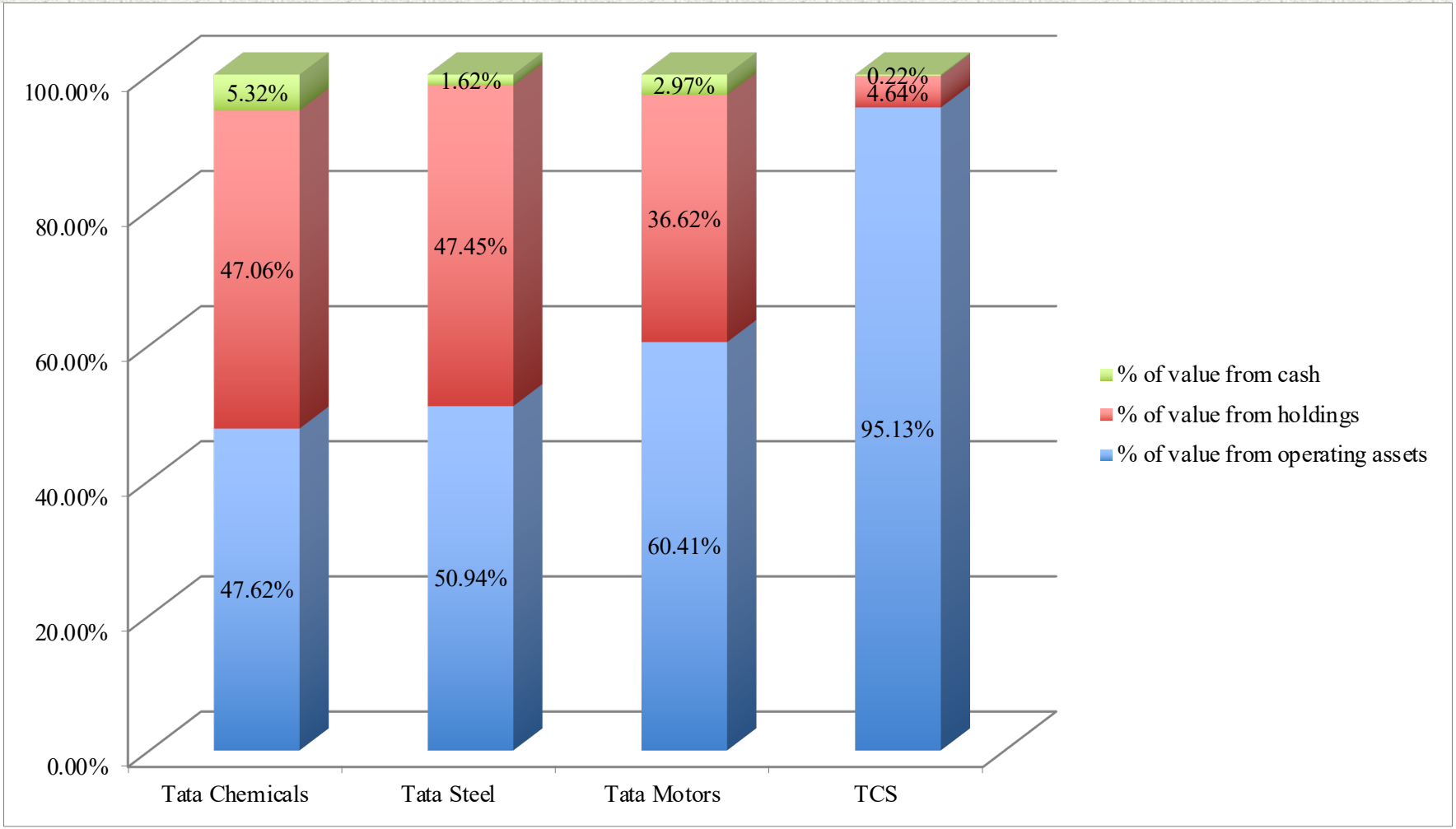


Where is the corporate governance discount in this valuation?

LESSON 4: WATCH OUT FOR CROSS HOLDINGS...

- Emerging market companies are more prone to having cross holdings that companies in developed markets.
  - This is partially the result of history (since many of the larger public companies used to be family owned businesses until a few decades ago)
  - And partly because those who run these companies value control (and use cross holdings to preserve this control).
- In many emerging market companies, the real process of valuation begins when you have finished your DCF valuation, since the cross holdings (which can be numerous) have to be valued, often with minimal information.

TATA COMPANIES IN 2010: VALUE BREAKDOWN

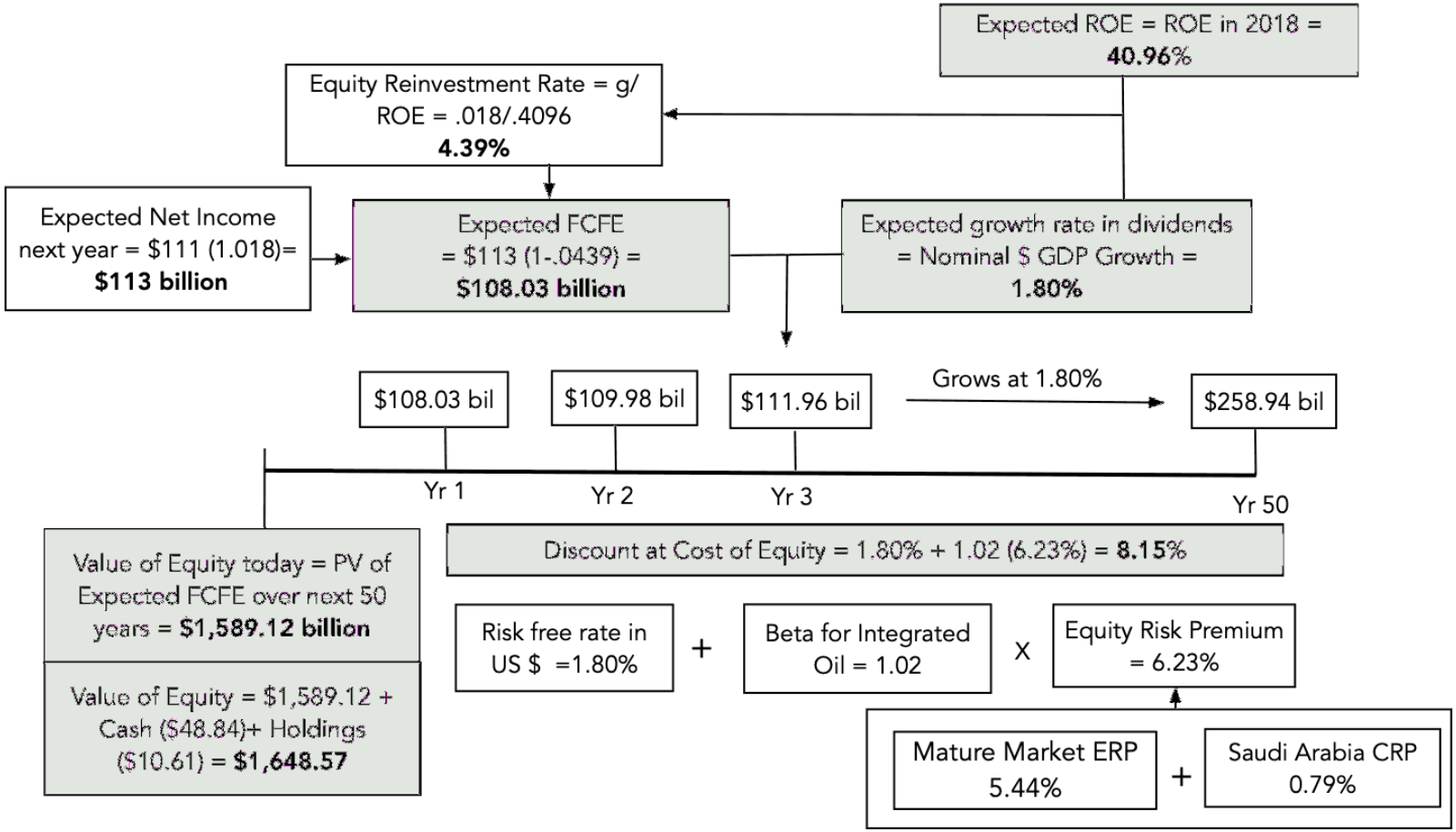


LESSON 5: TRUNCATION RISK CAN COME IN MANY FORMS...

- Natural disasters: Small companies in some economies are much exposed to natural disasters (hurricanes, earthquakes), without the means to hedge against that risk (with insurance or derivative products).
- Terrorism risk: Companies in some countries that are unstable or in the grips of civil war are exposed to damage or destruction.
- Nationalization risk: While less common than it used to be, there are countries where businesses may be nationalized, with owners receiving less than fair value as compensation.

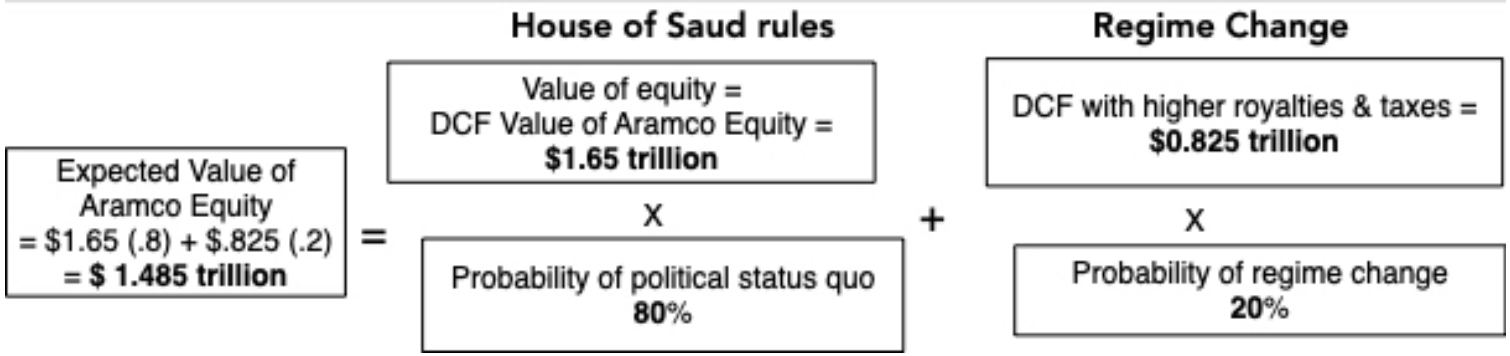
VALUING ARAMCO: POTENTIAL DIVIDENDS

A Potential Dividend (FCFE) Discount Model Valuation of Aramco



ADJUSTING FOR REGIME CHANGE

- If you believe that there is no chance of regime change, your expected value will remain $1.65 trillion.
- If you believe that regime change is imminent, and that your equity will be fully expropriated, your expected value will be zero.
- If you believe that there remains a non-trivial chance (perhaps as high as 20%) that there will be a regime change and that if there is one, there will be changes that reduce, but not extinguish, your equity claim:



V. VALUING FINANCIAL SERVICE COMPANIES

Existing assets are usually financial assets or loans, often marked to market. Earnings do not provide much information on underlying risk.

Defining capital expenditures and working capital is a challenge.Growth can be strongly influenced by regulatory limits and constraints. Both the amount of new investments and the returns on these investments can change with regulatory changes.

What is the value added by growth assets?

What are the cashflows from existing assets?

When will the firm become a mature fiirm, and what are the potential roadblocks?

How risky are the cash flows from both existing assets and growth assets?

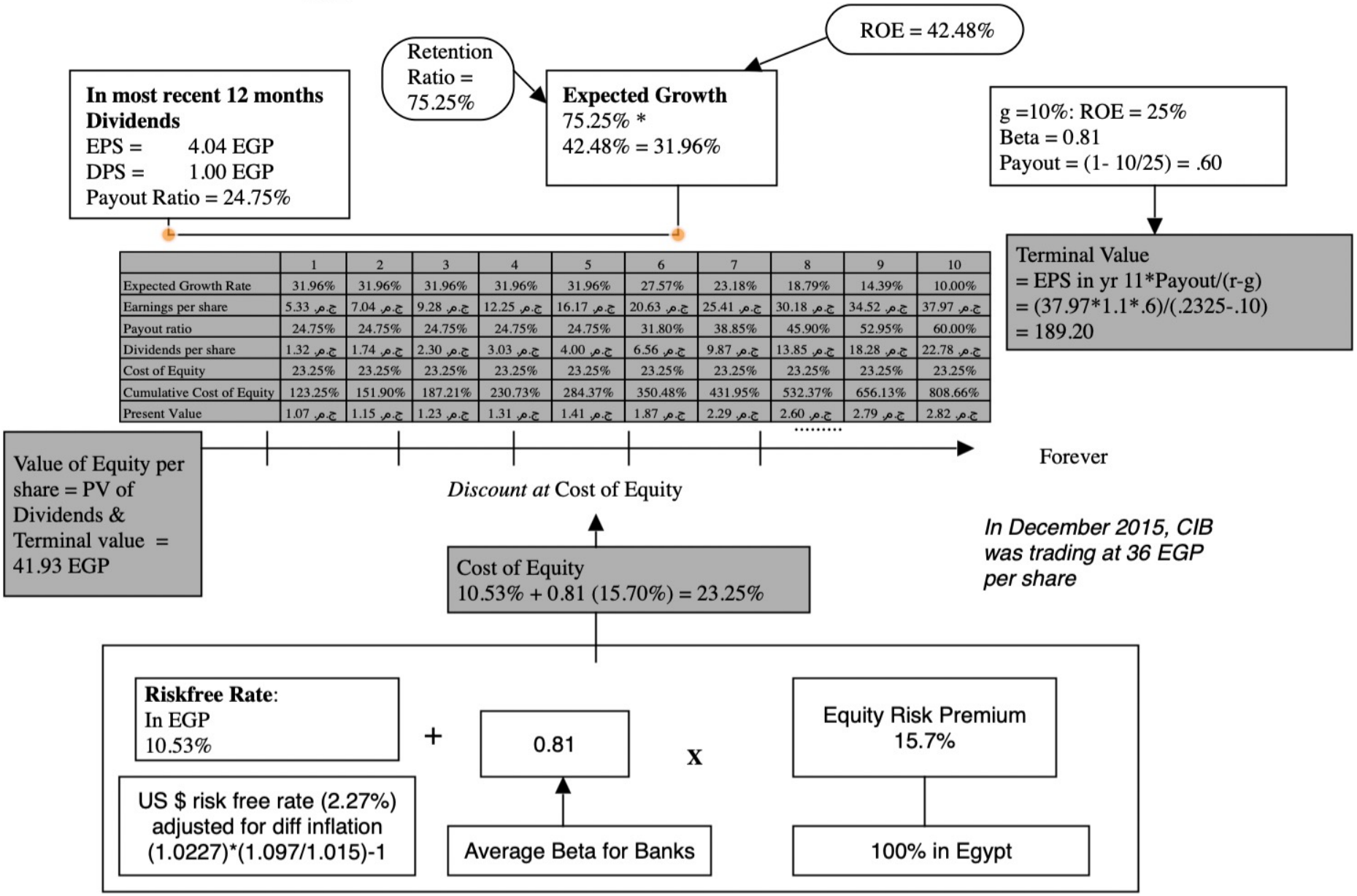
Preferred stock is a significant source of capital.

What is the value of equity in the firm?

For financial service firms, debt is raw material rather than a source of capital. It is not only tough to define but if defined broadly can result in high financial leverage, magnifying the impact of small operating risk changes on equity risk.

In addition to all the normal constraints, financial service firms also have to worry about maintaining capital ratios that are acceptable ot regulators. If they do not, they can be taken over and shut down.

CIB Egypt in December 2015
Valuation in Egyptian Pounds



	1	2	3	4	5	6	7	8	9	10
Expected Growth Rate	31.96%	31.96%	31.96%	31.96%	31.96%	27.57%	23.18%	18.79%	14.39%	10.00%
Earnings per share	5.33 ج.م.	7.04 ج.م.	9.28 ج.م.	12.25 ج.م.	16.17 ج.م.	20.63 ج.م.	25.41 ج.م.	30.18 ج.م.	34.52 ج.م.	37.97 ج.م.
Payout ratio	24.75%	24.75%	24.75%	24.75%	24.75%	31.80%	38.85%	45.90%	52.95%	60.00%
Dividends per share	1.32 ج.م.	1.74 ج.م.	2.30 ج.م.	3.03 ج.م.	4.00 ج.م.	6.56 ج.م.	9.87 ج.م.	13.85 ج.م.	18.28 ج.م.	22.78 ج.م.
Cost of Equity	23.25%	23.25%	23.25%	23.25%	23.25%	23.25%	23.25%	23.25%	23.25%	23.25%
Cumulative Cost of Equity	123.25%	151.90%	187.21%	230.73%	284.37%	350.48%	431.95%	532.37%	656.13%	808.66%
Present Value	1.07 ج.م.	1.15 ج.م.	1.23 ج.م.	1.31 ج.م.	1.41 ج.م.	1.87 ج.م.	2.29 ج.م.	2.60 ج.م.	2.79 ج.م.	2.82 ج.م.

LESSON 1: FINANCIAL SERVICE COMPANIES ARE OPAQUE...

- With financial service firms, we enter into a Faustian bargain. They tell us very little about the quality of their assets (loans, for a bank, for instance are not broken down by default risk status) but we accept that in return for assets being marked to market (by accountants who presumably have access to the information that we don't have).
- In addition, estimating cash flows for a financial service firm is difficult to do. So, we trust financial service firms to pay out their cash flows as dividends. Hence, the use of the dividend discount model.
- During times of crises or when you don't trust banks to pay out what they can afford to in dividends, using the dividend discount model may not give you a "reliable" value.

LESSON 2: FOR FINANCIAL SERVICE COMPANIES, BOOK VALUE MATTERS...

- The book value of assets and equity is mostly irrelevant when valuing non-financial service companies. After all, the book value of equity is a historical figure and can be nonsensical. (The book value of equity can be negative and is so for more than a 1000 publicly traded US companies)
- With financial service firms, book value of equity is relevant for two reasons:
  - Since financial service firms mark to market, the book value is more likely to reflect what the firms own right now (rather than a historical value)
  - The regulatory capital ratios are based on book equity. Thus, a bank with negative or even low book equity will be shut down by the regulators.
- From a valuation perspective, it therefore makes sense to pay heed to book value. In fact, you can argue that reinvestment for a bank is the amount that it needs to add to book equity to sustain its growth ambitions and safety requirements:
  - FCFE = Net Income – Reinvestment in regulatory capital (book equity)

Deutsche Bank: A Crisis Valuation (October 2016)

Risk adjusted assets grows at inflation rate of 1% a year forever.

Tier 1 capital ratio increases to 15.67%, the 75th percentile for all banks

Expected DOJ fine of $10 billions lower Tier 1 capital today

Common Equity increases in tandem with Tier 1 capital

Cost of equity starts at 10.2% (75th percentile of banks) & decreases after year 5 to 9.44% (median across banks).

	Current	1	2	3	4	5	6	7	8	9	10
Risk Adjusted Assets	$ 445,570	$ 450,026	$ 454,526	$ 459,071	$ 463,662	$ 468,299	$ 472,982	$ 477,711	$ 482,488	$ 487,313	$ 492,186
Tier 1 Capital Ratio	12.41%	13.74%	13.95%	14.17%	14.38%	14.60%	14.81%	15.03%	15.24%	15.46%	15.67%
Tier 1 Capital (Risk Adjusted Assets * T	$55,282	$61,834	$63,427	$65,045	$66,690	$68,361	$70,059	$71,784	$73,537	$75,317	$77,126
Change in regulatory capital (Tier 1)		$6,552	$1,593	$1,619	$1,645	$1,671	$1,698	$1,725	$1,753	$1,780	$1,809
Book Equity	$64,609	$71,161	$72,754	$74,372	$76,017	$77,688	$79,386	$81,111	$82,864	$84,644	$86,453
Expected ROE	-13.70%	-7.18%	-2.84%	0.06%	1.99%	5.85%	6.568%	7.286%	8.004%	8.722%	9.440%
Net Income (Book Equity * ROE)	$ (8,851)	$ (5,111)	$ (2,065)	$ 43	$ 1,512	$ 4,545	$ 5,214	$ 5,910	$ 6,632	$ 7,383	$ 8,161
- Investment in Regulatory Capital		$ 6,552	$ 1,593	$ 1,619	$ 1,645	$ 1,671	$ 1,698	$ 1,725	$ 1,753	$ 1,780	$ 1,809
FCFE		$ (11,663)	$ (3,658)	$ (1,576)	$ (133)	$ 2,874	$ 3,516	$ 4,185	$ 4,880	$ 5,602	$ 6,352
Terminal value of equity											$87,317
Present value		$ (10,583)	$ (3,012)	$ (1,178)	$ (90)	$ 1,768	$ 1,966	$ 2,129	$ 2,262	$ 2,370	$ 36,207
Cost of equity	10.20%	10.20%	10.20%	10.20%	10.20%	10.20%	10.048%	9.896%	9.744%	9.592%	9.440%
Cumulative Cost of equity		1.1020	1.2144	1.3383	1.4748	1.6252	1.7885	1.9655	2.1570	2.3639	2.5871
Value of equity today =	$31,838.74										
Number of shares outstanding =	1386.00										
DCF Value per share =	**$ 22.97**										
Probability of equity wipeout	10.00%										
Adjusted value per share =	**$ 20.67**										
Stock price on October 3, 2016=	**$ 13.33**										

Value per share adjusted for probability of catastrophic failure (bailout) resulting in complete loss of equity.

Return on equity increases to 5.85% (25th percentile of banks) in year 5 and 9.44% (cost of equity) in year 10

LESSON 3: NOT ALL FINANCIAL SERVICE FIRMS ARE BUILT ALIKE..

- Financial service is a broad category, and while banks may be its most substantive component, there are a range of other companies, with very different business models.
- For instance, payment processing companies and credit card companies are also financial service companies, but they derive their value from
  - Getting consumers to use their platforms to make payments to businesses or to each other, resulting in transactions on the platform (called Gross Merchandising Value or GMV)
  - Keeping a slice, called a take rate, of the GMV for themselves.

Paytm						Sep-21
The Story						
Paytm will continue its dominance of the Indian mobile payment market, while that market continues to grow. Along the way, its management will focus more on converting transactions on its platform into revenues, and revenues into operating income.						
The Assumptions						
	Base year	*Next year*	*Years 2-5*	*Years 6-10*	*After year 10*	*Link to story*
GMV	₹ 4,033,000	40.00%	40.00%	4.19%	4.19%	Growing mobile payment market
Revenue as % of GMV	0.79%	0.83%	1.00%	2.00%	2.00%	Take rate improves, as company matures
Operating margin (b)	-49.00%	-20.0%	5.00%	30.00%	30.00%	High-margin intermediary business
Tax rate	25.00%		25.00%	25.00%	25.00%	Converge on statutory tax rate
Reinvestment (c)		3.00	2.45	2.45	27.93%	Industry average reinvestment, for capital intensive business.
Return on capital	-21.78%	Marginal ROIC =	80.13%		15.00%	Competitive advantages fade over time.
Cost of capital (d)			10.44%	8.91%	8.91%	Cost of capital relatively stable.
The Cash Flows						
	GMV	*Revenues*	*Operating Margin*	*EBIT (1-t)*	*Reinvestment*	*FCFF*
1	₹ 5,646,200	₹ 46,984.56	-20.00%	₹ -9,396.91	₹ 5,038.85	₹ -14,435.77
2	₹ 7,904,680	₹ 69,095.49	-10.00%	₹ -6,909.55	₹ 9,024.87	₹ -15,934.42
3	₹ 11,066,552	₹ 101,377.63	-5.00%	₹ -5,068.88	₹ 13,176.38	₹ -18,245.27
4	₹ 15,493,173	₹ 148,430.20	0.00%	₹ -0.00	₹ 19,205.13	₹ -19,205.13
5	₹ 21,690,442	₹ 216,904.42	5.00%	₹ 10,845.22	₹ 27,948.66	₹ -17,103.44
6	₹ 28,813,149	₹ 345,757.79	10.00%	₹ 28,564.36	₹ 52,593.21	₹ -24,028.85
7	₹ 36,211,213	₹ 506,956.99	15.00%	₹ 57,032.66	₹ 65,795.59	₹ -8,762.93
8	₹ 42,915,357	₹ 686,645.72	20.00%	₹ 102,996.86	₹ 73,342.34	₹ 29,654.52
9	₹ 47,787,109	₹ 860,167.96	25.00%	₹ 161,281.49	₹ 70,825.40	₹ 90,456.09
10	₹ 49,789,389	₹ 995,787.77	30.00%	₹ 224,052.25	₹ 55,355.03	₹ 168,697.22
Terminal year	₹ 51,875,564	₹ 1,037,511.28	30.00%	₹ 233,440.04	₹ 65,207.58	₹ 168,232.45
The Value						
Terminal value			₹ 3,564,246.92			
PV(Terminal value)			₹ 1,377,090.74			
PV (CF over next 10 years)			₹ 36,169.53			
Value of operating assets =			₹ 1,413,260.27			
Adjustment for distress			₹ 35,331.51		Probability of failure =	5.00%
- Debt & Minority Interests			₹ 12,006.00			
+ Cash & Other Non-operating assets			₹ 7,785.00			
+IPO Proceeds			₹ 83,000.00	*Total proceeds expected to be 166,000, but half will be cashing out existing stockholders.*		
Value of equity			₹ 1,456,707.76			
- Value of equity options			₹ 45,696.90			
Number of shares			644.23			
Value per share			₹ 2,190.24		Stock was trading at =	₹ 2,950.00

VI. VALUING COMPANIES WITH "INTANGIBLE" ASSETS

If capital expenditures are miscategorized as operating expenses, it becomes very difficult to assess how much a firm is reinvesting for future growth and how well its investments are doing.

What is the value added by growth assets?

What are the cashflows from existing assets?

The capital expenditures associated with acquiring intangible assets (technology, himan capital) are mis-categorized as operating expenses, leading to inccorect accounting earnings and measures of capital invested.

How risky are the cash flows from both existing assets and growth assets?

It ican be more difficult to borrow against intangible assets than it is against tangible assets. The risk in operations can change depending upon how stable the intangbiel asset is.

When will the firm become a mature fiirm, and what are the potential roadblocks?

Intangbile assets such as brand name and customer loyalty can last for very long periods or dissipate overnight.

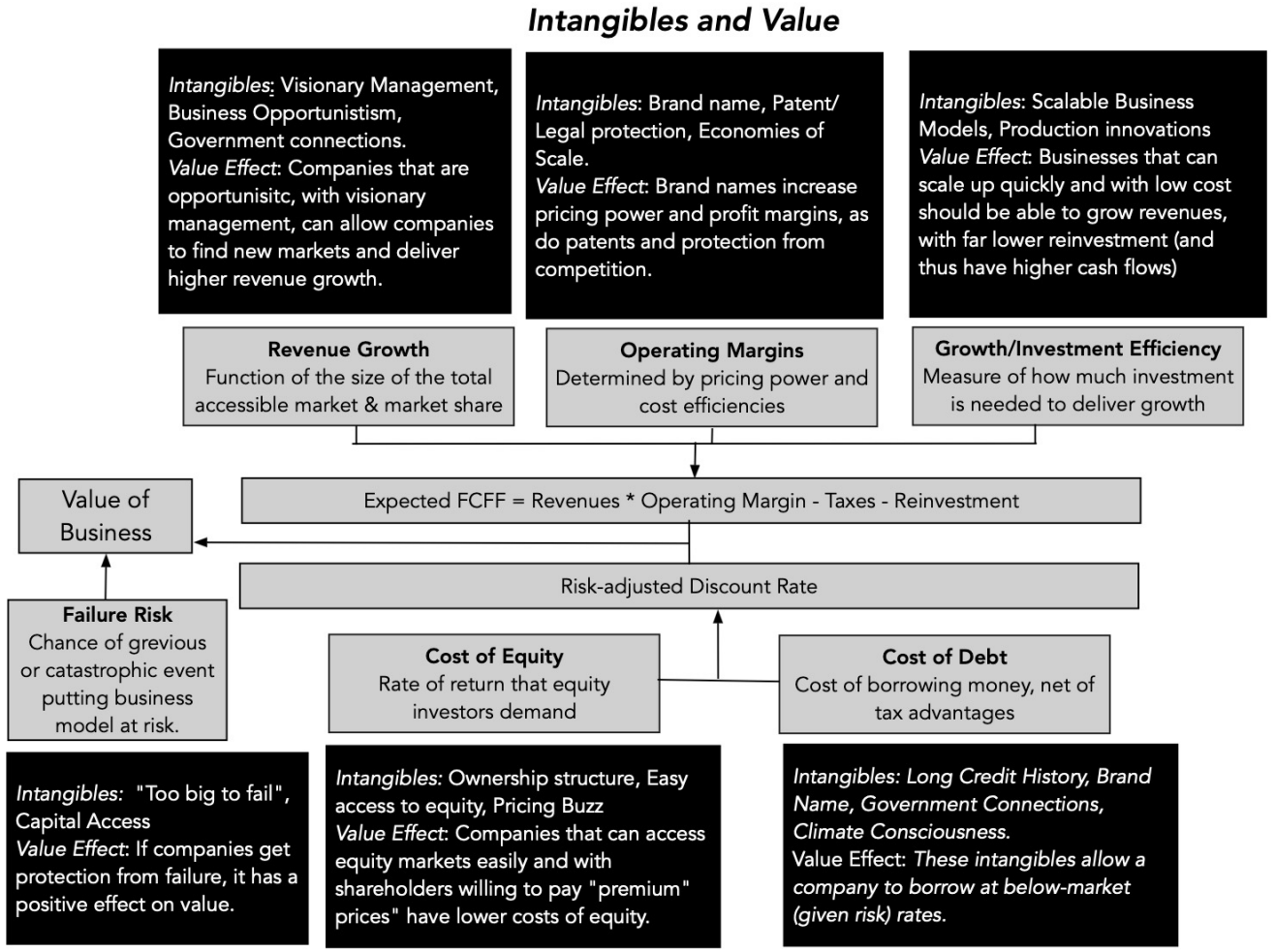
LESSON 1: ACCOUNTING RULES ARE CLUTTERED WITH INCONSISTENCIES...

- If we start with accounting first principles, capital expenditures are expenditures designed to create benefits over many periods. They should not be used to reduce operating income in the period that they are made, but should be depreciated/amortized over their life. They should show up as assets on the balance sheet.
- Accounting is consistent in its treatment of cap ex with manufacturing firms, but is inconsistent with firms that do not fit the mold.
  - With pharmaceutical and technology firms, R&D is the ultimate cap ex but is treated as an operating expense.
  - With consulting firms and other firms dependent on human capital, recruiting and training expenses are your long term investments that are treated as operating expenses.
  - With brand name consumer product companies, a portion of the advertising expense is to build up brand name and is the real capital expenditure. It is treated as an operating expense.

LESSON 2: AND FIXING THOSE INCONSISTENCIES CAN ALTER YOUR VIEW OF A COMPANY AND AFFECT ITS VALUE

	No R&D adjustment	R&D adjustment
EBIT	$5,071	$7,336
Invested Capital	$25,277	$33,173
ROIC	14.58%	18.26%
Reinvestment Rate	115.68%	106.98%
Value of firm	$58,617	$95,497
Value of equity	$50,346	$87,226
Value/share	$42.73	$74.33

LESSON 3: IN A DCF, INTANGIBLES ARE IN YOUR CASH FLOWS (OR RISK)..



MULTIPLE INTANGIBLES: VALUING BIRKENSTOCK'S MANY INTANGIBLES!

1. Brand Name: It is undeniable that Birkenstock not only has a brand name, in terms of recognition and visibility, but has the pricing power and operating margins to back up that brand name.

2. Celebrity Customer Base: Birkenstock attracts celebrities in different age groups, from Gwyneth Paltrow & Heidi Klum to Paris Jackson & Kendall Jenner, and more impressively, it does so without paying them sponsorship fees. If the best advertising is unsolicited, Birkenstock clearly has mastered the game.

3. Good Management: Birkenstock seems to have struck gold with Oliver Reichert. Not only has he steered the company towards high growth, but he has done so without upsetting the balance that lies behind its brand name.

4. The Barbie Buzz: Margot Robbie's pink Birkenstock sandals in that movie, which has been the blockbuster hit of the year, hyper charged the demand for the company's footwear. It is true that buzzes fade, but not before they create a revenue bump and perhaps even increase the customer base for the long term.

Birkenstock IPO Valuation

Sep-23

Base Year and Comparison	Company	Big Apparel
CAGR in Revenues (2013-22)	18.20%	8.66%
Revenue (LTM)	€ 1,439,976	
Operating Margin (LTM)	22.31%	14.74%
Operating Income	€ 321,230	
EBIT (1-t)	€ 224,861	

Growth Story
Growth of 25% in year 1, followed by 15% in years 2-5
Barbie Buzz in year 1. **Strong management** finds growth in new markets/proudcts, without sacrificing brand name.

Profitability Story
Operating margin of 23% in year 1, rising to 25% over the following four years.
Brand name allows for preservation & slight growth in strong profit margins.

Growth Efficiency Story
Set to third quartile (2.62) of big brand apparel & footwear firms.
Free celebrity advertising and more sponsorship deals will allow for more efficient reinvestment.

Terminal Value	
Growth Rate	2.74%
Cost of capital	7.74%
Return on capital	12.00%
Reinvestment Rate	22.83%

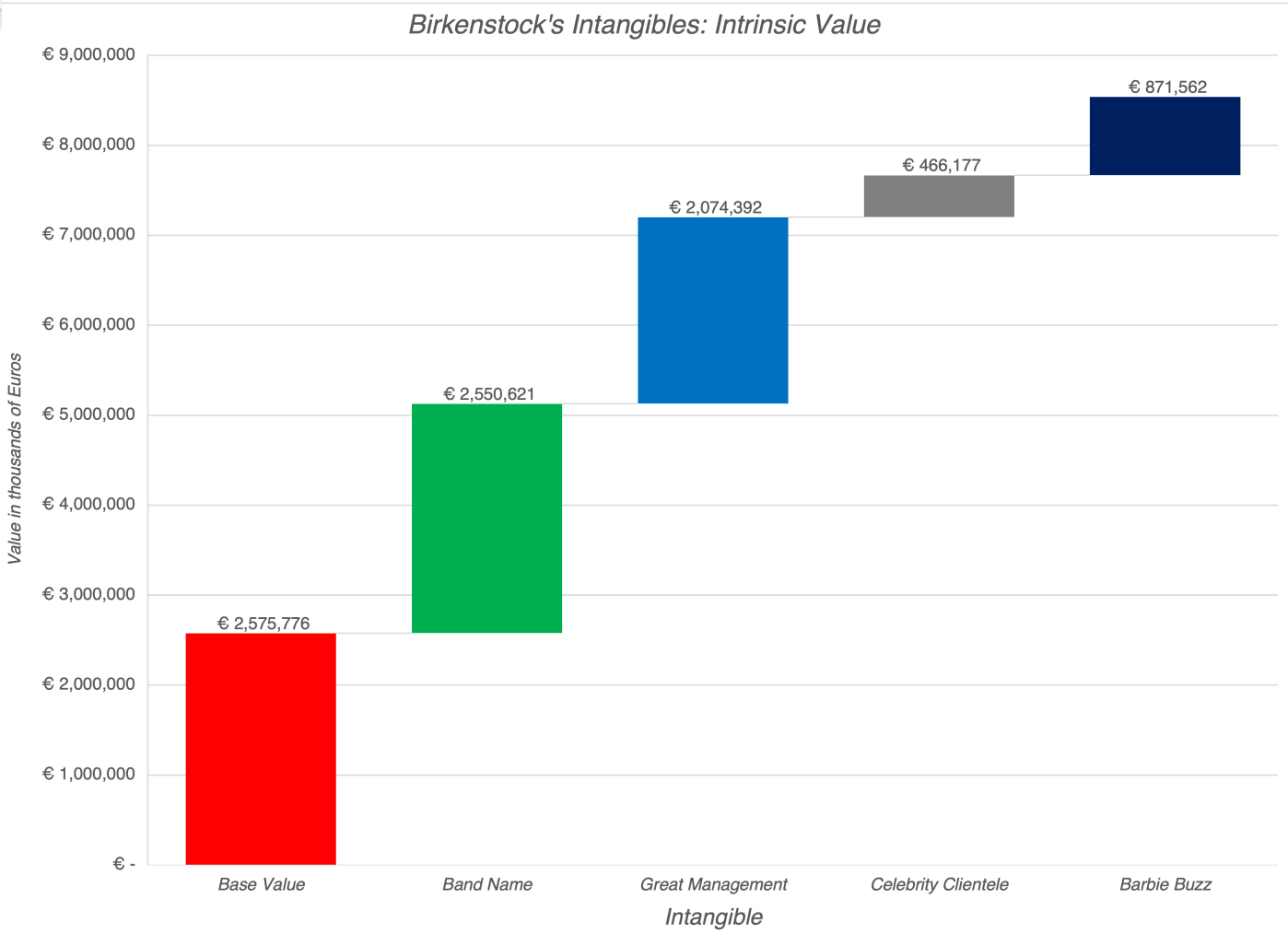
PV(Terminal value)	€ 6,087,285
PV (CF over next 10 years)	€ 2,862,595
Probability of failure =	0.00%
Value of operating assets =	€ 8,949,880
- Debt	€ 1,874,002
- Minority interests	€ -
+ Cash	€ 307,078
+ Non-operating assets	€ -
Value of equity	€ 8,382,956
- Value of options	€ -
Value of equity (common stock)	€ 8,382,956
Number of shares	202,853.00
Estimated value /share	€ 41.33
Price per share	€ 46.50
% Under or Over Valued	12.52%

	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue Growth	25.00%	15.00%	15.00%	15.00%	15.00%	12.55%	10.10%	7.64%	5.19%	2.74%	2.74%
Revenue	€ 1,799,970	€ 2,069,966	€ 2,380,460	€ 2,737,529	€ 3,148,159	€ 3,543,190	€ 3,900,910	€ 4,199,096	€ 4,417,113	€ 4,538,142	€ 4,662,487
Operating Margin	23.00%	23.80%	24.20%	24.60%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%	25.00%
Operating Income	€ 413,993	€ 492,652	€ 576,071	€ 673,432	€ 787,040	€ 885,797	€ 975,228	€ 1,049,774	€ 1,104,278	€ 1,134,535	€ 1,165,622
EBIT (1-t)	€ 289,795	€ 344,856	€ 403,250	€ 471,403	€ 550,928	€ 620,058	€ 682,659	€ 734,842	€ 772,995	€ 794,175	€ 815,935
Reinvestment	€ 103,052	€ 118,509	€ 136,286	€ 156,729	€ 150,775	€ 136,535	€ 113,811	€ 83,213	€ 46,194	€ 47,460	€ 186,305
FCFF	€ 186,743	€ 226,347	€ 266,964	€ 314,674	€ 400,153	€ 483,524	€ 568,848	€ 651,629	€ 726,801	€ 746,715	€ 629,630
										€ 12,592,600	
Cost of Capital	7.45%	7.45%	7.45%	7.45%	7.45%	7.51%	7.57%	7.63%	7.68%	7.74%	
Cumulated WACC	0.9306	0.8661	0.8060	0.7501	0.6980	0.6493	0.6036	0.5608	0.5208	0.4834	
Sales to Capital	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	
ROIC	7.38%	8.56%	9.73%	11.01%	12.41%	13.51%	14.44%	15.18%	15.70%	15.98%	12.00%

Risk Story
Cost of capital reflecting business mix, geography & debt policy.
Centering production in Germany reduces supply chain & country risk.

Competitive Advantages
Competive advantages will persist.
Intangibles collectively sustain a return on capital above the cost of capital.

BIRKENSTOCK: INTANGIBLES IN VALUE



VII. VALUING CYCLICAL AND COMMODITY COMPANIES

Company growth often comes from movements in the economic cycle, for cyclical firms, or commodity prices, for commodity companies.

What is the value added by growth assets?

What are the cashflows from existing assets?

Historial revenue and earnings data are volatile, as the economic cycle and commodity prices change.

How risky are the cash flows from both existing assets and growth assets?

Primary risk is from the economy for cyclical firms and from commodity price movements for commodity companies. These risks can stay dormant for long periods of apparent prosperity.

When will the firm become a mature fiirm, and what are the potential roadblocks?

For commodity companies, the fact that there are only finite amounts of the commodity may put a limit on growth forever. For cyclical firms, there is the peril that the next recession may put an end to the firm.

LESSON 1: WITH "MACRO" COMPANIES, IT IS EASY TO GET LOST IN "MACRO" ASSUMPTIONS...

- With cyclical and commodity companies, it is undeniable that the value you arrive at will be affected by your views on the economy or the price of the commodity.
- Consequently, you will feel the urge to take a stand on these macro variables and build them into your valuation. Doing so, though, will create valuations that are jointly impacted by your views on macro variables and your views on the company, and it is difficult to separate the two.
- The best (though not easiest) thing to do is to separate your macro views from your micro views. Use current market based numbers for your valuation, but then provide a separate assessment of what you think about those market numbers.

LESSON 2: USE PROBABILISTIC TOOLS TO ASSESS VALUE AS A FUNCTION OF MACRO VARIABLES...

- If there is a key macro variable affecting the value of your company that you are uncertain about (and who is not), why not quantify the uncertainty in a distribution (rather than a single price) and use that distribution in your valuation.
- That is exactly what you do in a Monte Carlo simulation, where you allow one or more variables to be distributions and compute a distribution of values for the company.
- With a simulation, you get not only everything you would get in a standard valuation (an estimated value for your company) but you will get additional output (on the variation in that value and the likelihood that your firm is under or over valued)

Shell: A "Oil Price" Neutral Valuation: March 2016

Revenue calculated from prevailing oil price of $40/barrel in March 2016
Revenue = 39992.77+4039.40*$40 = $201,569

Compounded revenue growth of 3.91% a year, based on Shell's historical revenue growth rate from 2000 to 2015

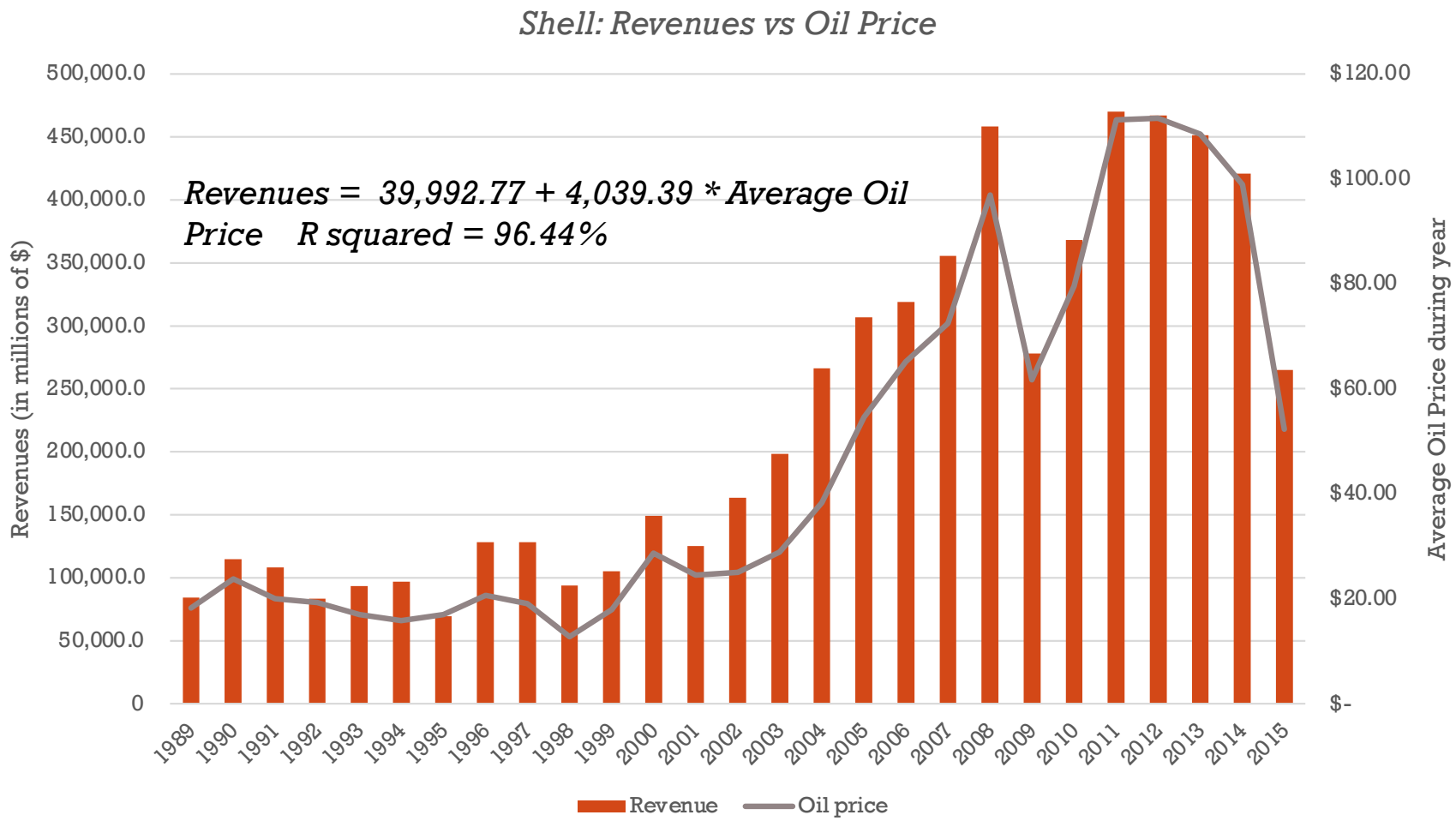
	Base Year	1	2	3	4	5	Terminal Year
Revenues	$ 201,569	$ 209,450	$ 217,639	$ 226,149	$ 234,991	$ 244,180	$ 249,063
Operating Margin	3.01%	6.18%	7.76%	8.56%	8.95%	9.35%	9.35%
Operating Income	$ 6,065.00	$ 12,942.85	$ 16,899.10	$ 19,352.39	$ 21,040.39	$ 22,830.80	$ 23,287.41
Effective tax rate	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%	30.00%
AT Operating Income	$ 4,245.50	$ 9,060.00	$ 11,829.37	$ 13,546.68	$ 14,728.27	$ 15,981.56	$ 16,301.19
+ Depreciation	$ 26,714.00	$ 27,759	$ 28,844	$ 29,972	$ 31,144	$ 32,361	
- Cap Ex	$ 31,854.00	$ 33,099	$ 34,394	$ 35,738	$ 37,136	$ 38,588	
- Chg in WC		$ 472.88	$ 491.37	$ 510.58	$ 530.55	$ 551.29	
FCFF		$ 3,246.14	$ 5,788.19	$ 7,269.29	$ 8,205.44	$ 9,203.68	$ 13,011.34
Terminal Value						$ 216,855.71	
Return on capital							12.37%
Cost of Capital		9.91%	9.91%	9.91%	9.91%	9.91%	8.00%
Cumulated Discount Factor		1.0991	1.2080	1.3277	1.4593	1.6039	
Present Value		$ 2,953.45	$ 4,791.47	$ 5,474.95	$ 5,622.81	$ 140,940.73	
Value of Operating Assets	$ 159,783.41						
+ Cash	$ 31,752.00						
+ Cross Holdings	$ 33,566.00						
- Debt	$ 58,379.00						
- Minority Interets	$ 1,245.00						
Value of Equity	$ 165,477.41						
Number of shares	4209.7						
Value per share	$ 39.31						

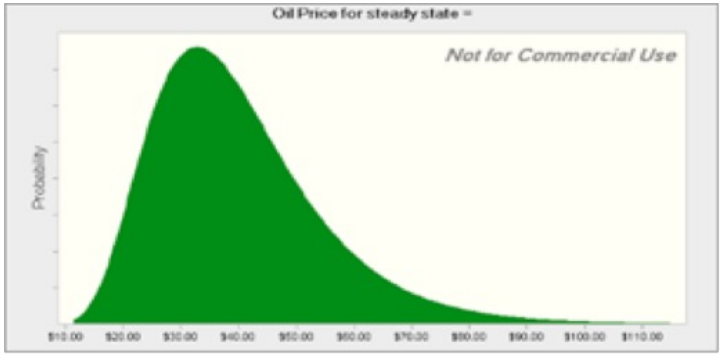
Added long term investments in joint ventures and subtracted out minority interest in consolidated holdings.

Operating margin converges on Shell's historical average margin of 9.35% from 200-2015

Return on capital reverts and stays at Shell's historic average of 12.37% from 200-2015

SHELL'S REVENUES & OIL PRICES





Revenue calculated from the oil price drawn from distribution
Revenue = 39992.77+4039.40*Oil Price/Barrel

Pre-tax Operating Income based on revenue & selected margin
Pre-tax Operating Income = Revenues * Operating Margin

Value Shell based on operating income, assuming other assumptions (tax rate, revenue growth, cost of capital

Percentiles:	Forecast values
0%	$6.55
10%	$23.90
20%	$27.73
30%	$30.89
40%	$33.88
50%	$36.99
60%	$40.28
70%	$44.22
80%	$49.24
90%	$57.49
100%	$197.11