

*Aswath Damodaran*

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# VALUATION: IT'S NOT THAT COMPLICATED!

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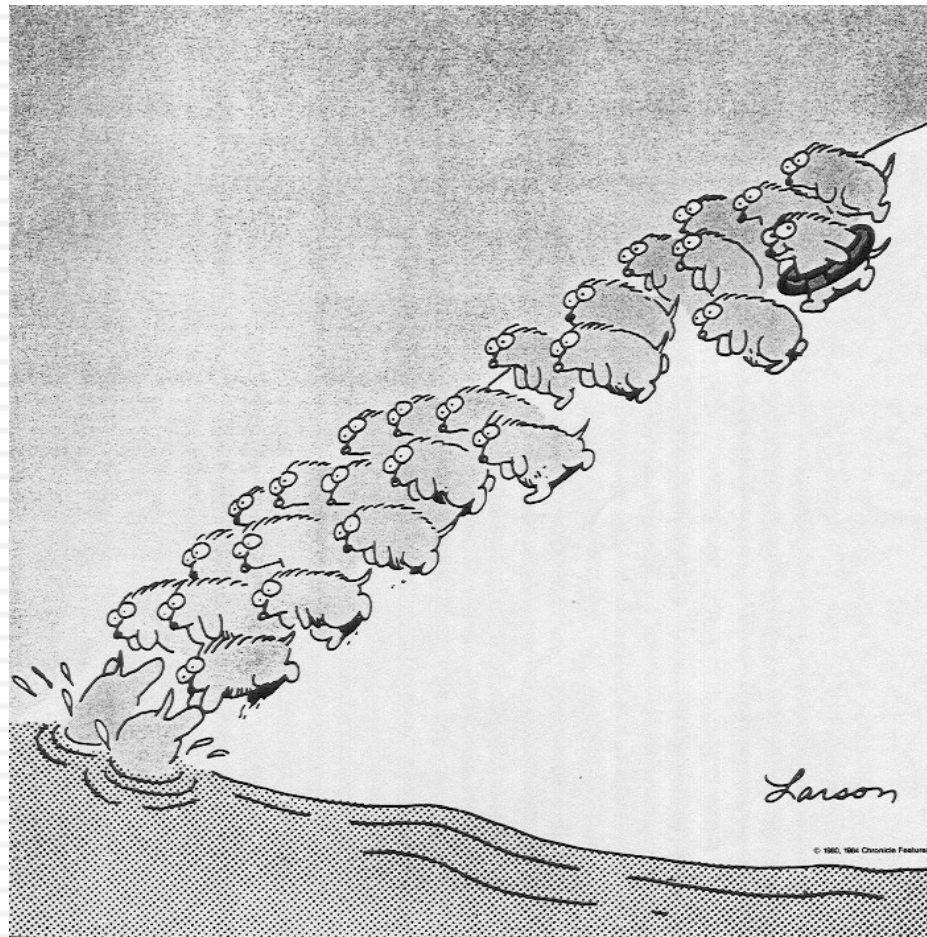
# The Big Picture

Just because you have a D and a CF does not mean you have a DCF!

# Some Initial Thoughts

" One hundred thousand lemmings cannot be wrong"

Graffiti

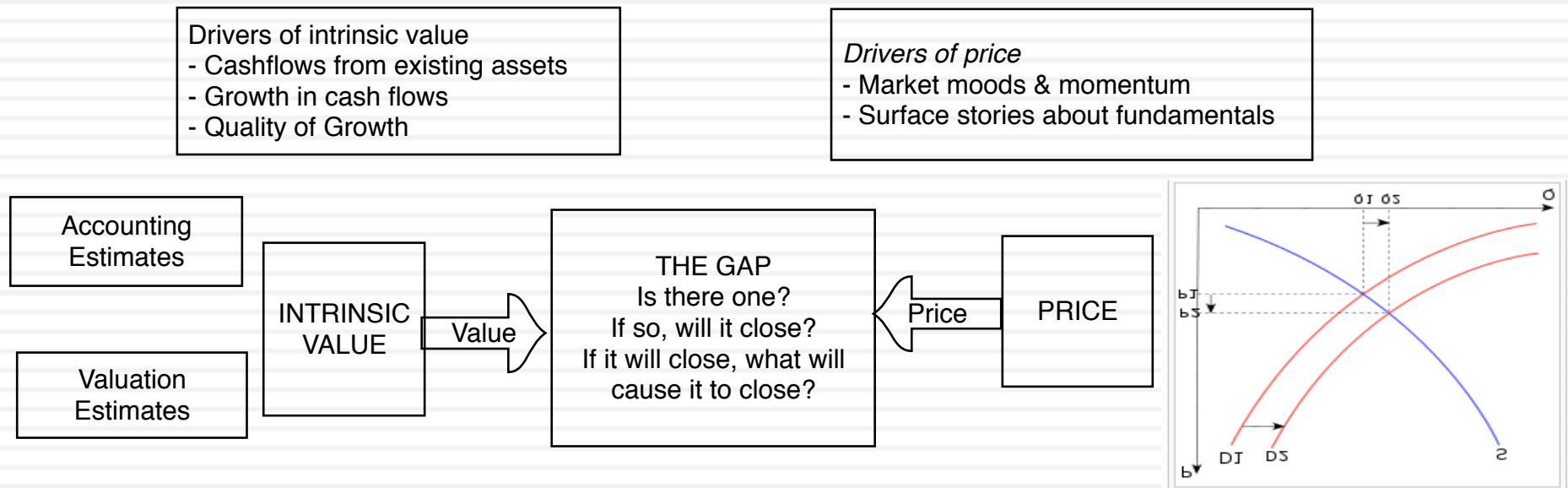


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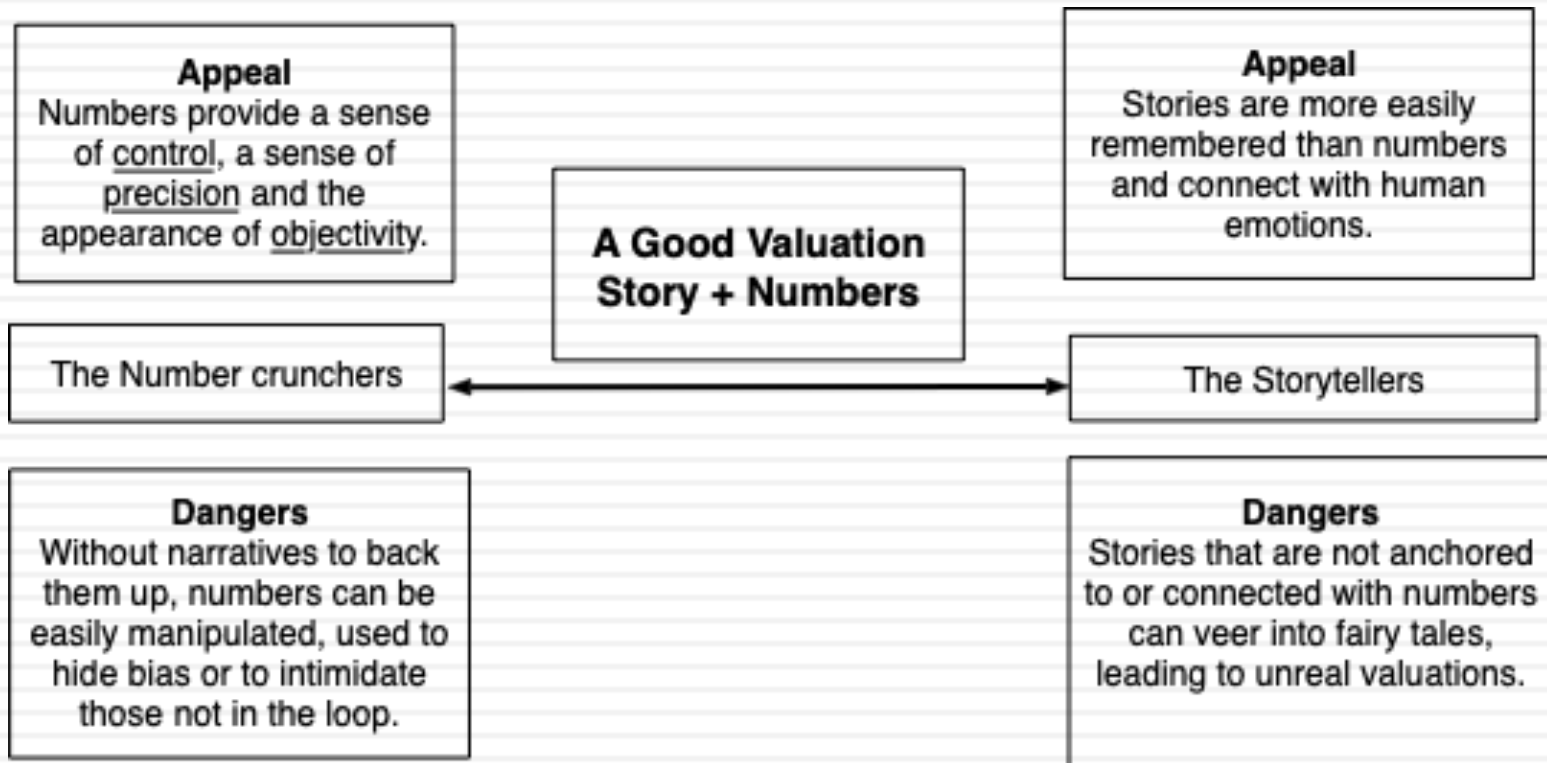
# Theme 1: Characterizing Valuation as a discipline

- In a science, if you get the inputs right, you should get the output right. The laws of physics and mathematics are universal and there are no exceptions. **Valuation is not a science.**
- In an art, there are elements that can be taught but there is also a magic that you either have or you do not. The essence of an art is that you are either a great artist or you are not. **Valuation is not an art.**
- A craft is a skill that you learn by doing. The more you do it, the better you get at it. **Valuation is a craft.**

# Theme 2: Valuing an asset is not the same as pricing that asset



# Theme 3: Good valuation = Story + Numbers



## Theme 4: If you value something, you should be willing to act on it..

- What theory? There is very little theory in valuation and I am not sure what an academic valuation would like like and am not sure that I want to find out.
- Pragmatism, not purity: The end game is to estimate a value for an asset. I plan to get there, even if it means taking short cuts and making assumptions that would make purists blanch.
- Do you have faith? To act on your valuations, you have to have faith in
  - ▣ In your own valuation judgments.
  - ▣ In markets: that prices will move towards your value estimates. That faith will have to be earned.

# Misconceptions about Valuation

- Myth 1: A valuation is an objective search for “true” value
  - Truth 1.1: All valuations are biased. The only questions are how much and in which direction.
  - Truth 1.2: The direction and magnitude of the bias in your valuation is directly proportional to who pays you and how much you are paid.
- Myth 2.: A good valuation provides a precise estimate of value
  - Truth 2.1: There are no precise valuations
  - Truth 2.2: The payoff to valuation is greatest when valuation is least precise.
- Myth 3: . The more quantitative a model, the better the valuation
  - Truth 3.1: One’ s understanding of a valuation model is inversely proportional to the number of inputs required for the model.
  - Truth 3.2: Simpler valuation models do much better than complex ones.



# Approaches to Valuation

- **Intrinsic valuation**, relates the value of an asset to the present value of expected future cashflows on that asset. In its most common form, this takes the form of a discounted cash flow valuation.
- **Relative valuation or Pricing**, estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable like earnings, cash flows, book value or sales.
- **Contingent claim valuation**, uses option pricing models to measure the value of assets that share option characteristics.



# Intrinsic Valuation: The Big Picture

*Aswath Damodaran*

# Discounted Cash Flow Valuation

- *What is it:* In discounted cash flow valuation, the value of an asset is the present value of the expected cash flows on the asset.
- *Philosophical Basis:* Every asset has an intrinsic value that can be estimated, based upon its characteristics in terms of cash flows, growth and risk.
- *Information Needed:* To use discounted cash flow valuation, you need
  - ▣ to estimate the life of the asset
  - ▣ to estimate the cash flows during the life of the asset
  - ▣ to estimate the discount rate to apply to these cash flows to get present value
- *Market Inefficiency:* Markets are assumed to make mistakes in pricing assets across time, and are assumed to correct themselves over time, as new information comes out about assets.

# Risk Adjusted Value: Three Basic Propositions

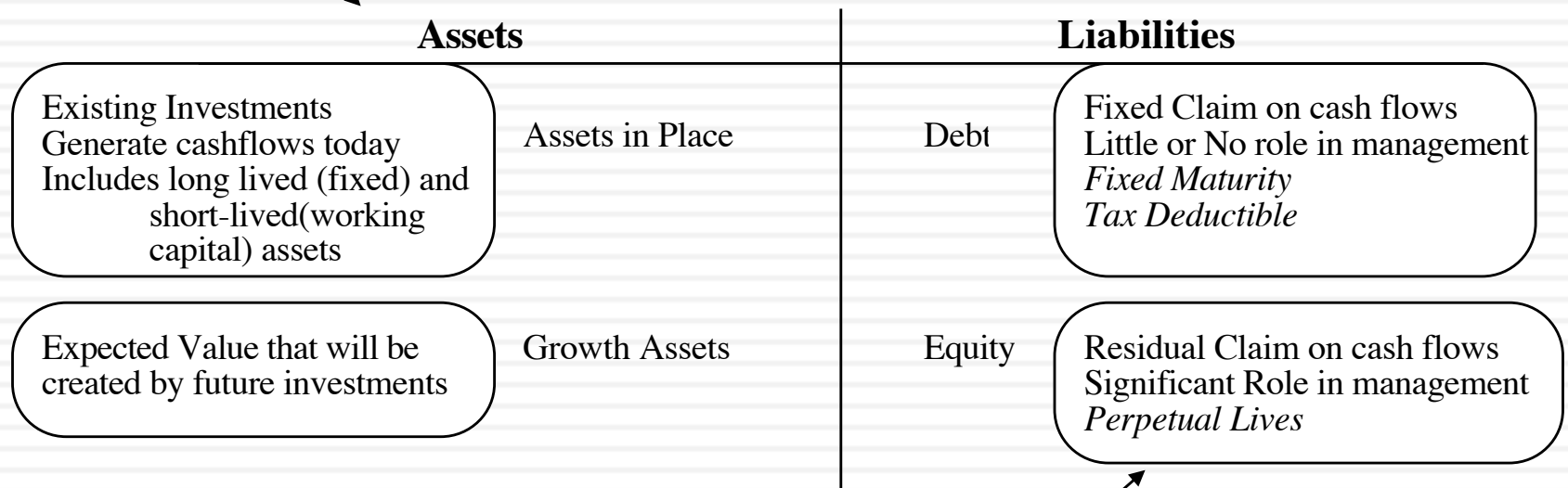
- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

$$\text{Value of asset} = \frac{E(\text{CF}_1)}{(1+r)} + \frac{E(\text{CF}_2)}{(1+r)^2} + \frac{E(\text{CF}_3)}{(1+r)^3} \dots + \frac{E(\text{CF}_n)}{(1+r)^n}$$

1. *The IT Proposition:* If “it” does not affect the cash flows or alter risk (thus changing discount rates), “it” cannot affect value.
2. *The DUH Proposition:* For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.
3. *The DON'T FREAK OUT Proposition:* Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.

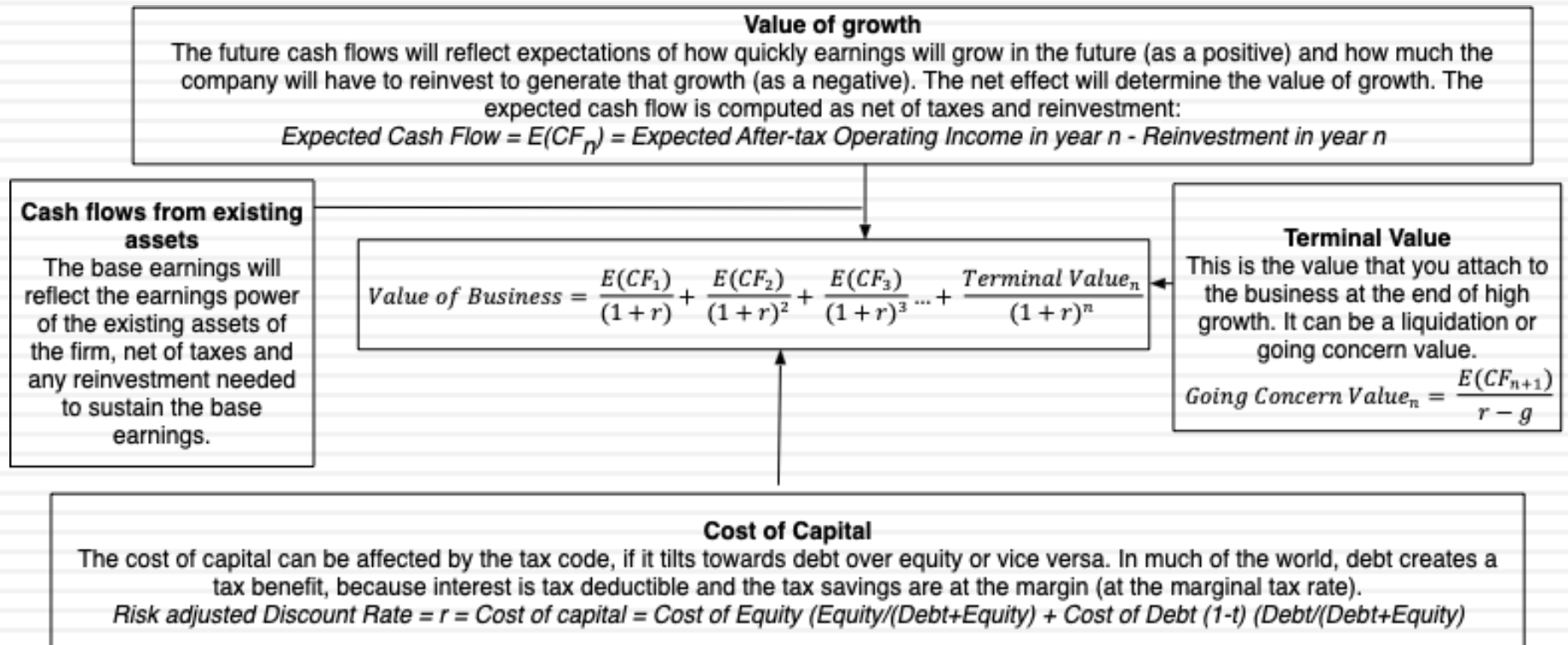
# DCF Choices: Equity Valuation versus Firm Valuation

**Firm Valuation:** Value the entire business



**Equity valuation:** Value just the equity claim in the business

# The Drivers of Value...



Going Concern Val

*Start with the past*

**Cash flow to Firm**

Revenues \* Operating Margin  
= Operating Income

\* (1- tax rate) Tax Effect

- (Cap Ex - Depreciation) Reinvestment

- Change in non-cash WC

= Free Cash flow to Firm

- \* How quickly is the firm growing?
- \* How efficiently is it growing?
- \* How profitable is the firm?

*Forecast future cashflows*

*If margins & returns are stable*

Expected growth in operating income = Reinvestment Rate \* Return on Invested Capital

FCFF = After-tax Oper. Income (1 - Reinvestment Rate)

*If margins & returns are changing*

1. Estimate revenue growth & future revenues

2. Estimate operating margins over time

3. Estimate reinvestment based on revenues

FCFF = After tax Operating Income - Reinvestment

*Apply Closure*

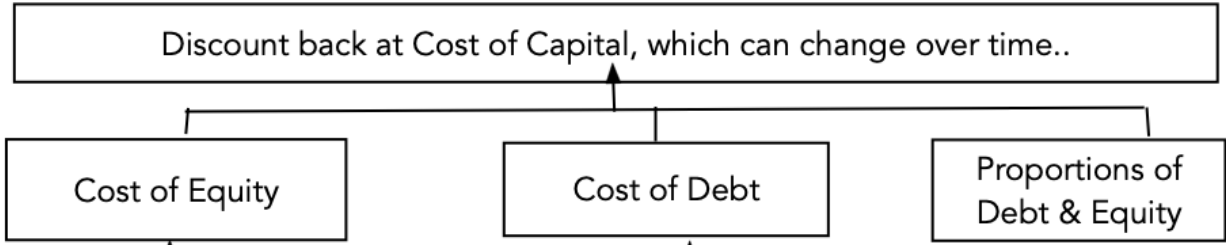
**Firm is mature**

Cashflow/Earnings grow at constant rate forever ( $g_n$ )

Terminal Value =  $FCFF_{n+1} / (r - g_n)$

Value of Operating Assets  
+ Cash  
+ Non-operating Assets  
- Debt  
= Value of Equity

**Adjust for risk of failure**  
= Probability of failure \* Value of Equity in failure



**Long term rate at which you can borrow money, today**  
(Riskfree Rate + Default Spread) (1- tax rate)

**Return required by "marginal" investors, given perceived risk in equity investment**

**Riskfree Rate**

- Default free & long term  
- In same currency and in same terms as cash flows

+

**Relative Risk Measure (Beta)**

Business Mix

Financial Leverage

X

**Equity Risk Premium**

Operating Locations

*Adjust for operating risk in cashflows*

Net Cap Ex = Acctg Cap Ex (255) + Cap R&D (2216) + Acquisitions (\$3,975)

## Amgen: A Status Quo Valuation - May 1, 2007

Amgen will continue with existing management practices in place on reinvestment (a mix of R&D and acquisitions), while delivering stable operating margins.

**Current Cash Flows (\$ m)**  
 EBIT: (1-t): \$6,058  
 - Net Cap Ex: \$6,443  
 - Chg WC: \$ 37  
**FCFF: -\$423**

Reinvestment Rate  
 =  $(6443+37)/6058 = 106.98\%$   
 ROIC =  $\$6,058/\$36254 = 16.71\%$   
 Effective tax rate = 28%

### For the next five years

Reinvestment Rate  
 = 60% (Average over last 5 years)

Expected ROIC  
 = 16% (trend down over time)

Expected Growth rate next 5 years  
 =  $.6 \times 16 = .096$  or 9.6%

### Transition period (years 6-10)

- Growth goes from 9.6% to 4%
- ROIC drifts down to 10%
- Reinvestment rate decreases over time

### Beyond year 10

Stable growth rate = 4%  
 ROIC = 10%; Tax rate = 35%  
 Reinvestment Rate =  $4/10 = 40\%$

Terminal Value =  $\$7300 / (.0808 - .04) = \$179,099$

FCFF in year 11  
 EBIT (1-t): \$12,167  
 - Reinvestment \$4,867  
 = FCFF \$7,300

|   |             |
|---|-------------|
| PV of FCFF (Yrs 1-10) =                 | \$25,460.54 |
| + PV of Terminal Value =                | \$68,753.78 |
| Value of operating assets of the firm = | \$94,214.31 |
| + Cash                                  | \$1,283.00  |
| Value of Firm =                         | \$95,497.31 |
| - Debt                                  | \$8,271.52  |
| Value of Equity =                       | \$87,225.79 |
| - Employee Option Value                 | \$478.68    |
| Value of Equity in Common Stock =       | \$86,747.11 |
| Value/Share                             | \$74.33     |

|                   | 1       | 2       | 3       | 4       | 5       | 6        | 7        | 8        | 9        | 10       |
|-------------------|---------|---------|---------|---------|---------|----------|----------|----------|----------|----------|
| EBIT Growth       | 9.60%   | 9.60%   | 9.60%   | 9.60%   | 9.60%   | 8.48%    | 7.36%    | 6.24%    | 5.12%    | 4.00%    |
| EBIT (1-t)        | \$6,639 | \$7,276 | \$7,975 | \$8,741 | \$9,580 | \$10,392 | \$11,157 | \$11,853 | \$12,460 | \$12,958 |
| Reinvestment Rate | 60.00%  | 60.00%  | 60.00%  | 60.00%  | 60.00%  | 56.00%   | 52.00%   | 48.00%   | 44.00%   | 40.00%   |
| - Reinvestment    | \$3,983 | \$4,366 | \$4,785 | \$5,244 | \$5,748 | \$5,820  | \$5,802  | \$5,690  | \$5,482  | \$5,183  |
| = FCFF            | \$2,656 | \$2,911 | \$3,190 | \$3,496 | \$3,832 | \$4,573  | \$5,355  | \$6,164  | \$6,978  | \$7,775  |
| Cost of Capital   | 10.90%  | 10.90%  | 10.90%  | 10.90%  | 10.90%  | 10.33%   | 9.77%    | 9.21%    | 8.64%    | 8.08%    |
| Cumulated WACC    | 1.1090  | 1.2299  | 1.3639  | 1.5126  | 1.6774  | 1.8508   | 2.0316   | 2.2186   | 2.4103   | 2.6049   |
| PV of FCFF        | \$2,395 | \$2,367 | \$2,339 | \$2,311 | \$2,284 | \$2,471  | \$2,636  | \$2,778  | \$2,895  | \$2,985  |

**Amgen Price (5/1/07) = \$55**

Cost of capital for years 1-5 =  $11.70\% (0.90) + 3.66\% (0.10) = 10.90\%$

Cost of capital decreases during transition

Cost of equity =  $4.78\% + 1.73 (4\%) = 11.70\%$

Riskfree Rate in US\$ = 4.78%

Beta = 1.73

Beta for Pharma = 1.59

Amgen D/E = 11.06%

Equity Risk Premium = 4%

All revenues in US

Cost of debt =  $5.63\% (1-.35) = 3.66\%$

Riskfree Rate in US\$ = 4.78%

Default Spread based on rating = 0.85%

Marginal Tax rate = 35%

Beta = 1.10  
 Cost of equity =  $4.78\% + 1.10 (4\%) = 9.18\%$   
 Debt ratio = 20%  
 Cost of capital =  $9.18\% (.8) + 3.66\% (.2) = 8.08\%$



# Tata Motors: A Family Group Company in Transition - April 2010

Tata Motor's acquisition of Jaguar Land Rover changes the company, and gives it a global, luxury car twist to a mass market auto company.

Acquisitions are cap ex

A big portion of net cap ex in 2009 came up the JLR acquisition

Current Cash Flows (Rs mil)  
 EBIT: (1-t): Rs 20,116  
 - Net Cap Ex: Rs 31,590  
 - Chg WC: Rs 2,732  
**FCFF: Rs-14,206**

Reinvestment Rate  
 =  $(31590+2732)/20116 = 170.61\%$   
 ROIC =  $20116/117226 = 17.16\%$   
 Effective tax rate = 21%

For the next five years

Reinvestment Rate = 70% (Average without acquisition)

Expected ROIC = 17.16% (current value)

Expected Growth rate next 5 years =  $.7 * 17.16 = .1201$  or 12.01%

Transition period (years 6-10)

- Growth goes from 12.01% to 5%
- ROIC drifts down to 10.11%
- Reinvestment rate decreases over time

Beyond year 10

Stable growth rate = 5%  
 ROIC = 10.11%; Tax rate = 33.99%  
 Reinvestment Rate =  $5\%/10.11\% = 49.45\%$

Terminal Value =  $Rs 22,890 / (.1011 - .05) = Rs 447,750$

|                              |           |
|------------------------------|-----------|
| PV of FCFF (Yrs 1-10) =      | ₹ 66,691  |
| + PV of Terminal Value =     | ₹ 142,148 |
| Value of operating assets of | ₹ 208,839 |
| + Cash                       | ₹ 11,418  |
| + Cross holdings             | ₹ 140,576 |
| Value of Firm =              | ₹ 360,833 |
| -Debt                        | ₹ 109,198 |
| Value of Equity =            | ₹ 251,635 |
| Value per share              | ₹ 609.21  |

| Year              | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       |
|-------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| EBIT Growth       | 12.01%   | 12.01%   | 12.01%   | 12.01%   | 12.01%   | 10.61%   | 9.21%    | 7.80%    | 6.40%    | 5.00%    |
| EBIT (1-t)        | ₹ 22,533 | ₹ 25,240 | ₹ 28,272 | ₹ 31,668 | ₹ 35,472 | ₹ 39,236 | ₹ 42,848 | ₹ 46,192 | ₹ 49,150 | ₹ 51,607 |
| Reinvestment Rate | 70.00%   | 70.00%   | 70.00%   | 70.00%   | 70.00%   | 65.89%   | 61.78%   | 57.67%   | 53.56%   | 49.44%   |
| - Reinvestment    | ₹ 15,773 | ₹ 17,668 | ₹ 19,790 | ₹ 22,168 | ₹ 24,830 | ₹ 25,852 | ₹ 26,471 | ₹ 26,638 | ₹ 26,323 | ₹ 25,517 |
| FCFF              | ₹ 6,760  | ₹ 7,572  | ₹ 8,482  | ₹ 9,500  | ₹ 10,642 | ₹ 13,384 | ₹ 16,377 | ₹ 19,555 | ₹ 22,827 | ₹ 26,090 |
| Cost of capital   | 13.04%   | 13.04%   | 13.04%   | 13.04%   | 13.04%   | 12.46%   | 11.87%   | 11.28%   | 10.70%   | 10.11%   |
| Cumulated WACC    | 1.1304   | 1.2778   | 1.4445   | 1.6329   | 1.8458   | 2.0757   | 2.3221   | 2.5841   | 2.8606   | 3.1499   |
| PV of FCFF        | ₹ 5,980  | ₹ 5,926  | ₹ 5,872  | ₹ 5,818  | ₹ 5,765  | ₹ 6,448  | ₹ 7,053  | ₹ 7,567  | ₹ 7,980  | ₹ 8,283  |

FCFF in year 11  
 EBIT (1-t): Rs 45,278  
 - Reinvestment Rs 22,387  
 = FCFF Rs 22,890

**Tata Motors Price = Rs 780.50**

Cost of capital for years 1-5 =  $14.72\% (0.747) + 8.09\% (0.253) = 13.04\%$

Debt weight: Equity = 74.7% and Debt = 25.3%

Cost of capital decreases during transition

Beta = 1.20  
 Cost of equity =  $5.00\% + 1.20 (6.90\%) = 11.90\%$   
 Debt ratio = 30%  
 Cost of debt = 9%  
 Cost of capital =  $11.90\% (.8) + 9\% (1-.3399) (.3) = 10.11\%$

Cost of equity =  $5.00\% + 1.20 (8.10\%) = 14.72\%$

Riskfree Rate in Rs = 5.00%

Beta = 1.20

ERP =  $4.50\% (.2) + 9.00\% (.8) = 8.10\%$

Beta for Auto = 0.98

TM D/E = 33.87%

20% in mature mkt  
80% in India

Cost of debt =  $(5\% + 3\% + 4.25\%) (1 - .3399) = 8.09\%$

Riskfree Rate in Rs = 5.00%

+ Default Spread for country = 3.00%

+ Default Spread for company = 4.25%

Marginal Tax rate = 33.99%

HCL has a history as a high growth company, deriving its revenues from outsourcing and business services, but that business has matured and become more competitive.

### HCL: My valuation in US \$ (August 2024)

**The Narrative:** HCL has transitioned to a lower and more sustainable growth, as its core business has matured and attracted competition. While AI remains a disruption threat, HCL is positioned to continue to grow, albeit at less than double digit rates, while maintaining its existing operating margins. Its reinvestment needs remain low, even with R&D treated as capital investment, and the company's cost advantages (from economies of scale and a trained workforce) will allow it to earn well above its cost of capital in the long term. Finally, as a company that services a wide range of businesses globally, its cost of capital is close to that of the average global company and will decline slightly as the company approaches steady state.

| Base Year and Comparison |           |              |          |
|--------------------------|-----------|--------------|----------|
|                          | Last year | Last 5 years | Industry |
| Revenue Growth           | 5.04%     | 9.25%        | 7.48%    |
| Operating Margin         | 18.29%    | 18.51%       | 9.15%    |
| Revenue                  | \$13,434  |              |          |
| Operating Income         | \$2,457   |              |          |
| EBIT (1-t)               | \$1,836   |              |          |

**Revenue growth 9.25% a year for next 5 years, tapering down to 3.94% in year 10**

**Pre-tax operating margin increases slightly to 18.50, HCL's 5-year average**

**Sales to capital ratio of 2.21, matching HCL's current sales to capital ratio**

**Stable Growth**  
 $g = 3.94\%$   
 Cost of capital = 8.05%  
 ROC = 20.00%;  
 Reinvestment Rate =  $3.94\%/20.00\% = 19.70\%$

Terminal Value =  $3,235 / (.0805 - .0394) = \$76,720$

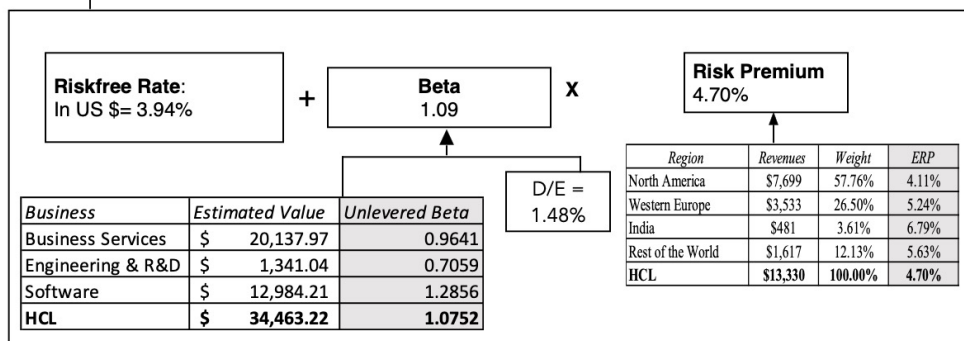
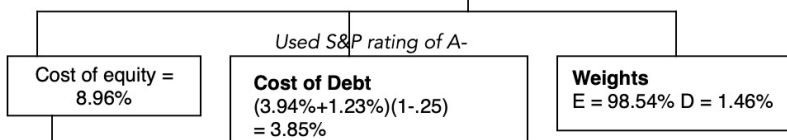
|                                 |           |
|---------------------------------|-----------|
| PV(Terminal value)              | \$ 34,218 |
| PV (CF over next 10 years)      | \$ 13,955 |
| Probability of failure =        | 0.00%     |
| Value of operating assets =     | \$48,173  |
| - Debt                          | \$659     |
| - Minority interests            | \$0       |
| + Cash                          | \$3,147   |
| + Non-operating assets          | \$12      |
| Value of equity                 | \$50,673  |
| - Value of options              | \$0       |
| Value of equity in common stock | \$50,673  |
| Number of shares                | 2,709.00  |
| Estimated value /share          | \$18.71   |

|                  | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        | Terminal year |
|------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|
| Revenue Growth   | 9.25%     | 9.25%     | 9.25%     | 9.25%     | 9.25%     | 8.19%     | 7.13%     | 6.06%     | 5.00%     | 3.94%     | 3.94%         |
| Revenue          | \$ 14,677 | \$ 16,034 | \$ 17,517 | \$ 19,138 | \$ 20,908 | \$ 22,620 | \$ 24,232 | \$ 25,701 | \$ 26,987 | \$ 28,050 | \$ 29,155     |
| Operating Margin | 18.29%    | 18.38%    | 18.42%    | 18.46%    | 18.50%    | 18.50%    | 18.50%    | 18.50%    | 18.50%    | 18.50%    | 18.50%        |
| Operating Income | \$ 2,685  | \$ 2,946  | \$ 3,226  | \$ 3,533  | \$ 3,868  | \$ 4,185  | \$ 4,483  | \$ 4,755  | \$ 4,993  | \$ 5,189  | \$ 5,394      |
| EBIT (1-t)       | \$ 2,005  | \$ 2,201  | \$ 2,410  | \$ 2,639  | \$ 2,889  | \$ 3,126  | \$ 3,349  | \$ 3,552  | \$ 3,729  | \$ 3,876  | \$ 4,029      |
| Reinvestment     | \$ 615    | \$ 672    | \$ 734    | \$ 802    | \$ 775    | \$ 730    | \$ 665    | \$ 582    | \$ 482    | \$ 501    | \$ 794        |
| FCFF             | \$ 1,391  | \$ 1,529  | \$ 1,676  | \$ 1,837  | \$ 2,114  | \$ 2,396  | \$ 2,683  | \$ 2,970  | \$ 3,248  | \$ 3,376  | \$ 3,235      |

Cost of capital =  $8.77\% (.9854) + 3.85\% (.0146) = 8.96\%$

Cost of capital decreases to 10.63% from years 6-10

On Aug 14, 2024, the shares were trading at 1,623 rupees per share, about \$19.57

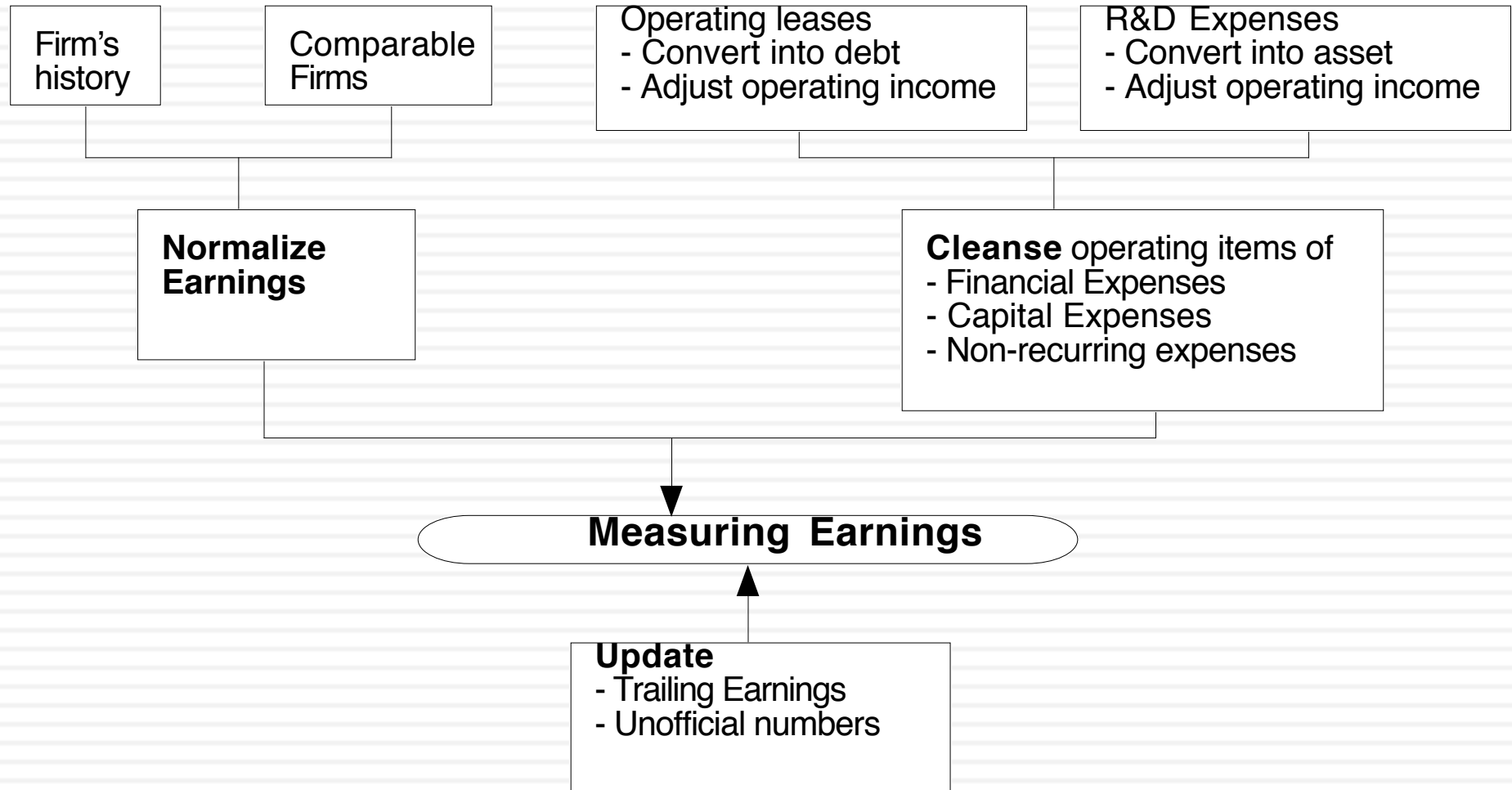




# Intrinsic Value: Nuts and Bolts!

The details matter, but never as much as you think they do...

# I. Measure earnings right..



# Operating Leases at Amgen in 2007

- Amgen has lease commitments and its cost of debt (based on its A rating) is 5.63%.

| Year | Commitment | Present Value                     |
|------|------------|-----------------------------------|
| 1    | \$96.00    | \$90.88                           |
| 2    | \$95.00    | \$85.14                           |
| 3    | \$102.00   | \$86.54                           |
| 4    | \$98.00    | \$78.72                           |
| 5    | \$87.00    | \$66.16                           |
| 6-12 | \$107.43   | \$462.10 (\$752 million prorated) |

- **Debt Value of leases = \$869.55**
- Debt outstanding at Amgen = \$7,402 + **\$ 870** = \$8,272 million
- Adjusted Operating Income = Stated OI + Lease expense this year – Depreciation  
$$= 5,071 \text{ m} + \mathbf{69 \text{ m}} - \mathbf{870/12} = \$5,068 \text{ million (12-year life for assets)}$$

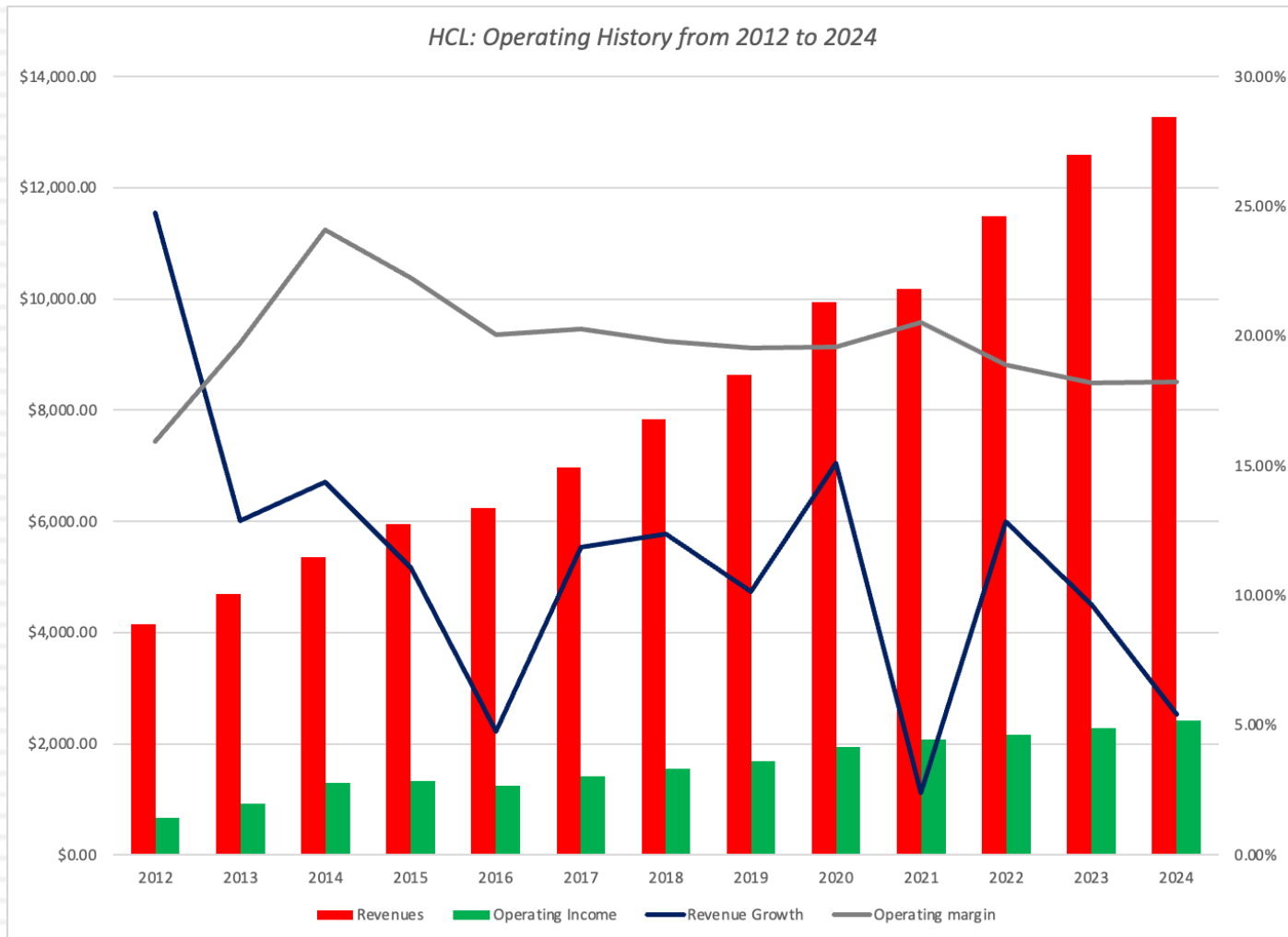
# Capitalizing R&D Expenses: Amgen

- R & D was **assumed to have a 10-year life.**

| Year   | R&D Expense | Unamortized portion | Amortization this year |
|--|-------------|---------------------|------------------------|
| Current  | 3366.00     | 1.00                | <b>3366.00</b>         |
| -1   | 2314.00     | 0.90                | \$231.40               |
| -2   | 2028.00     | 0.80                | \$202.80               |
| -3   | 1655.00     | 0.70                | \$165.50               |
| -4   | 1117.00     | 0.60                | \$111.70               |
| -5   | 865.00      | 0.50                | \$86.50                |
| -6   | 845.00      | 0.40                | \$84.50                |
| -7   | 823.00      | 0.30                | \$82.30                |
| -8   | 663.00      | 0.20                | \$66.30                |
| -9   | 631.00      | 0.10                | \$63.10                |
| -10  | 558.00      | 0.00                | \$55.80                |
| Value of Research Asset & Current Amortization = |             |                     | <b>\$10,113</b>        |
|  |             |                     | <b>\$1,150</b>         |

- Adjusted Operating Income = \$5,120 + **3,366** - **1,150** = \$7,336 million

# HCL's Operating History



## II. Get the big picture (not the accounting one) when it comes to cap ex and working capital

- Capital expenditures should include
  - ▣ Research and development expenses, once they have been re-categorized as capital expenses.
  - ▣ Acquisitions of other firms, whether paid for with cash or stock.
- Working capital should be defined not as the difference between current assets and current liabilities but as the difference between non-cash current assets and non-debt current liabilities.
- On both items, start with what the company did in the most recent year but do look at the company's history and at industry averages.



# Amgen's Net Capital Expenditures

- The accounting net cap ex at Amgen is small:
  - ▣ Accounting Capital Expenditures = \$1,218 million
  - ▣ - Accounting Depreciation = \$ 963 million
  - ▣ Accounting Net Cap Ex = \$ 255 million
- We define capital expenditures broadly to include R&D and acquisitions:
  - ▣ Accounting Net Cap Ex = \$ 255 million
  - ▣ Net R&D Cap Ex = (3366-1150) = \$2,216 million
  - ▣ Acquisitions in 2006 = \$3,975 million
  - ▣ Total Net Capital Expenditures = \$ 6,443 million
- Acquisitions have been a volatile item. Amgen was quiet on the acquisition front in 2004 and 2005 and had a significant acquisition in 2003.

# III. The government bond rate is not always the riskfree rate

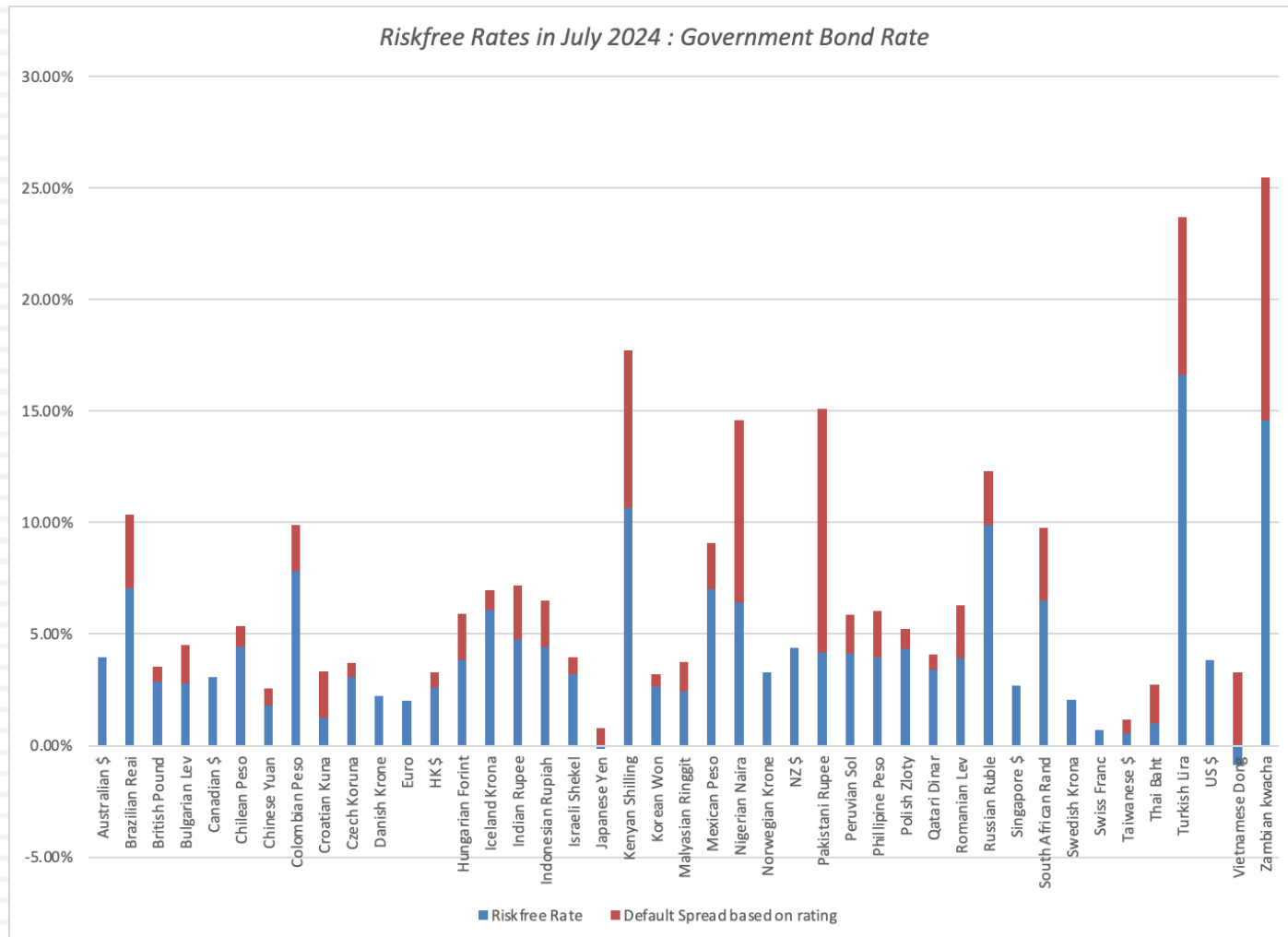
- When valuing Amgen in US dollars, the US\$ ten-year bond rate of 4.78% was used as the riskfree rate. We assumed that the US treasury was default free.
- When valuing Tata Motors in Indian rupees in 2010, the Indian government bond rate of 8% was not default free. Using the Indian government's local currency rating of Ba2 yielded a default spread of 3% for India and a riskfree rate of 5% in Indian rupees.

Risk free rate in Indian Rupees in 2010 = 8% - 3% = 5%

- To value HCL in August 2024, I used the US treasury bond rate of 3.94% as the riskfree rate, since I chose to do the valuation in US dollars. If I had chosen to value the company in rupees, I would have started with Indian government bond rate and adjusted for default risk:

Risk free rate in Rupees in August 2024 = 7.18% - 2.07% = 5.11%

# Risk free rates will vary across currencies!



# Risk free Rates in Currencies without a Government Bond Rate

- There are no traded long term Government bonds in some currencies. Hence, you have to improvise.
- One simple technique is to use differential inflation and the US dollar risk free rate. Using this technique on the Egyptian pound, here is what you get:
  - ▣ Risk free rate in US dollars on 12/31/15 = 2.27%
  - ▣ Expected inflation rate in the US = 1.50%
  - ▣ Expected inflation rate in Egypt = 9.70% (last year's estimate)
  - ▣ Risk free rate in EGP =  $(1.0227) * (1.097/1.015) - 1 = 10.53\%$
- This is also a good way to check government bond rates that you do not trust. For instance, if you believe that expected inflation in India (long term) is 5%, your riskfree rate would then be as follows (assuming a 3.94% riskfree rate in US dollars, with a 2.5% inflation rate):
  - ▣ Riskfree rate in Indian rupees =  $1.0394 (1.05/1.025) - 1 = 6.5\%$

# But valuations should not! Revisiting the Tata Motors Valuation

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

# Heineken: September 2019 (in Euros)

## Cash flows from existing assets

|                        | LTM      | 2013-2018           |
|------------------------|----------|---------------------|
| Revenues               | € 23,119 | Growth rate = 3.22% |
| Operating Margin       | 14.86%   | 14.44%              |
| Sales/Invested Capital | 0.71     | 0.79                |
| ROIC                   | 7.46%    | 8.32%               |
| Effective Tax Rate     | 29.70%   | 27.00%              |

## The Payoff from growth

Revenues will grow 3.22% a year for next 5 years, tapering down to -0.5% growth in year 10

Operating margin (per-tax) will drop to 14.00%

Sales/Invested Capital will stay at five-year average of 0.79.

## Maturity and Closure

**Stable Growth**  
 $g = -0.5\%$ ;  
 Cost of capital = 5%  
 $ROC = 5\%$ ;  
 Reinvestment Rate =  $-0.5\%/5\% = -10\%$

## Euro Cashflows

Terminal Value =  $2972 / (0.05 - (-0.005)) = 54,034$

|                         | 1        | 2        | 3        | 4        | 5        | 6        | 7        | 8        | 9        | 10       | Terminal year |
|-------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|
| Revenue growth rate     | 3.22%    | 3.22%    | 3.22%    | 3.22%    | 3.22%    | 2.48%    | 1.73%    | 0.99%    | 0.24%    | -0.50%   | -0.50%        |
| Revenues                | € 23,863 | € 24,632 | € 25,425 | € 26,244 | € 27,089 | € 27,759 | € 28,240 | € 28,519 | € 28,589 | € 28,446 | € 28,304      |
| EBIT (Operating) margin | 14.38%   | 14.34%   | 14.30%   | 14.26%   | 14.21%   | 14.17%   | 14.13%   | 14.09%   | 14.04%   | 14.00%   | 14.00%        |
| EBIT (Operating income) | € 3,432  | € 3,532  | € 3,635  | € 3,741  | € 3,850  | € 3,934  | € 3,990  | € 4,017  | € 4,015  | € 3,982  | \$ 3,963      |
| Tax rate                | 29.70%   | 29.70%   | 29.70%   | 29.70%   | 29.70%   | 28.76%   | 27.82%   | 26.88%   | 25.94%   | 25.00%   | 0             |
| EBIT(1-t)               | € 2,413  | € 2,483  | € 2,556  | € 2,630  | € 2,707  | € 2,802  | € 2,880  | € 2,937  | € 2,973  | € 2,987  | \$ 2,972      |
| - Reinvestment          | € 942    | € 973    | € 1,004  | € 1,036  | € 1,070  | € 849    | € 609    | € 353    | € 88     | € (181)  | \$ (297)      |
| FCFF                    | € 1,471  | € 1,511  | € 1,552  | € 1,594  | € 1,637  | € 1,953  | € 2,271  | € 2,584  | € 2,885  | € 3,168  | \$ 3,269      |

|                             |             |
|-----------------------------|-------------|
| PV(Terminal value)          | € 36,390.85 |
| PV (CF over next 10 years)  | € 15,300.34 |
| Value of operating assets = | € 51,691.19 |
| - Debt                      | € 19,709.52 |
| - Minority interests        | € 1,069.00  |
| + Cash                      | € 1,751.60  |
| + Non-operating assets      | € 1,401.00  |
| Value of equity             | € 34,065.26 |
| Number of shares            | 571.10      |
| Estimated value /share      | € 59.65     |
| Price                       | € 93.25     |
| Price as % of value         | 56.33%      |

Discount at Euro Cost of Capital (WACC) =  $7.66\% (.599) + 1.13\% (0.401) = 5.04\%$

## The Risk in the Cash flows

On September 1, 2019, Heineken was trading at 93.25 Euros/share

Cost of Equity 7.66%

Cost of Debt  $(-0.5\% + 2\%)(1 - 0.25) = 1.13\%$

Weights  
 $E = 59.9\%$   $D = 40.1\%$

Riskfree Rate:  
 Euro Risk free rate = -0.50%

+ Beta = 1.20 X

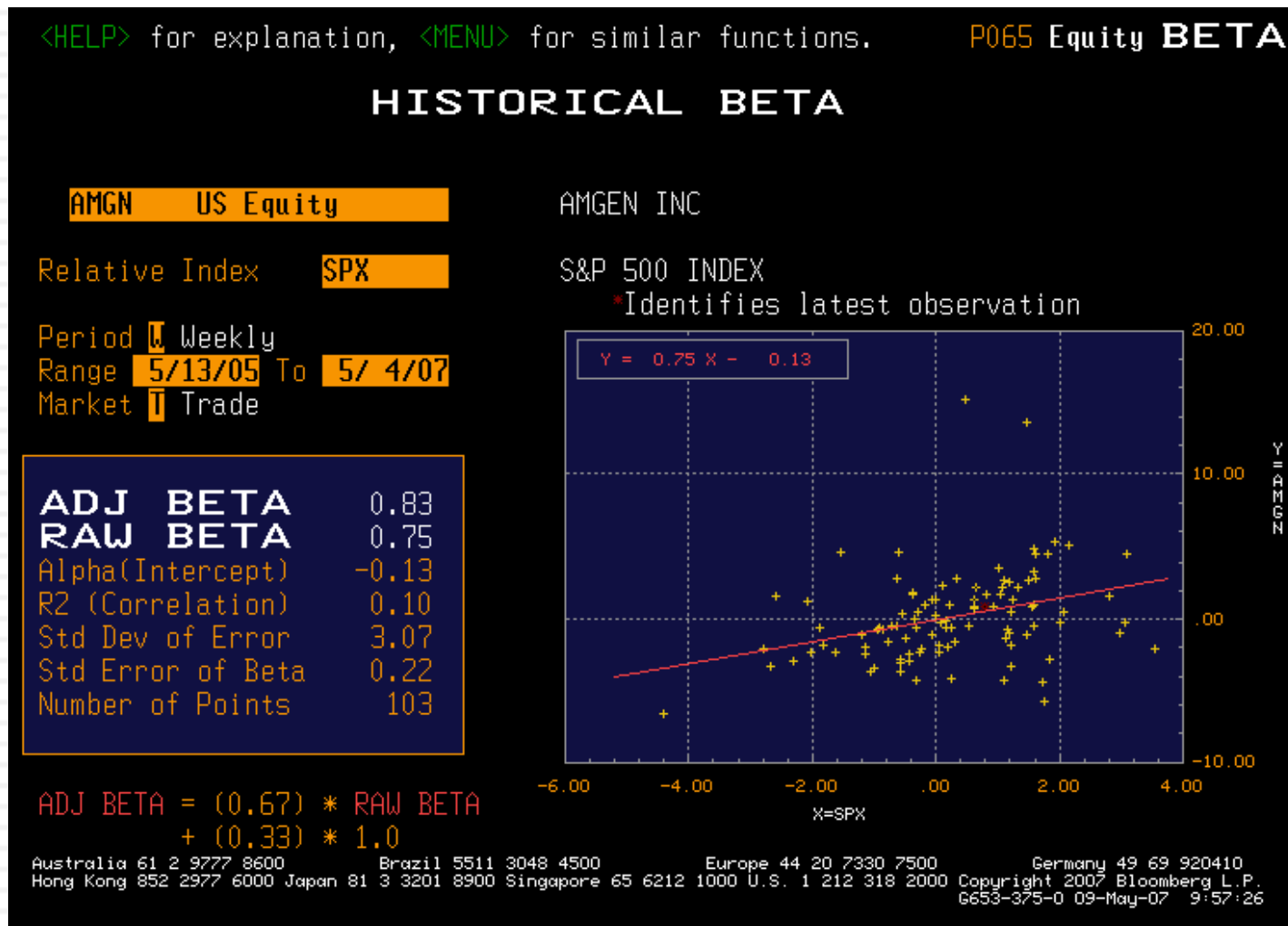
Unlevered beta of alcoholic beverage business = 0.80

Firm's D/E Ratio: 66.98%

ERP = 6.83%

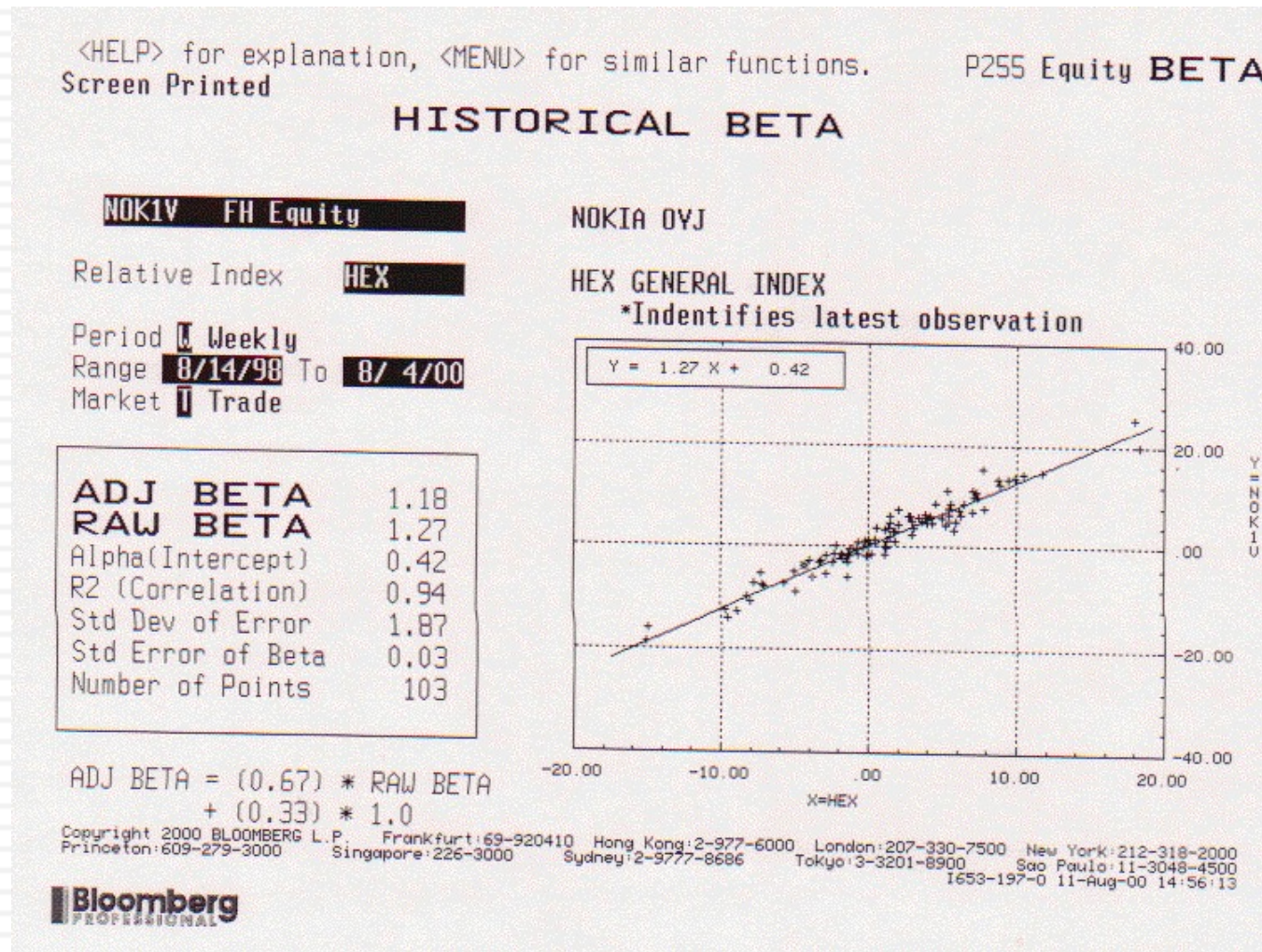
| Region                    | Revenues     | Weight         | ERP          |
|---------------------------|--------------|----------------|--------------|
| Europe                    | 10348        | 50.24%         | 6.90%        |
| North America             | 5920         | 28.74%         | 5.75%        |
| Asia                      | 2919         | 14.17%         | 7.22%        |
| Latin America & Caribbean | 781          | 3.79%          | 10.53%       |
| Africa & Mid East         | 631          | 3.06%          | 9.30%        |
| <b>Total</b>              | <b>20599</b> | <b>100.00%</b> | <b>6.83%</b> |

# IV. Betas do not come from regressions... and are noisy...



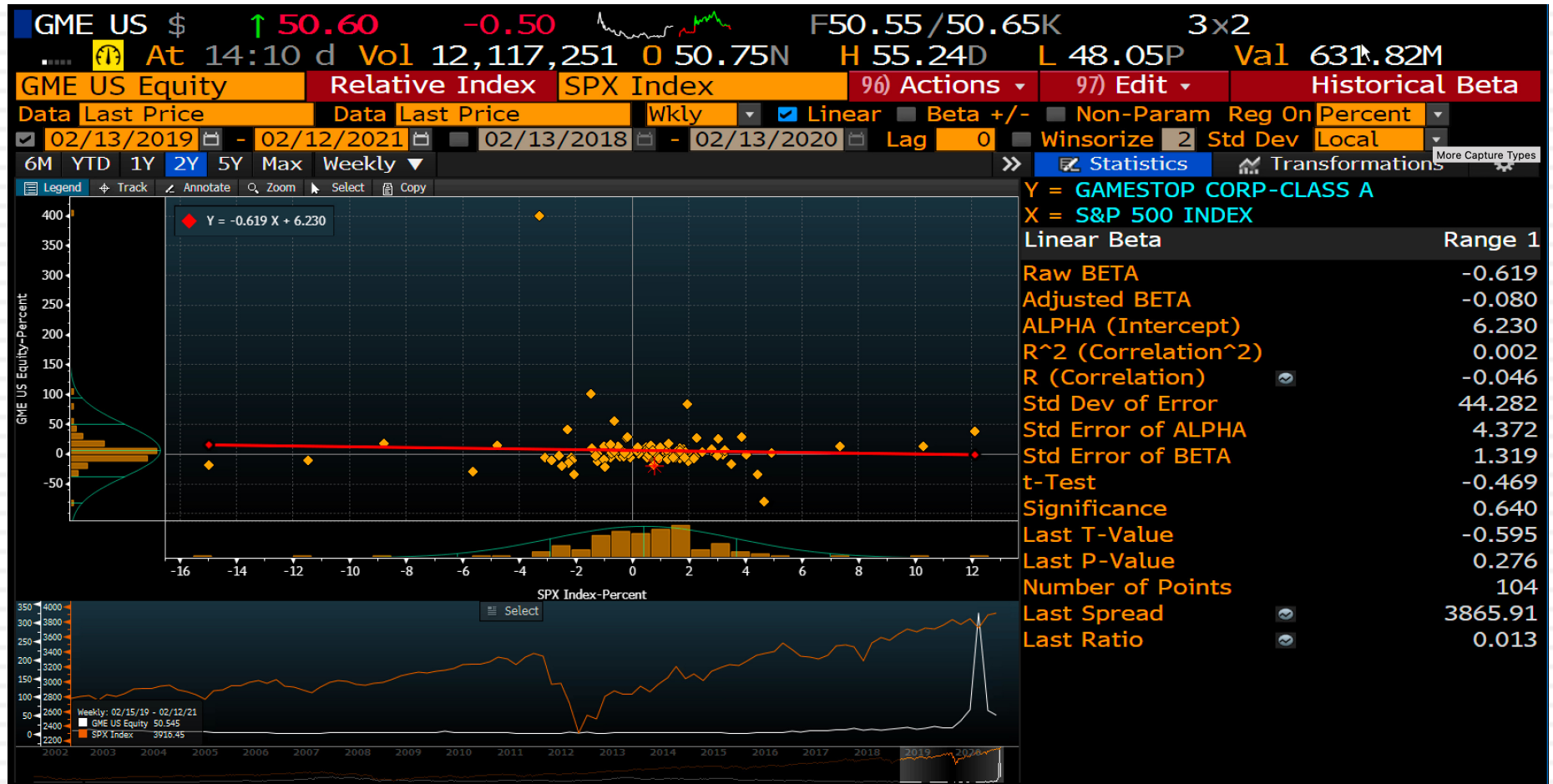
# But should not be trusted, even when they look great...

32

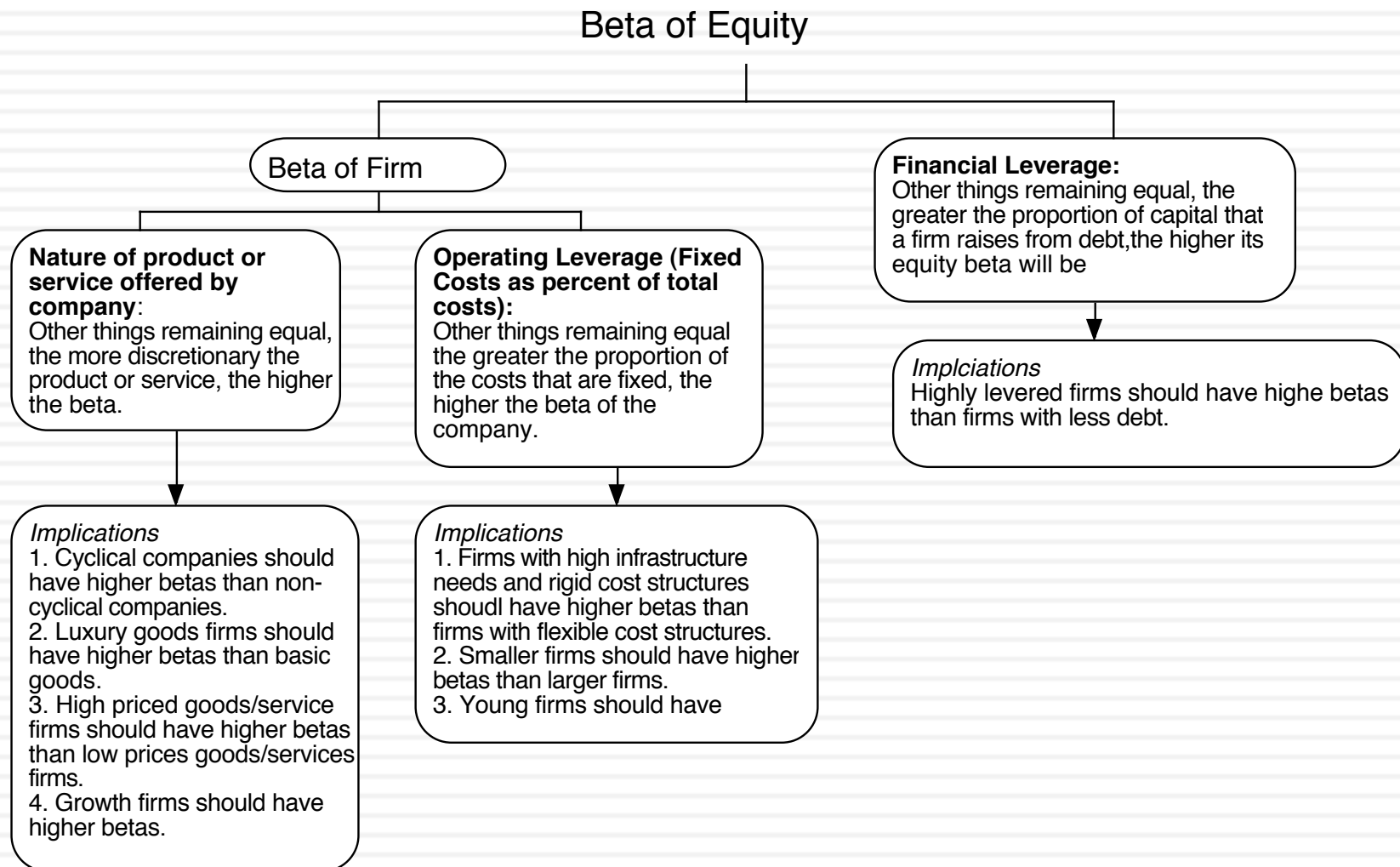




# One slice of history...



# Determinants of Betas



# Bottom-up Betas

Step 1: Find the business or businesses that your firm operates in.

Step 2: Find publicly traded firms in each of these businesses and obtain their regression betas. Compute the simple average across these regression betas to arrive at an average beta for these publicly traded firms. Unlever this average beta using the average debt to equity ratio across the publicly traded firms in the sample.  
Unlevered beta for business =  $\text{Average beta across publicly traded firms} / (1 + (1-t) (\text{Average D/E ratio across firms}))$

Step 3: Estimate how much value your firm derives from each of the different businesses it is in.

Step 4: Compute a weighted average of the unlevered betas of the different businesses (from step 2) using the weights from step 3.  
Bottom-up Unlevered beta for your firm =  $\text{Weighted average of the unlevered betas of the individual business}$

Step 5: Compute a levered beta (equity beta) for your firm, using the market debt to equity ratio for your firm.  
Levered bottom-up beta =  $\text{Unlevered beta} (1 + (1-t) (\text{Debt/Equity}))$

## Possible Refinements

If you can, adjust this beta for differences between your firm and the comparable firms on operating leverage and product characteristics.

While revenues or operating income are often used as weights, it is better to try to estimate the value of each business.

If you expect the business mix of your firm to change over time, you can change the weights on a year-to-year basis.

If you expect your debt to equity ratio to change over time, the levered beta will change over time.

# Three examples...

- Amgen
  - ▣ The unlevered beta for pharmaceutical firms is 1.59. Using Amgen's debt to equity ratio of 11%, the bottom up beta for Amgen is
  - ▣ Bottom-up Beta =  $1.59 (1 + (1 - .35)(.11)) = 1.73$
- Tata Motors
  - ▣ The unlevered beta for automobile firms is 0.98. Using Tata Motor's debt to equity ratio of 33.87%, the bottom up beta for Tata Motors is
  - ▣ Bottom-up Beta =  $0.98 (1 + (1 - .3399)(.3387)) = 1.20$
- HCL

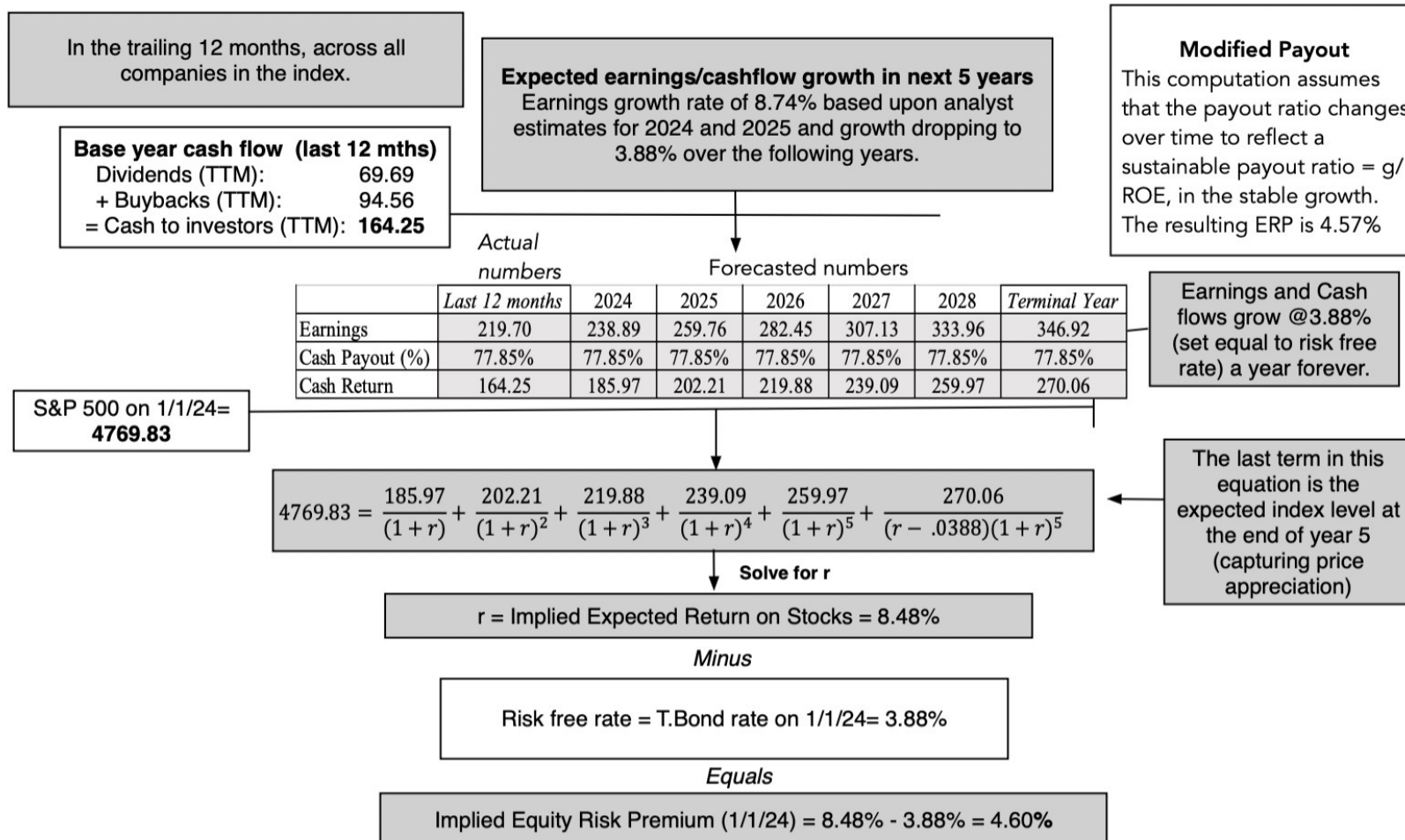
| <i>Business</i>   | <i>Revenues</i>     | <i>EV/Sales</i> | <i>Estimated Value</i> | <i>Unlevered Beta</i> |
|-------------------|---------------------|-----------------|------------------------|-----------------------|
| Business Services | \$ 9,796.00         | 2.0557          | \$ 20,137.97           | 0.9641                |
| Engineering & R&D | \$ 2,122.00         | 1.5902          | \$ 1,341.04            | 0.7059                |
| Software          | \$ 1,411.00         | 2.2690          | \$ 12,984.21           | 1.2856                |
| <b>HCL</b>        | <b>\$ 13,329.00</b> |                 | <b>\$ 34,463.22</b>    | <b>1.0752</b>         |

## V. And the past is not always a good indicator of the future.

|           | <i>Arithmetic Average</i> |                   | <i>Geometric Average</i> |                   |
|-----------|---------------------------|-------------------|--------------------------|-------------------|
|           | Stocks - T. Bills         | Stocks - T. Bonds | Stocks - T. Bills        | Stocks - T. Bonds |
| 1928-2023 | 8.32%                     | 6.80%             | 6.50%                    | 5.23%             |
| Std Error | 2.03%                     | 2.14%             |                          |                   |
| 1974-2023 | 8.18%                     | 5.95%             | 6.79%                    | 4.97%             |
| Std Error | 2.45%                     | 2.73%             |                          |                   |
| 2014-2023 | 11.70%                    | 11.17%            | 10.63%                   | 10.44%            |
| Std Error | 4.97%                     | 3.86%             |                          |                   |

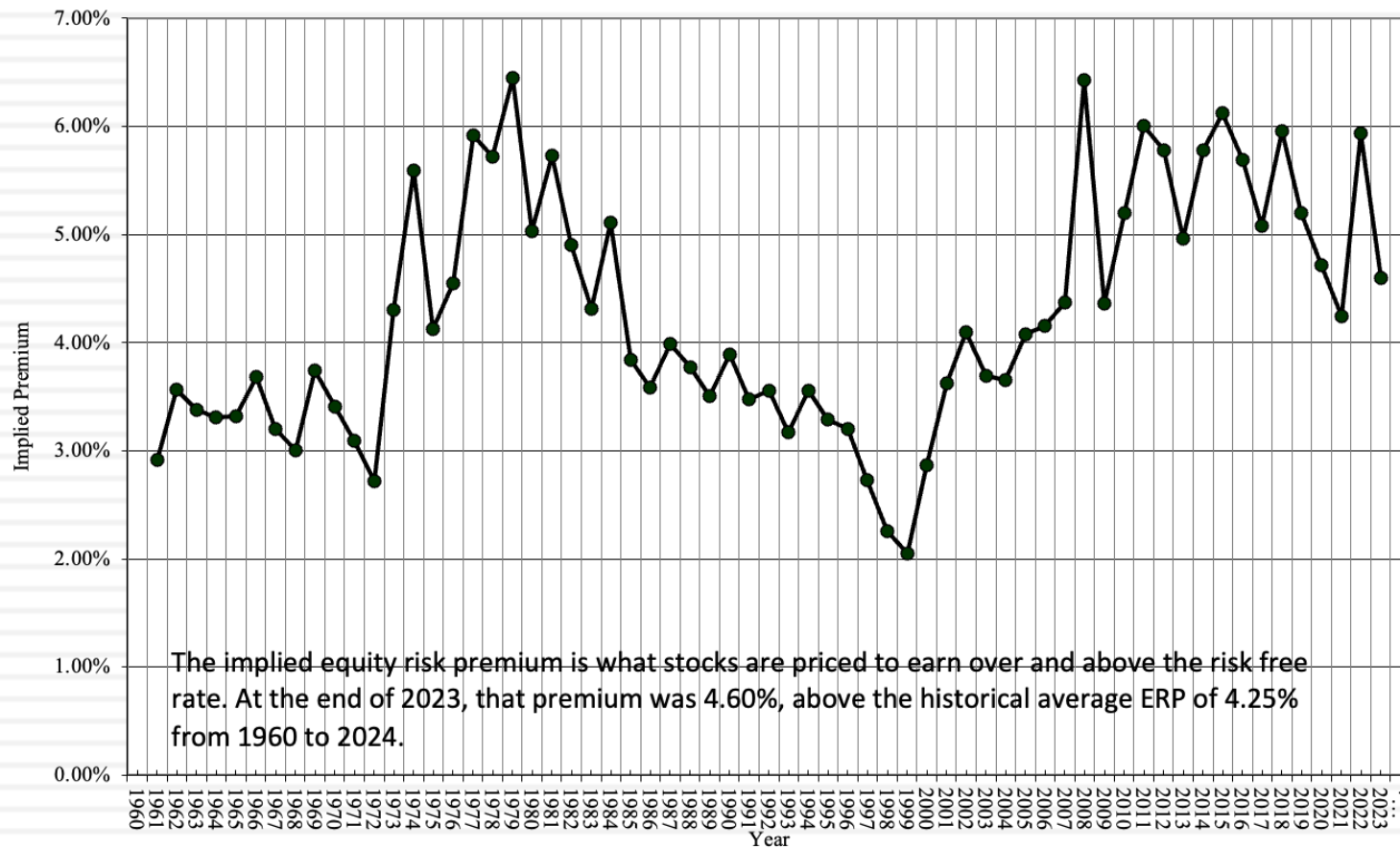
- If you are going to use a historical risk premium, make it
  - ▣ Long term (because of the standard error)
  - ▣ Consistent with your risk free rate
  - ▣ A “compounded” average
- No matter which estimate you use, recognize that it is backward looking, is noisy and may reflect selection bias

# But in the future..



# Implied ERP for the S&P 500: History

*Implied Equity Risk Premium for US Equity Market: 1960-2023*



# Implied Premium for India using the Sensex: April 2010

- Level of the Index = 17559
- FCFE on the Index = 3.5% (Estimated FCFE for companies in index as % of market value of equity)
- Other parameters
  - ▣ Riskfree Rate = 5% (Rupee)
  - ▣ Expected Growth (in Rupee)
    - Next 5 years = 20% (Used expected growth rate in Earnings)
    - After year 5 = 5%
- Solving for the expected return:
  - ▣ Expected return on Equity = 11.72%
  - ▣ Implied Equity premium for India =  $11.72\% - 5\% = 6.72\%$

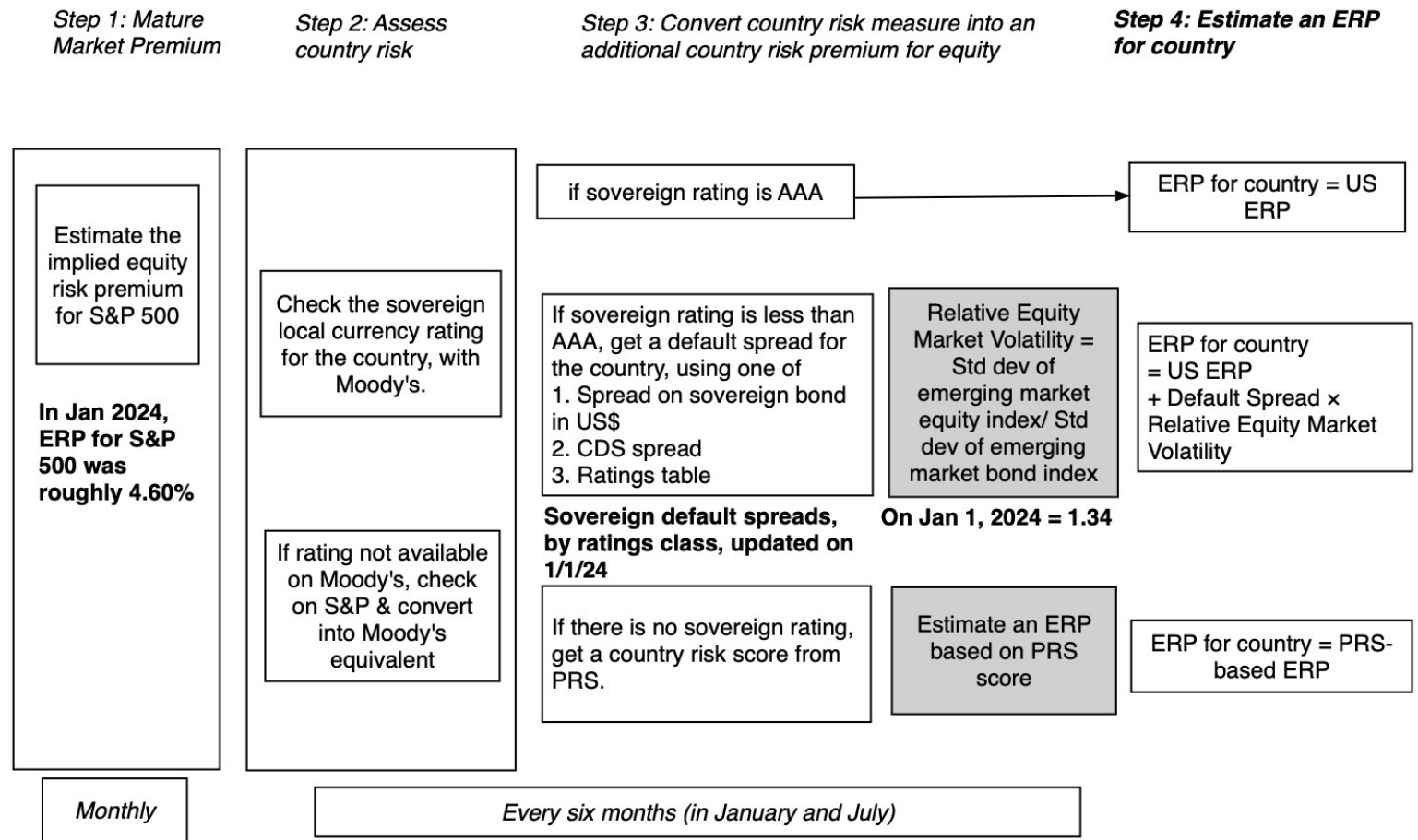


# VI. There is a downside to globalization...

- Emerging markets offer growth opportunities but they are also riskier. If we want to count the growth, we have to also consider the risk.
- Two ways of estimating the country risk premium:
  - Sovereign Default Spread: In this approach, the country equity risk premium is set equal to the default spread of the bond issued by the country.
    - Equity Risk Premium for mature market = 6.00%
    - Default Spread for India = 200% (based on rating)
    - Equity Risk Premium for India = 6.00% + 2.00% = 8.00%
  - Adjusted for equity risk: The country equity risk premium is based upon the volatility of the equity market relative to the government bond rate.
    - Country risk premium =  $\text{Default Spread} * \frac{\text{Std Deviation}_{\text{Country Equity}}}{\text{Std Deviation}_{\text{Country Bond}}}$
    - Standard Deviation in Sensex = 21%
    - Standard Deviation in Indian government bond = 14%
    - Default spread on Indian Bond = 2%
    - Additional country risk premium for India =  $2\% (21/14) = 3.00\%$
    - Total equity risk premium = US equity risk premium + CRP for India  
= 6.00% + 3.00% = 9.00%

# A Template for Estimating the ERP

## ERP Estimation Procedure



ERP : July 2024

|                      |      |       |       |                    |      |       |        |
|----------------------|------|-------|-------|--------------------|------|-------|--------|
| Andorra              | Baa1 | 1.95% | 6.06% | Italy              | Baa3 | 2.68% | 6.79%  |
| Austria              | Aa1  | 0.49% | 4.60% | Jersey (States of) | Aa3  | 0.73% | 4.84%  |
| Belgium              | Aa3  | 0.73% | 4.84% | Liechtenstein      | Aaa  | 0.00% | 4.11%  |
| Cyprus               | Baa2 | 2.33% | 6.44% | Luxembourg         | Aaa  | 0.00% | 4.11%  |
| Denmark              | Aaa  | 0.00% | 4.11% | Malta              | A2   | 1.03% | 5.14%  |
| Finland              | Aa1  | 0.49% | 4.60% | Netherlands        | Aaa  | 0.00% | 4.11%  |
| France               | Aa2  | 0.60% | 4.71% | Norway             | Aaa  | 0.00% | 4.11%  |
| Germany              | Aaa  | 0.00% | 4.11% | Portugal           | A3   | 1.46% | 5.57%  |
| Greece               | Ba1  | 3.06% | 7.17% | Spain              | Baa1 | 1.95% | 6.06%  |
| Guernsey (States of) | A1   | 0.86% | 4.97% | Sweden             | Aaa  | 0.00% | 4.11%  |
| Iceland              | A2   | 1.03% | 5.14% | Switzerland        | Aaa  | 0.00% | 4.11%  |
| Ireland              | Aa3  | 0.73% | 4.84% | Turkey             | B3   | 7.94% | 12.05% |
| Isle of Man          | Aa3  | 0.73% | 4.84% | United Kingdom     | Aa3  | 0.73% | 4.84%  |
|                      |      |       |       | EU & Environs      |      | 1.13% | 5.24%  |

|                        |      |        |        |
|------------------------|------|--------|--------|
| Albania                | B1   | 5.50%  | 9.61%  |
| Armenia                | Ba3  | 4.39%  | 8.50%  |
| Azerbaijan             | Ba1  | 3.06%  | 7.17%  |
| Belarus                | C    | 22.72% | 26.83% |
| Bosnia and Herzegovina | B3   | 7.94%  | 12.05% |
| Bulgaria               | Baa1 | 1.95%  | 6.06%  |
| Croatia                | Baa2 | 2.33%  | 6.44%  |
| Czech Republic         | Aa3  | 0.73%  | 4.84%  |
| Estonia                | A1   | 0.86%  | 4.97%  |
| Georgia                | Ba2  | 3.67%  | 7.78%  |
| Hungary                | Baa2 | 2.33%  | 6.44%  |
| Kazakhstan             | Baa2 | 2.33%  | 6.44%  |
| Kyrgyzstan             | B3   | 7.94%  | 12.05% |
| Latvia                 | A3   | 1.46%  | 5.57%  |
| Lithuania              | A2   | 1.03%  | 5.14%  |
| Macedonia              | Ba3  | 4.39%  | 8.50%  |
| Moldova                | B3   | 7.94%  | 12.05% |
| Montenegro             | B1   | 5.50%  | 9.61%  |
| Poland                 | A2   | 1.03%  | 5.14%  |
| Romania                | Baa3 | 2.68%  | 6.79%  |
| Russia                 | #N/A | 6.58%  | 11.18% |
| Serbia                 | Ba2  | 3.67%  | 7.78%  |
| Slovakia               | A2   | 1.03%  | 5.14%  |
| Slovenia               | A3   | 1.46%  | 5.57%  |
| Tajikistan             | B3   | 7.94%  | 12.05% |
| Ukraine                | Ca   | 14.66% | 18.77% |
| Uzbekistan             | Ba3  | 4.39%  | 8.50%  |
| E. Europe & Russia     |      | 3.37%  | 7.48%  |

| Country         | PRS   | CRP    | ERP    |
|-----------------|-------|--------|--------|
| Algeria         | 69.25 | 3.67%  | 7.78%  |
| Brunei          | 81.75 | 0.73%  | 4.84%  |
| Gambia          | 66.75 | 5.50%  | 9.61%  |
| Guinea          | 59.00 | 11.00% | 15.11% |
| Guinea-Bissau   | 63.00 | 7.94%  | 12.05% |
| Guyana          | 74.50 | 1.95%  | 6.06%  |
| Haiti           | 55.00 | 14.66% | 18.77% |
| Iran            | 63.25 | 7.94%  | 12.05% |
| Korea, D.P.R.   | 49.25 | 22.72% | 26.83% |
| Liberia         | 61.50 | 9.16%  | 13.27% |
| Libya           | 74.75 | 1.95%  | 6.06%  |
| Madagascar      | 63.25 | 7.94%  | 12.05% |
| Malawi          | 52.25 | 14.66% | 18.77% |
| Myanmar         | 58.00 | 11.00% | 15.11% |
| Russia          | 71.25 | 3.67%  | 7.78%  |
| Sierra Leone    | 58.00 | 11.00% | 15.11% |
| Somalia         | 54.25 | 14.66% | 18.77% |
| Sudan           | 43.50 | 22.72% | 26.83% |
| Syria           | 44.25 | 22.72% | 26.83% |
| Yemen, Republic | 51.50 | 14.66% | 18.77% |
| Zimbabwe        | 58.00 | 11.00% | 15.11% |

|               |     |       |       |
|---------------|-----|-------|-------|
| Canada        | Aaa | 0.00% | 4.11% |
| United States | Aaa | 0.00% | 4.11% |
| N. America    |     | 0.00% | 4.11% |

| Country        | Rating | CRP    | ERP    |
|----------------|--------|--------|--------|
| Angola         | B3     | 7.94%  | 12.05% |
| Benin          | B1     | 5.50%  | 9.61%  |
| Botswana       | A3     | 1.46%  | 5.57%  |
| Burkina Faso   | Caa1   | 9.16%  | 13.27% |
| Cameroon       | Caa1   | 9.16%  | 13.27% |
| Cape Verde     | B3     | 7.94%  | 12.05% |
| Congo (DR)     | B3     | 7.94%  | 12.05% |
| Congo (Rep of) | Caa2   | 11.00% | 15.11% |
| Côte d'Ivoire  | Ba2    | 3.67%  | 7.78%  |
| Egypt          | Caa1   | 9.16%  | 13.27% |
| Ethiopia       | Caa2   | 11.00% | 15.11% |
| Gabon          | Caa2   | 11.00% | 15.11% |
| Ghana          | Caa3   | 12.22% | 16.33% |
| Kenya          | B3     | 7.94%  | 12.05% |
| Mali           | Caa2   | 11.00% | 15.11% |
| Mauritius      | Baa3   | 2.68%  | 6.79%  |
| Morocco        | Ba1    | 3.06%  | 7.17%  |
| Mozambique     | Caa2   | 11.00% | 15.11% |
| Namibia        | B1     | 5.50%  | 9.61%  |
| Niger          | Caa3   | 12.22% | 16.33% |
| Nigeria        | Caa1   | 9.16%  | 13.27% |
| Rwanda         | B2     | 6.72%  | 10.83% |
| Senegal        | Ba3    | 4.39%  | 8.50%  |
| South Africa   | Ba2    | 3.67%  | 7.78%  |
| Swaziland      | B3     | 7.94%  | 12.05% |
| Tanzania       | B1     | 5.50%  | 9.61%  |
| Togo           | B3     | 7.94%  | 12.05% |
| Tunisia        | Caa2   | 11.00% | 15.11% |
| Uganda         | B3     | 7.94%  | 12.05% |
| Zambia         | Caa2   | 11.00% | 15.11% |
| Africa         |        | 7.57%  | 11.68% |

|                             |      |        |        |
|-----------------------------|------|--------|--------|
| Abu Dhabi                   | Aa2  | 0.60%  | 4.71%  |
| Bahrain                     | B2   | 6.72%  | 10.83% |
| Iraq                        | Caa1 | 9.16%  | 13.27% |
| Israel                      | A2   | 1.03%  | 5.14%  |
| Jordan                      | Ba3  | 4.39%  | 8.50%  |
| Kuwait                      | A1   | 0.86%  | 4.97%  |
| Lebanon                     | C    | 22.72% | 26.83% |
| Oman                        | Ba1  | 3.06%  | 7.17%  |
| Qatar                       | Aa2  | 0.60%  | 4.71%  |
| Ras Al Khaimah (Emirate of) | A3   | 1.46%  | 5.57%  |
| Saudi Arabia                | A1   | 0.86%  | 4.97%  |
| Sharjah                     | Ba1  | 3.06%  | 7.17%  |
| United Arab Emirates        | Aa2  | 0.60%  | 4.71%  |
| Middle East                 |      | 1.82%  | 5.93%  |

|                  |      |        |        |
|------------------|------|--------|--------|
| Bangladesh       | B1   | 5.50%  | 9.61%  |
| Cambodia         | B2   | 6.72%  | 10.83% |
| China            | A1   | 0.86%  | 4.97%  |
| Fiji             | B1   | 5.50%  | 9.61%  |
| Hong Kong        | Aa3  | 0.73%  | 4.84%  |
| India            | Baa3 | 2.68%  | 6.79%  |
| Indonesia        | Baa2 | 2.33%  | 6.44%  |
| Japan            | A1   | 0.86%  | 4.97%  |
| Korea            | Aa2  | 0.60%  | 4.71%  |
| Laos             | Caa3 | 12.22% | 16.33% |
| Macao            | Aa3  | 0.73%  | 4.84%  |
| Malaysia         | A3   | 1.46%  | 5.57%  |
| Maldives         | Caa1 | 9.16%  | 13.27% |
| Mongolia         | B3   | 7.94%  | 12.05% |
| Pakistan         | Caa3 | 12.22% | 16.33% |
| Papua New Guinea | B2   | 6.72%  | 10.83% |
| Philippines      | Baa2 | 2.33%  | 6.44%  |
| Singapore        | Aaa  | 0.00%  | 4.11%  |
| Solomon Islands  | Caa1 | 9.16%  | 13.27% |
| Sri Lanka        | Ca   | 14.66% | 18.77% |
| Taiwan           | Aa3  | 0.73%  | 4.84%  |
| Thailand         | Baa1 | 1.95%  | 6.06%  |
| Vietnam          | Ba2  | 3.67%  | 7.78%  |
| Asia             |      | 1.40%  | 5.51%  |

|               |      |        |        |
|---------------|------|--------|--------|
| Caribbean     |      | 7.41%  | 11.52% |
| Argentina     | Ca   | 14.66% | 18.77% |
| Belize        | Caa2 | 11.00% | 15.11% |
| Bolivia       | Caa3 | 12.22% | 16.33% |
| Brazil        | Ba2  | 3.67%  | 7.78%  |
| Chile         | A2   | 1.03%  | 5.14%  |
| Colombia      | Baa2 | 2.33%  | 6.44%  |
| Costa Rica    | B1   | 5.50%  | 9.61%  |
| Ecuador       | Caa3 | 12.22% | 16.33% |
| El Salvador   | Caa1 | 9.16%  | 13.27% |
| Guatemala     | Ba1  | 3.06%  | 7.17%  |
| Honduras      | B1   | 5.50%  | 9.61%  |
| Mexico        | Baa2 | 2.33%  | 6.44%  |
| Nicaragua     | B2   | 6.72%  | 10.83% |
| Panama        | Baa3 | 2.68%  | 6.79%  |
| Paraguay      | Ba1  | 3.06%  | 7.17%  |
| Peru          | Baa1 | 1.95%  | 6.06%  |
| Suriname      | Caa3 | 12.22% | 16.33% |
| Uruguay       | Baa1 | 1.95%  | 6.06%  |
| Venezuela     | C    | 22.72% | 26.83% |
| Latin America |      | 4.67%  | 8.78%  |

|              |     |       |       |
|--------------|-----|-------|-------|
| Australia    | Aaa | 0.00% | 4.11% |
| Cook Islands | B1  | 5.50% | 9.61% |
| New Zealand  | Aaa | 0.00% | 4.11% |
| Aus & NZ     |     | 0.00% | 4.11% |

Aswath Damodaran

Blue: Moody's Rating  
Red: Added Country Risk  
Green #: Total ERP

## VII. And it is not just emerging market companies that are exposed to this risk..

- The “default” approach in valuation has been to assign country risk based upon your country of incorporation. Thus, if you are incorporated in a developed market, the assumption has been that you are not exposed to emerging market risks. If you are incorporated in an emerging market, you are saddled with the entire country risk.
- As companies globalize and look for revenues in foreign markets, this practice will underestimate the costs of equity of developed market companies with significant emerging market risk exposure and over estimate the costs of equity of emerging market companies with significant developed market risk exposure.

# HCL: Equity Risk Premium in 2024

| <i>Region</i>     | <i>Revenues</i> | <i>Weight</i>  | <i>ERP</i>   |
|-------------------|-----------------|----------------|--------------|
| North America     | \$7,699         | 57.76%         | 4.11%        |
| Western Europe    | \$3,533         | 26.50%         | 5.24%        |
| India             | \$481           | 3.61%          | 6.79%        |
| Rest of the World | \$1,617         | 12.13%         | 5.63%        |
| <b>HCL</b>        | <b>\$13,330</b> | <b>100.00%</b> | <b>4.70%</b> |

*Questions to ponder:*

- 1. I used revenue weights. Why?*
- 2. Under what conditions would you consider using alternate metrics like EBIT or BV of assets as weights?*

# A Production-based ERP: Royal Dutch Shell in 2015

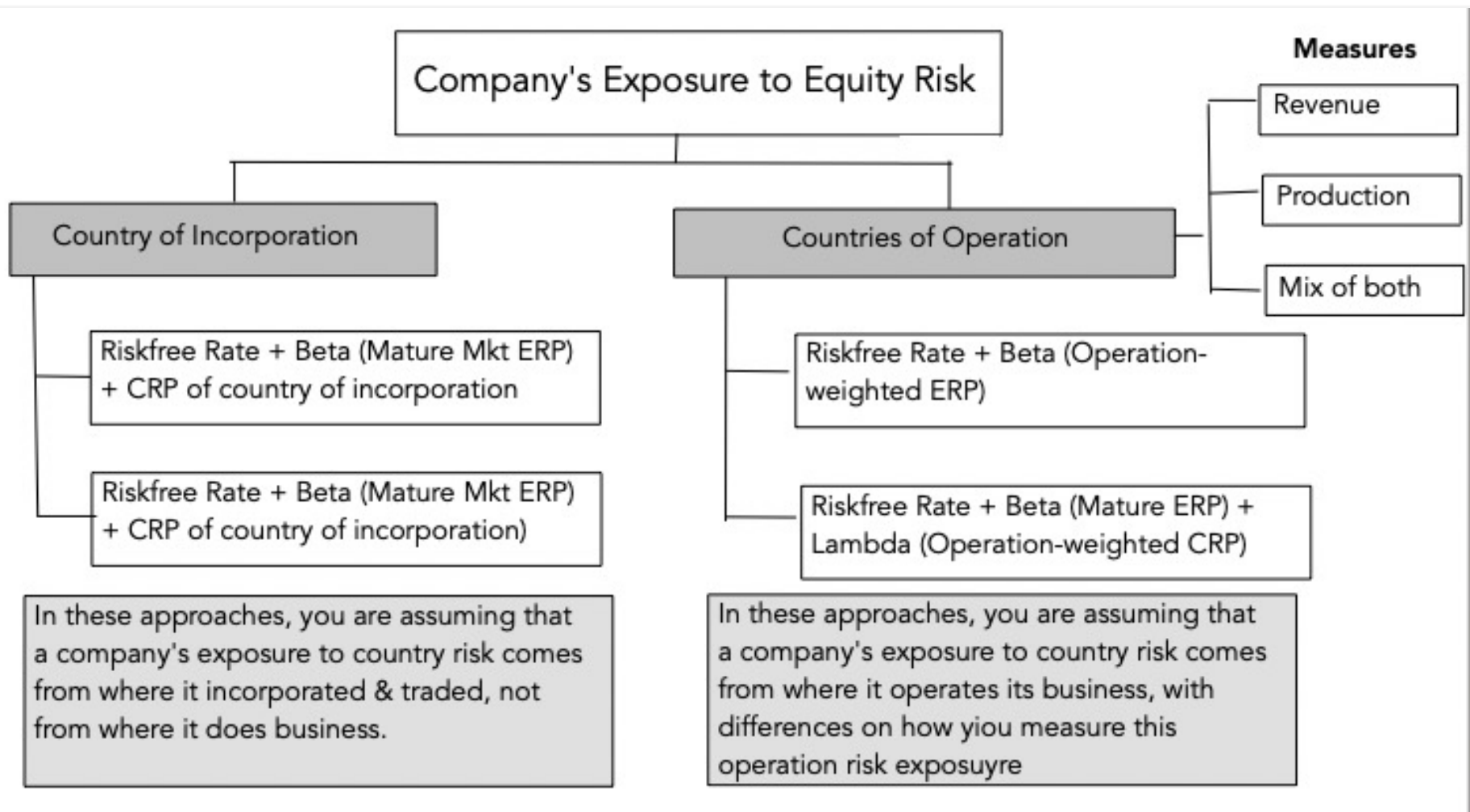
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| <i>Country</i>               | <i>Oil &amp; Gas Production</i> | <i>% of Total</i> | <i>ERP</i>   |
|------------------------------|---------------------------------|-------------------|--------------|
| Denmark                      | 17396                           | 3.83%             | 6.20%        |
| Italy                        | 11179                           | 2.46%             | 9.14%        |
| Norway                       | 14337                           | 3.16%             | 6.20%        |
| UK                           | 20762                           | 4.57%             | 6.81%        |
| <i>Rest of Europe</i>        | 874                             | 0.19%             | 7.40%        |
| Brunei                       | 823                             | 0.18%             | 9.04%        |
| Iraq                         | 20009                           | 4.40%             | 11.37%       |
| Malaysia                     | 22980                           | 5.06%             | 8.05%        |
| Oman                         | 78404                           | 17.26%            | 7.29%        |
| Russia                       | 22016                           | 4.85%             | 10.06%       |
| <i>Rest of Asia &amp; ME</i> | 24480                           | 5.39%             | 7.74%        |
| <i>Oceania</i>               | 7858                            | 1.73%             | 6.20%        |
| Gabon                        | 12472                           | 2.75%             | 11.76%       |
| Nigeria                      | 67832                           | 14.93%            | 11.76%       |
| Rest of Africa               | 6159                            | 1.36%             | 12.17%       |
| USA                          | 104263                          | 22.95%            | 6.20%        |
| Canada                       | 8599                            | 1.89%             | 6.20%        |
| Brazil                       | 13307                           | 2.93%             | 9.60%        |
| <i>Rest of Latin America</i> | 576                             | 0.13%             | 10.78%       |
| <b>Royal Dutch Shell</b>     | <b>454326</b>                   | <b>100.00%</b>    | <b>8.26%</b> |

# Estimating country risk premium exposure\_

## Variants

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# An alternate way: Estimating a company's exposure to country risk (Lambda)

□ Just as beta measures exposure to macro economic risk, lambda measures exposure just to country risk. Like beta, it is scaled around one.

□ The easiest and most accessible data is on revenues. Most companies break their revenues down by region. One simplistic solution would be to do the following:

$$\text{Lambda} = \% \text{ of revenues domestically}_{\text{firm}} / \% \text{ of revenues domestically}_{\text{average firm}}$$

□ In 2008-09, Tata Motors got about 91.37% of its revenues in India and TCS got 7.62%. The average Indian firm gets about 80% of its revenues in India:

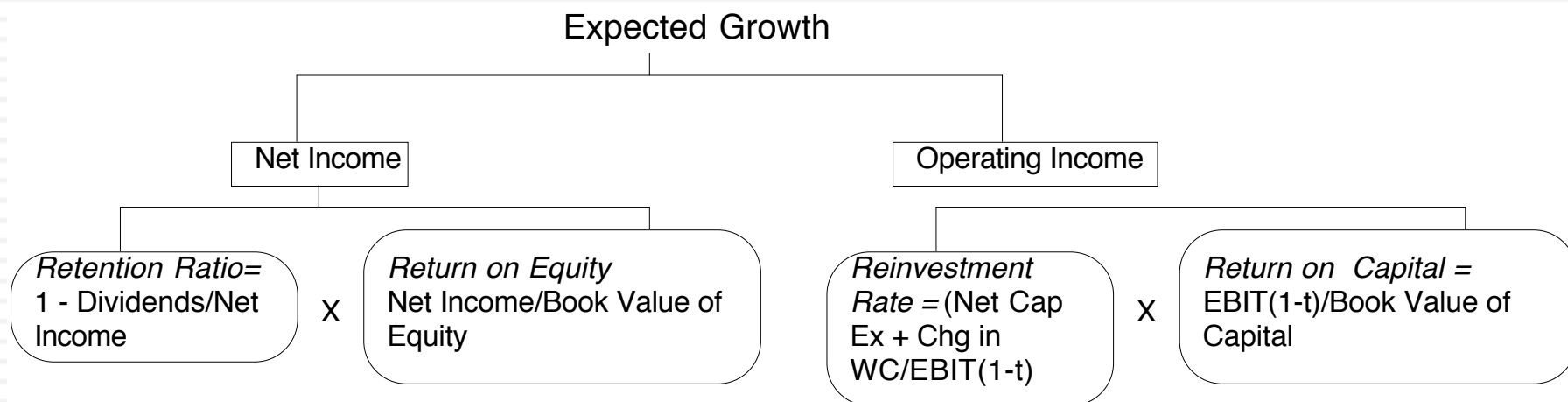
□  $\text{Lambda}_{\text{Tata Motors}} = 91\%/80\% = 1.14$

□ The danger of focusing just on revenues is that it misses other exposures to risk (production and operations).

|                                     | <i>Tata Motors</i>                          | <i>TCS</i>                     |
|-------------------------------------|---|--------------------------------|
| % of production/operations in India | High  | High                           |
| % of revenues in India              | 91.37% (in 2009)<br>Estimated 70% (in 2010) | 7.62%                          |
| Lambda                              | 0.80  | 0.20                           |
| Flexibility in moving operations    | Low. Significant physical assets.           | High. Human capital is mobile. |



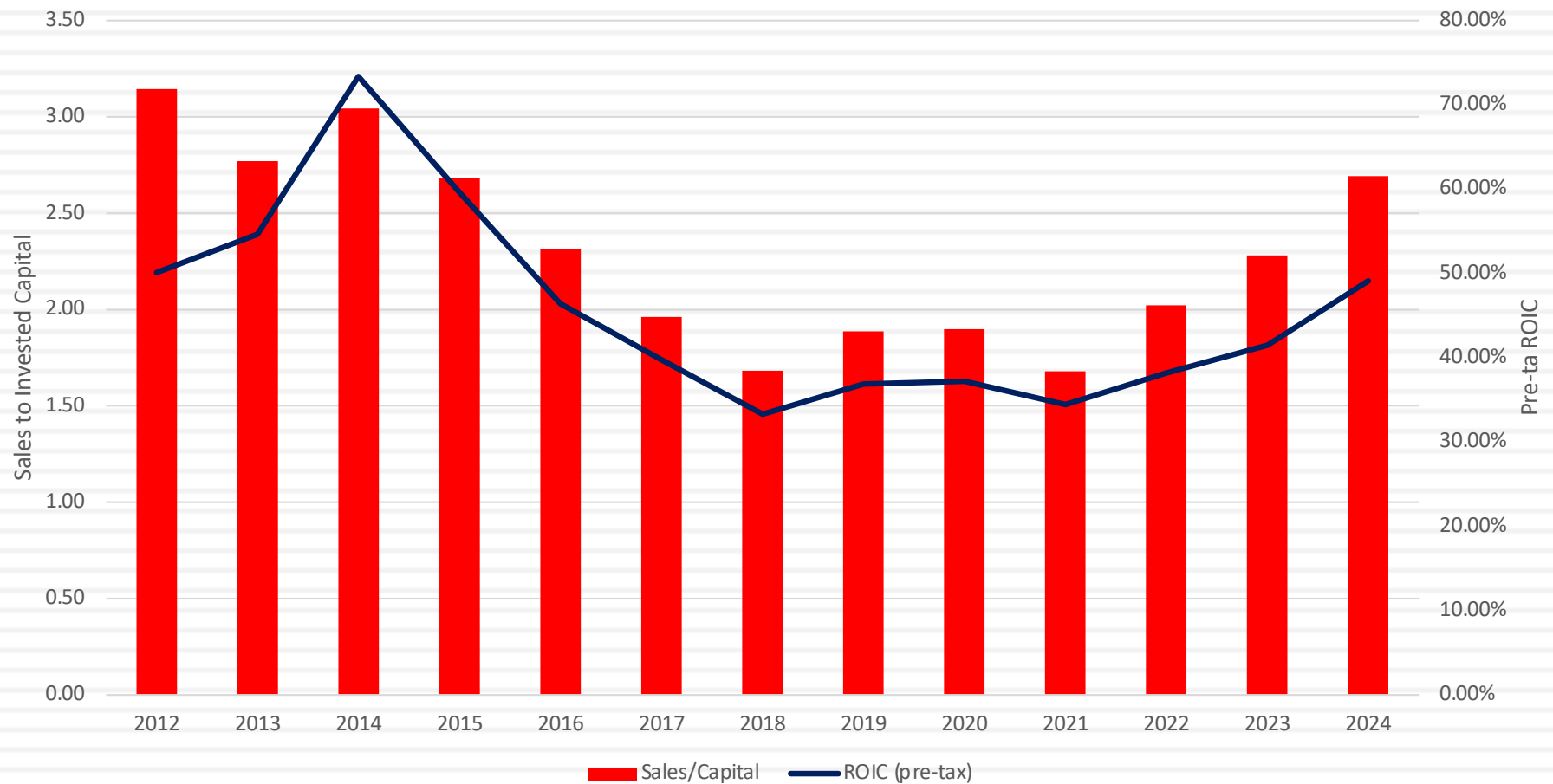
# VIII. Growth has to be earned (not endowed or estimated): Sustainable Growth



1. No free growth: In the long term, to grow, you have to reinvest.
2. Growth Quality: For a given reinvestment, the higher the return you generate on your reinvestment, the faster you can grow.
3. Scaling up is hard to do: As companies get larger, it gets more difficult to sustain value-adding growth.

# Operating income, Reinvestment & Return on Capital – HCL's History

HCL: Sales to Capital and ROIC



# Earn at least your cost of capital! But companies seem to have trouble in practice...

| <i>Region</i>             | <i># firms</i> | <i>ROE</i> | <i>COE</i> | <i>% of firms with ROE&gt;COE</i> | <i>ROIC</i> | <i>WACC</i> | <i>% of firms with ROIC&gt;WACC</i> | <i>% of firms with ROIC-WACC&gt;5%</i> | <i>% of firms with ROIC-WACC&lt;5%</i> |
|---------------------------|----------------|------------|------------|-----------------------------------|-------------|-------------|-------------------------------------|--|--|
| Africa and Middle East    | 2,423          | 7.55%      | 10.98%     | 32.03%                            | 4.77%       | 9.33%       | 25.05%                              | 16.59%                                 | 83.41%                                 |
| Australia & NZ            | 1,798          | -12.08%    | 8.51%      | 18.19%                            | -11.59%     | 8.36%       | 19.24%                              | 13.68%                                 | 86.32%                                 |
| Canada                    | 2,791          | -20.66%    | 8.64%      | 11.64%                            | -18.59%     | 8.41%       | 12.54%                              | 8.10%                                  | 91.90%                                 |
| China                     | 7,504          | 4.34%      | 10.07%     | 23.87%                            | 3.36%       | 8.94%       | 25.49%                              | 15.27%                                 | 84.73%                                 |
| EU & Environs             | 5,925          | 6.73%      | 9.83%      | 33.96%                            | 5.48%       | 8.59%       | 33.59%                              | 24.76%                                 | 75.24%                                 |
| Eastern Europe & Russia   | 325            | 10.17%     | 10.38%     | 34.46%                            | 4.32%       | 9.17%       | 26.46%                              | 16.31%                                 | 83.69%                                 |
| India                     | 4,446          | 8.32%      | 11.12%     | 34.14%                            | 5.61%       | 9.90%       | 29.94%                              | 19.50%                                 | 80.50%                                 |
| Japan                     | 4,020          | 7.14%      | 10.05%     | 33.23%                            | 7.15%       | 8.62%       | 41.32%                              | 26.87%                                 | 73.13%                                 |
| Latin America & Caribbean | 984            | 9.28%      | 12.30%     | 35.37%                            | 7.37%       | 9.76%       | 35.98%                              | 24.19%                                 | 75.81%                                 |
| Small Asia                | 9,876          | 5.19%      | 10.86%     | 25.65%                            | 3.81%       | 9.37%       | 23.78%                              | 14.14%                                 | 85.86%                                 |
| UK                        | 1,125          | 1.47%      | 9.71%      | 29.16%                            | 4.76%       | 8.74%       | 37.16%                              | 28.80%                                 | 71.20%                                 |
| United States             | 6,481          | 2.64%      | 8.80%      | 26.68%                            | 0.05%       | 7.91%       | 23.59%                              | 17.74%                                 | 82.26%                                 |
| Global                    | 47,698         | 4.93%      | 9.92%      | 27.54%                            | 3.73%       | 8.68%       | 27.12%                              | 18.02%                                 | 81.98%                                 |

# When everything is in flux: Changing growth and margins

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- The elegant connection between reinvestment and earnings growth, captured by a sustainable growth rate, when you have a company in transition, and margins are changing over time.
- If that is the case, you have to estimate cash flows in three steps:
  - Forecast revenue growth and revenues in future years, taking into account market potential and competition.
  - Forecast a “target” margin in the future and a pathway from current margins to the target.
  - Estimate reinvestment from revenues, using a sales to capital ratio (measuring the dollars of revenues you get from each dollar of investment).

# 1. Revenue Growth

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## Revenue Growth and Magnitude

### Market Size and Growth

1. *Current Market size*: The size of the market for the company's products & services, given geography it is targeting and product type.
2. *Expected Growth in Market*: Growth in total market, as technology and market conditions change.

X

### Market Share

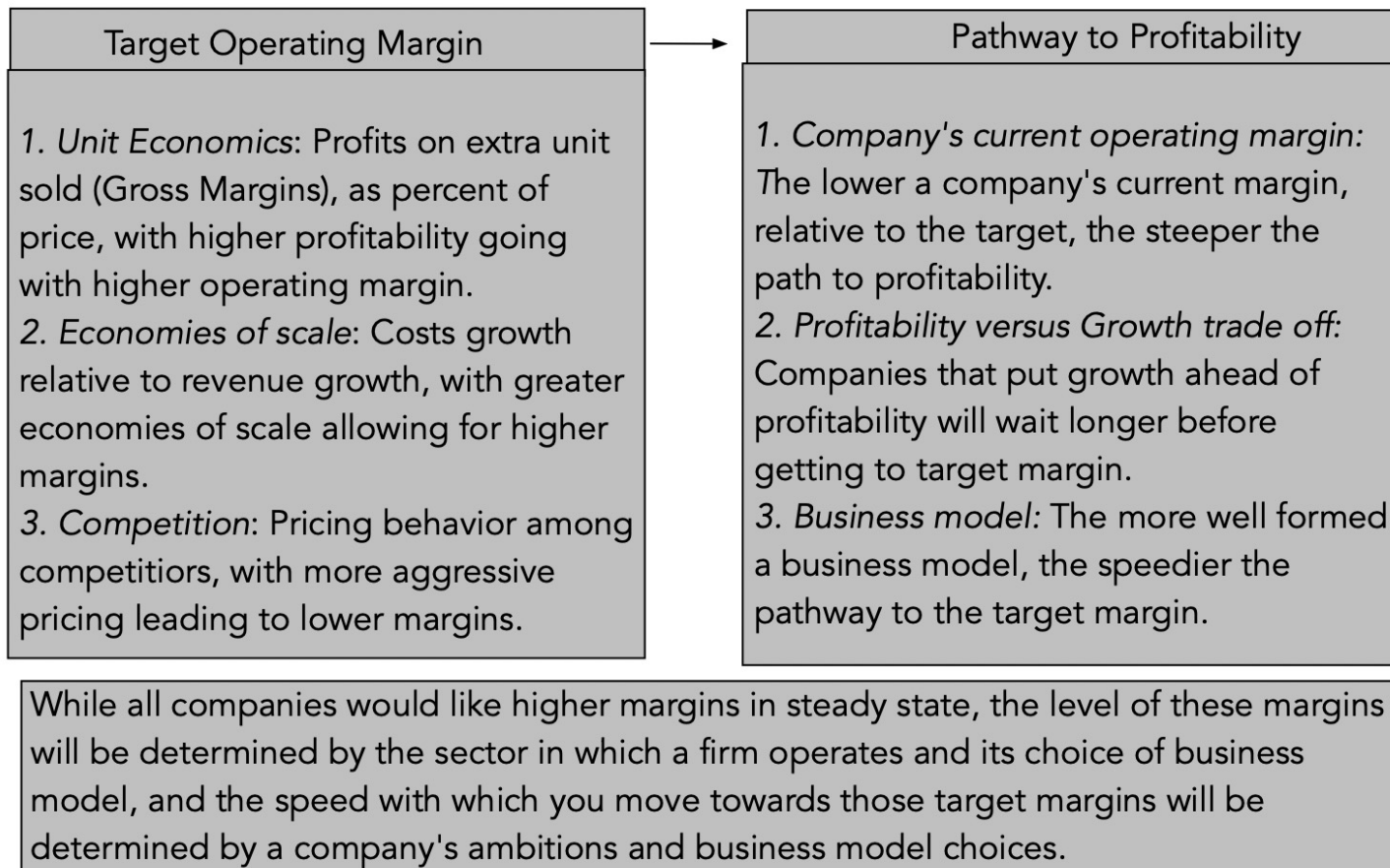
1. *Company's current market share*: If company's current market share is low, potential for growth in market share at expense of competition.
2. *Industry economics*: Nature of the business ( a few big winners or splintered competition).
3. *Strength of company's competitive advantages*: Stronger and more sustainable competitive advantages should allow for higher market share.

The potential for revenue growth is greater for companies with small revenues (and market share) in a big and growing market, especially if the company has strong competitive advantages in winner-take-all businesses.

## 2. Target Margins (and path there)...

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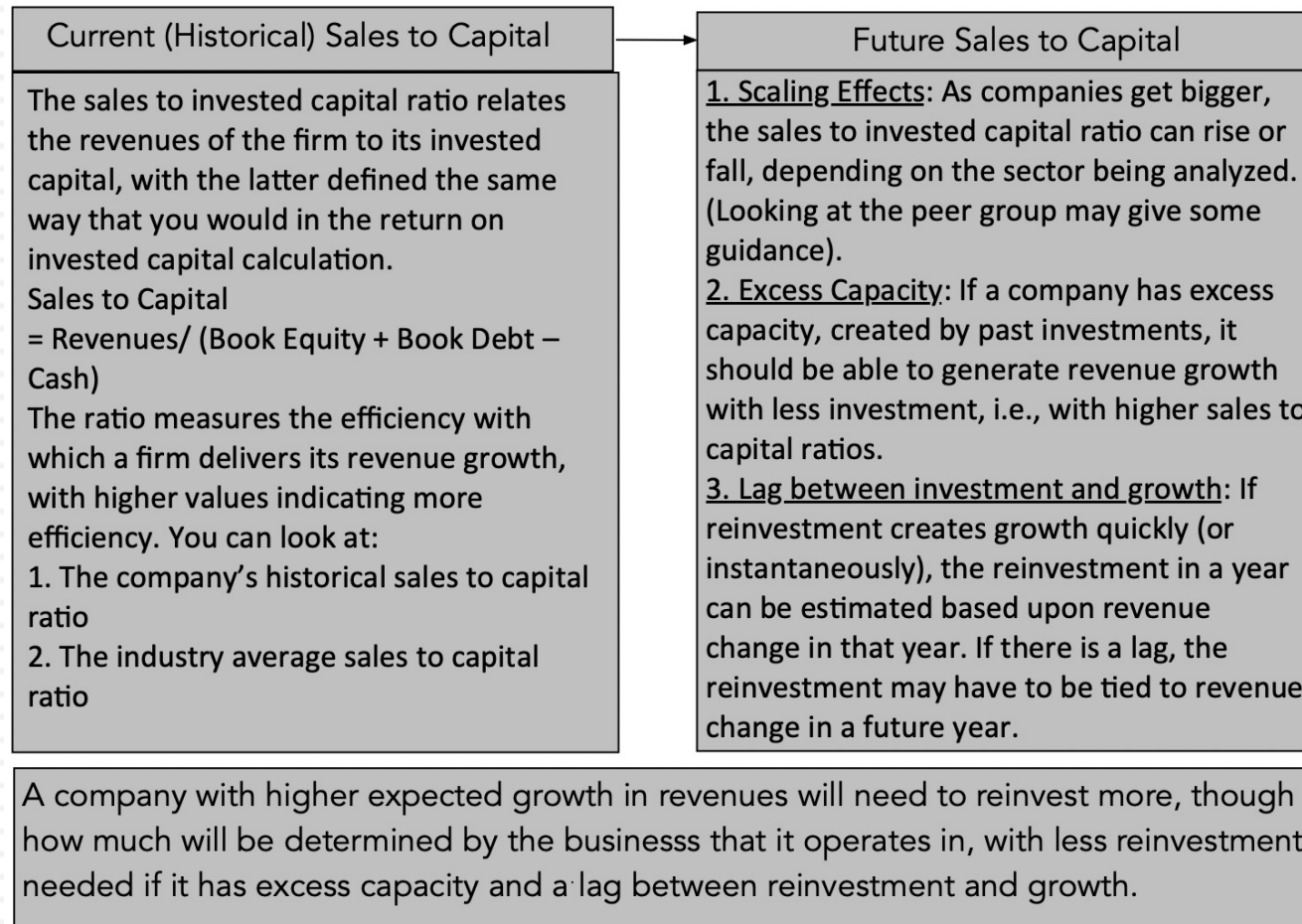
### Operating Margin: Target and Pathway



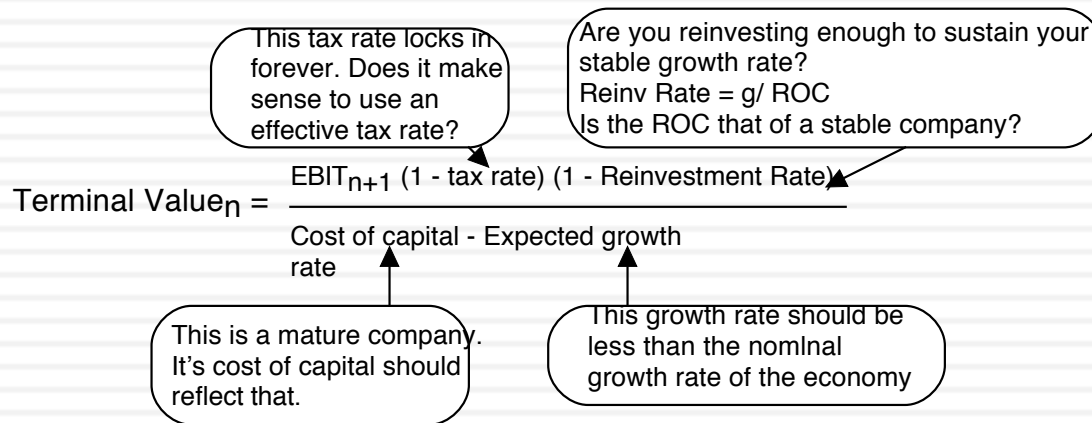
# 3. Sales to Invested Capital: A Pathway to estimating Reinvestment

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## Sales to Invested Capital: Reinvestment



# IX. All good things come to an end..And the terminal value is not an ATM...



**Myth 5.1:** The only way to estimate terminal value is to use the perpetual growth model.

**Myth 5.2:** The perpetual growth model can give you an infinite value.

**Myth 5.3:** The growth rate is your biggest driver of terminal value.

**Myth 5.4:** Your growth rate cannot be negative in a perpetual growth model.

**Myth 5.5:** If your terminal value is a high proportion of your DCF value, it is flawed.

$$\text{Value of an asset with life } > n \text{ years} = \frac{E(CF_1)}{(1+r)^1} + \frac{E(CF_2)}{(1+r)^2} + \dots + \frac{E(CF_n)}{(1+r)^n} + \frac{\text{Terminal Value}_n}{(1+r)^n}$$

**Truth 5.1:** The terminal value can be based on annuities or a liquidation value.

**Truth 5.2:** Not if growth forever is capped at the growth rate of the economy.

**Truth 5.3:** Growth is not free & increasing growth can add or destroy value.

**Truth 5.4:** Growth can be negative forever & is often more reflective of reality.

**Truth 5.5:** The terminal value should be a high percent of value today.



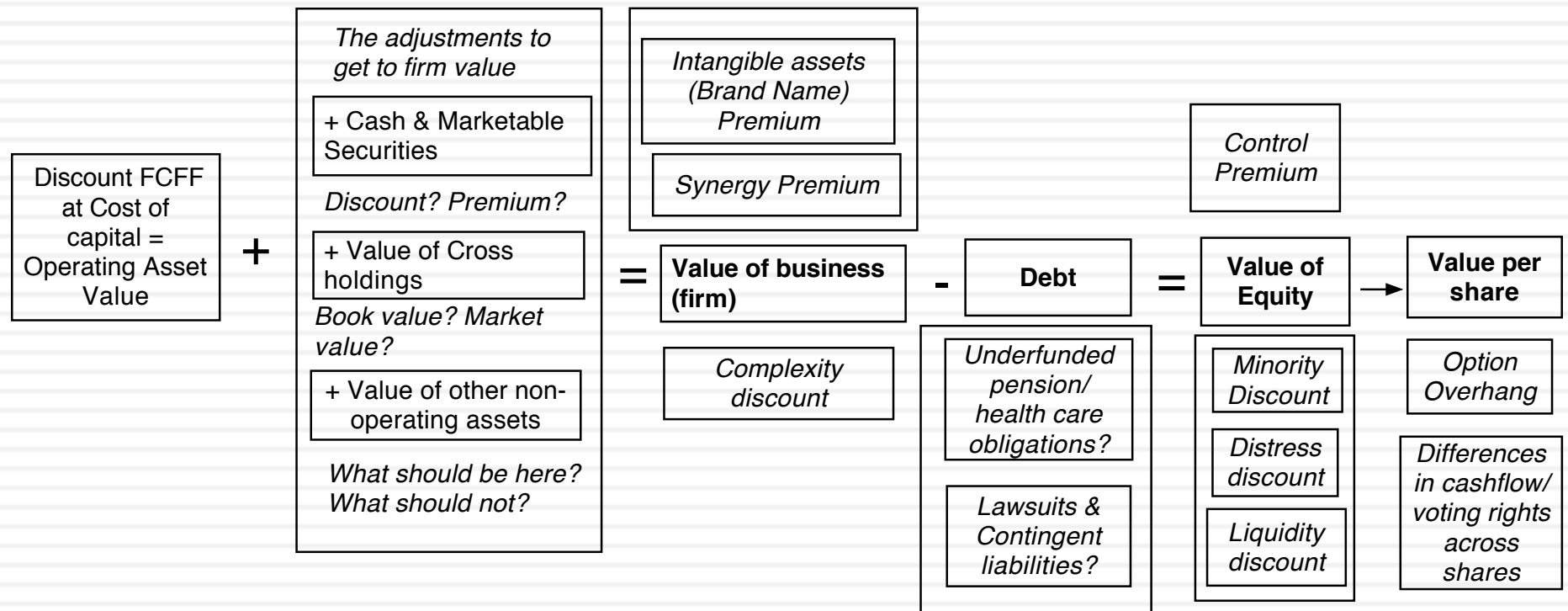
# Terminal Value and Growth

| <i>Stable Growth Rate</i> | <i>Amgen</i> | <i>Tata Motors</i> | <i>HCL</i> | <i>Heineken</i> |
|---------------------------|--------------|--------------------|------------|-----------------|
| 0%                        | \$150,652    | ₹ 435,686          | ₹ 42,975   | €59,438         |
| 1%                        | \$154,479    | ₹ 435,686          | ₹ 48,477   | €59,438         |
| 2%                        | \$160,194    | ₹ 435,686          | ₹ 55,636   | €59,438         |
| 3%                        | \$167,784    | ₹ 435,686          | ₹ 65,422   |                 |
| 4%                        | \$179,099    | ₹ 435,686          | ₹ 79,770   |                 |
| 5%                        |              | ₹ 435,686          |            |                 |
| Risk free Rate            | 4.78%        | 5.00%              | 3.94%      | -0.50%          |
| ROIC                      | 10.00%       | 10.39%             | 20.00%     | 5.00%           |
| Cost of capital           | 8.08%        | 10.39%             | 8.05%      | 5.00%           |

# Intrinsic Valuation: Loose Ends

A premium here, a discount there, and soon you are where you wanted to be in the first place..

# Getting from DCF to value per share: The Loose Ends



# 1. The Value of Cash

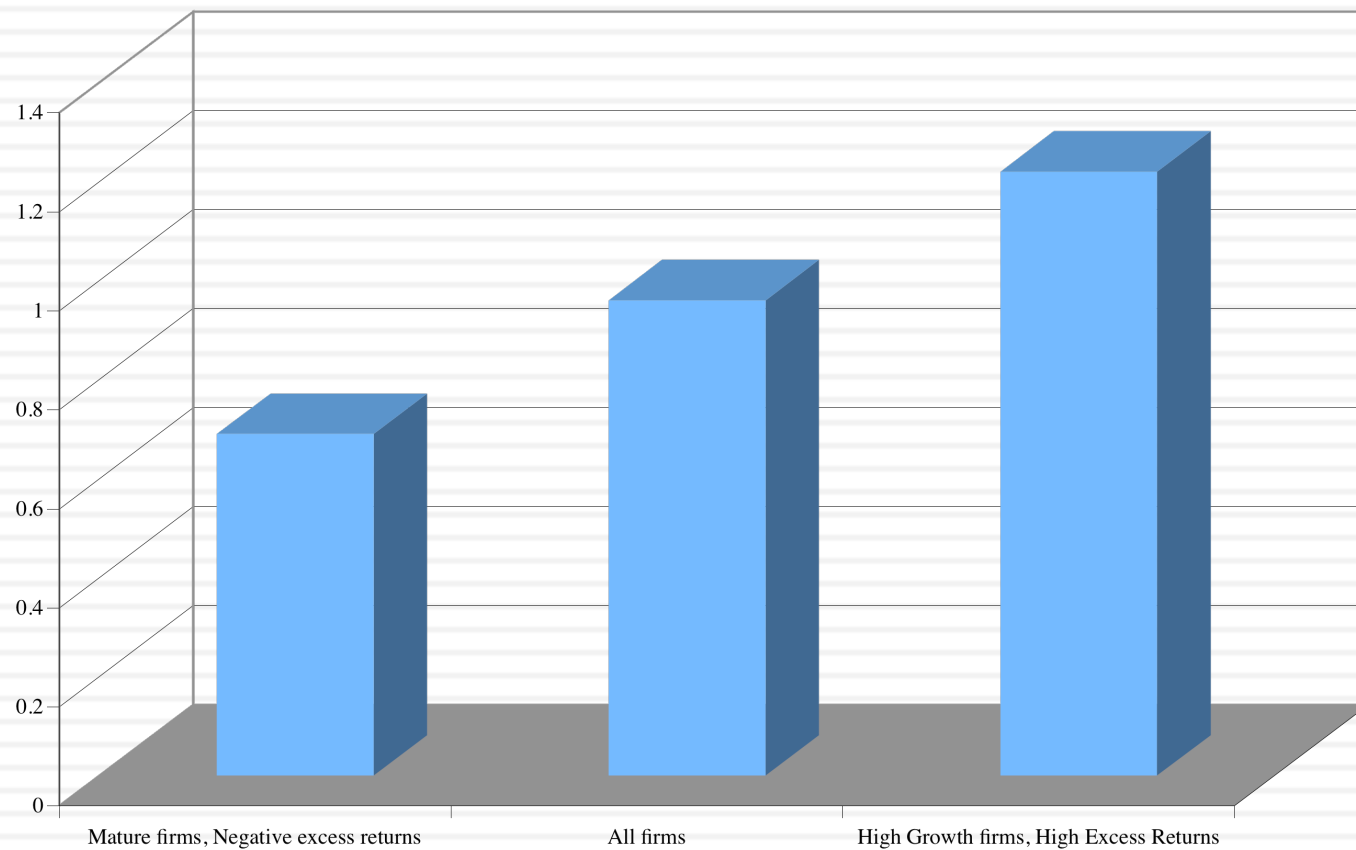
## An Exercise in Cash Valuation

|                   | <i>Company A</i> | <i>Company B</i> | <i>Company C</i> |
|-------------------|------------------|------------------|------------------|
| Enterprise Value  | \$ 1 billion     | \$ 1 billion     | \$ 1 billion     |
| Cash              | \$ 100 mil       | \$ 100 mil       | \$ 100 mil       |
| Return on Capital | 10%              | 5%               | 22%              |
| Cost of Capital   | 10%              | 10%              | 12%              |
| Trades in         | US               | US               | Argentina        |

- In which of these companies is cash most likely to trade at face value, at a discount and at a premium?

# Cash: Discount or Premium?

*Market Value of \$ 1 in cash:  
Estimates obtained by regressing Enterprise Value against Cash Balances*



## 2. Dealing with Holdings in Other firms

- Holdings in other firms can be categorized into
  - Minority passive holdings, in which case only the dividend from the holdings is shown in the balance sheet
  - Minority active holdings, in which case the share of equity income is shown in the income statements
  - Majority active holdings, in which case the financial statements are consolidated.
- We tend to be sloppy in practice in dealing with cross holdings. After valuing the operating assets of a firm, using consolidated statements, it is common to add on the balance sheet value of minority holdings (which are in book value terms) and subtract out the minority interests (again in book value terms), representing the portion of the consolidated company that does not belong to the parent company.

## How to value holdings in other firms.. In a perfect world..

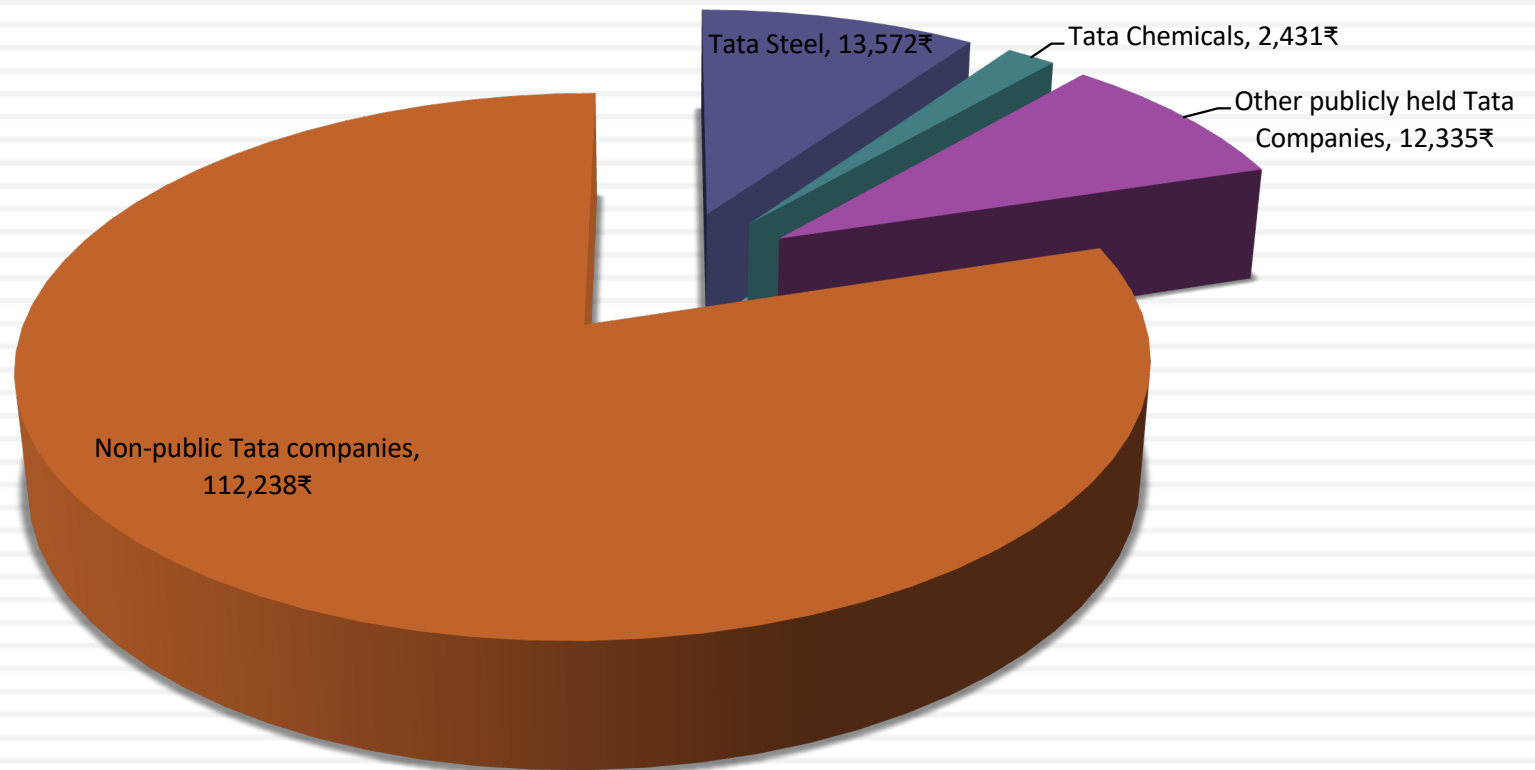
- In a perfect world, we would strip the parent company from its subsidiaries and value each one separately. The value of the combined firm will be
  - ▣ Value of parent company + Proportion of value of each subsidiary
- To do this right, you will need to be provided detailed information on each subsidiary to estimate cash flows and discount rates.

# Two compromise solutions...

- The market value solution: When the subsidiaries are publicly traded, you could use their traded market capitalizations to estimate the values of the cross holdings. You do risk carrying into your valuation any mistakes that the market may be making in valuation.
- The relative value solution: When there are too many cross holdings to value separately or when there is insufficient information provided on cross holdings, you can convert the book values of holdings that you have on the balance sheet (for both minority holdings and minority interests in majority holdings) by using the average price to book value ratio of the sector in which the subsidiaries operate.



# Tata Motor's Cross Holdings



### 3. Other Assets that have not been counted yet..

- Unutilized assets: If you have assets or property that are not being utilized (vacant land, for example), you have not valued it yet. You can assess a market value for these assets and add them on to the value of the firm.
- Overfunded pension plans: If you have a defined benefit plan and your assets exceed your expected liabilities, you could consider the over funding with two caveats:
  - Collective bargaining agreements may prevent you from laying claim to these excess assets.
  - There are tax consequences. Often, withdrawals from pension plans get taxed at much higher rates.
- **Do not double count an asset.** If you count the income from an asset in your cash flows, you cannot count the market value of the asset in your value.

# An Uncounted Asset?

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*Price tag: \$200 million*



The longtime home of Playboy magazine founder Hugh Hefner is to be sold to Daren Metropoulos, a principal at private-equity firm Metropoulos & Co. PHOTO: GETTY IMAGES

# The “real estate” play

- Assume that Accor Hotels, a hotel company, has real estate investments underlying its operations. Assume that you estimate a real estate value of \$1.5 billion for the real estate. Can you add this value on to your DCF value that you get for the hotel business?
  - a. Yes.
  - b. No.
  - c. Depends
- What would you do if the value of the land exceeds the present value that you have estimated for them as operating assets?
  - a. Nothing
  - b. Use the higher of the two values
  - c. Use the lower of the two values
  - d. Use a weighted average of the two values

## 4. A Discount for Complexity: An Experiment

|                  | Company A    | Company B           |
|------------------|--------------|---------------------|
| Operating Income | \$ 1 billion | \$ 1 billion        |
| Tax rate         | 40%          | 40%                 |
| ROIC             | 10%          | 10%                 |
| Expected Growth  | 5%           | 5%                  |
| Cost of capital  | 8%           | 8%                  |
| Business Mix     | Single       | Multiple Businesses |
| Holdings         | Simple       | Complex             |
| Accounting       | Transparent  | Opaque              |

□ Which firm would you value more highly?

# Measuring Complexity: Volume of Data in Financial Statements

| <i>Company</i>    | <i>Number of pages in last 10Q</i> | <i>Number of pages in last 10K</i> |
|-------------------|------------------------------------|------------------------------------|
| General Electric  | 65                                 | 410                                |
| Microsoft         | 63                                 | 218                                |
| Wal-mart          | 38                                 | 244                                |
| Exxon Mobil       | 86                                 | 332                                |
| Pfizer            | 171                                | 460                                |
| Citigroup         | 252                                | 1026                               |
| Intel             | 69                                 | 215                                |
| AIG               | 164                                | 720                                |
| Johnson & Johnson | 63                                 | 218                                |
| IBM               | 85                                 | 353                                |

# Measuring Complexity: A Complexity Score

| Item                 | Factors  | Follow-up Question                                      | Answer | Weighting factor | Gerdaul Score | GE Score |
|----------------------|--|---|--------|------------------|---------------|----------|
| Operating Income     | 1. Multiple Businesses   | Number of businesses (with more than 10% of revenues) = | 1      | 2.00             | 2             | 30       |
|                      | 2. One-time income and expenses  | Percent of operating income =                           | 10%    | 10.00            | 1             | 0.8      |
|                      | 3. Income from unspecified sources                                     | Percent of operating income =                           | 0%     | 10.00            | 0             | 1.2      |
|                      | 4. Items in income statement that are volatile                         | Percent of operating income =                           | 15%    | 5.00             | 0.75          | 1        |
| Tax Rate             | 1. Income from multiple locales  | Percent of revenues from non-domestic locales =         | 70%    | 3.00             | 2.1           | 1.8      |
|                      | 2. Different tax and reporting books                                   | Yes or No   | No     | Yes=3            | 0             | 3        |
|                      | 3. Headquarters in tax havens  | Yes or No   | No     | Yes=3            | 0             | 0        |
|                      | 4. Volatile effective tax rate   | Yes or No   | Yes    | Yes=2            | 2             | 0        |
| Capital Expenditures | 1. Volatile capital expenditures                                       | Yes or No   | Yes    | Yes=2            | 2             | 2        |
|                      | 2. Frequent and large acquisitions                                     | Yes or No   | Yes    | Yes=4            | 4             | 4        |
|                      | 3. Stock payment for acquisitions and investments                      | Yes or No   | No     | Yes=4            | 0             | 4        |
| Working capital      | 1. Unspecified current assets and current liabilities                  | Yes or No   | No     | Yes=3            | 0             | 0        |
|                      | 2. Volatile working capital items                                      | Yes or No   | Yes    | Yes=2            | 2             | 2        |
| Expected Growth rate | 1. Off-balance sheet assets and liabilities (operating leases and R&D) | Yes or No   | No     | Yes=3            | 0             | 3        |
|                      | 2. Substantial stock buybacks  | Yes or No   | No     | Yes=3            | 0             | 3        |
|                      | 3. Changing return on capital over time                                | Is your return on capital volatile?                     | Yes    | Yes=5            | 5             | 5        |
|                      | 4. Unsustainably high return   | Is your firm's ROC much higher than industry average?   | No     | Yes=5            | 0             | 0        |
| Cost of capital      | 1. Multiple businesses   | Number of businesses (more than 10% of revenues) =      | 1      | 1.00             | 1             | 20       |
|                      | 2. Operations in emerging markets                                      | Percent of revenues=                                    | 50%    | 5.00             | 2.5           | 2.5      |
|                      | 3. Is the debt market traded?  | Yes or No   | No     | No=2             | 2             | 0        |
|                      | 4. Does the company have a rating?                                     | Yes or No   | Yes    | No=2             | 0             | 0        |
|                      | 5. Does the company have off-balance sheet debt?                       | Yes or No   | No     | Yes=5            | 0             | 5        |
| No-operating assets  | Minority holdings as percent of book assets                            | Minority holdings as percent of book assets             | 0%     | 20.00            | 0             | 0.8      |
| Firm to Equity value | Consolidation of subsidiaries  | Minority interest as percent of book value of equity    | 63%    | 20.00            | 12.6          | 1.2      |
| Per share value      | Shares with different voting rights                                    | Does the firm have shares with different voting rights? | Yes    | Yes = 10         | 10            | 0        |
|                      | Equity options outstanding   | Options outstanding as percent of shares                | 0%     | 10.00            | 0             | 0.271    |
| Complexity Score =   |  |   |        |                  | 48.95         | 90.55    |

# Dealing with Complexity

## □ In Discounted Cashflow Valuation

- The Aggressive Analyst: Trust the firm to tell the truth and value the firm based upon the firm's statements about their value.
- The Conservative Analyst: Don't value what you cannot see.
- The Compromise: Adjust the value for complexity
  - Adjust cash flows for complexity
  - Adjust the discount rate for complexity
  - Adjust the expected growth rate/ length of growth period
  - Value the firm and then discount value for complexity

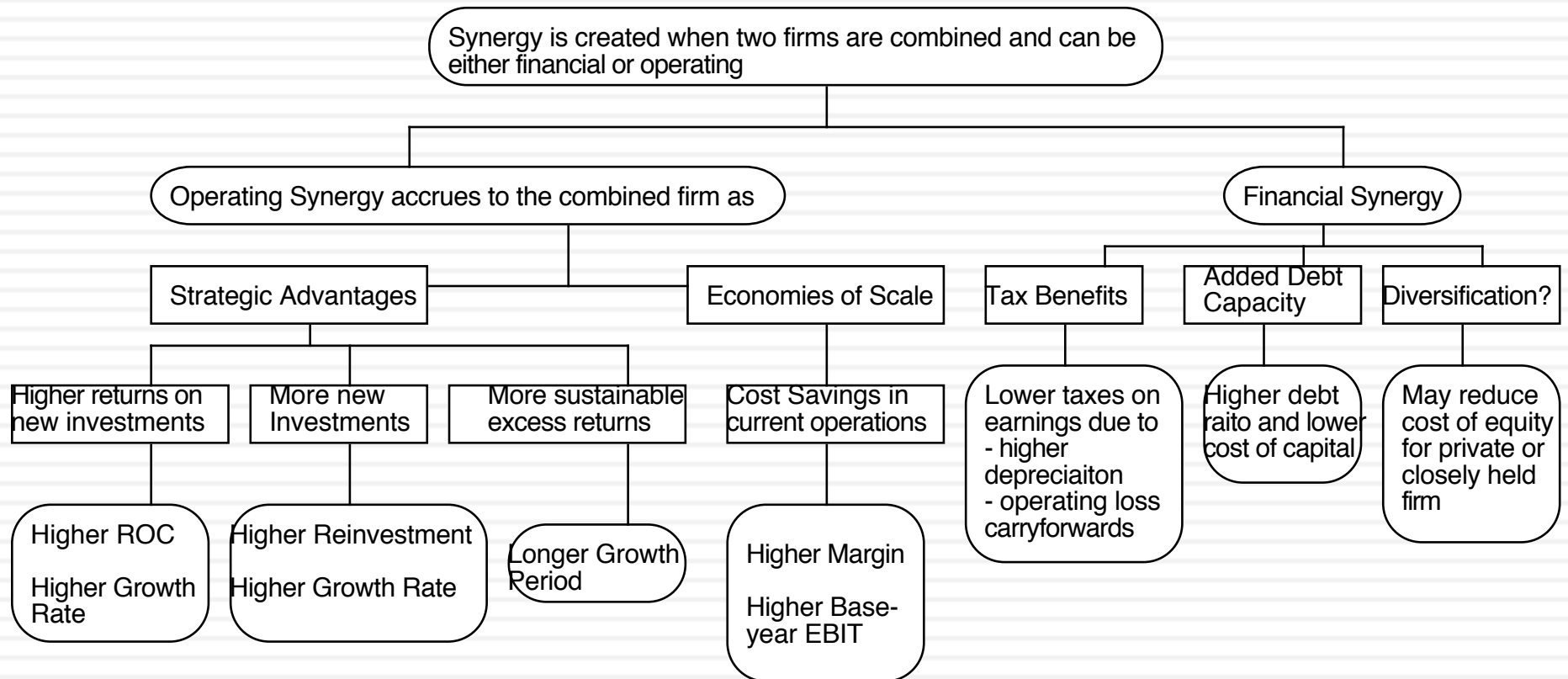
## □ In relative valuation

- In a relative valuation, you may be able to assess the price that the market is charging for complexity:
- With the hundred largest market cap firms, for instance:

$$\text{PBV} = 0.65 + 15.31 \text{ ROE} - 0.55 \text{ Beta} + 3.04 \text{ Expected growth rate} - 0.003 \# \text{ Pages in 10K}$$



# 5. The Value of Synergy



# Valuing Synergy

- (1) the firms involved in the merger are valued independently, by discounting expected cash flows to each firm at the weighted average cost of capital for that firm.
- (2) the value of the combined firm, with no synergy, is obtained by adding the values obtained for each firm in the first step.
- (3) The effects of synergy are built into expected growth rates and cashflows, and the combined firm is re-valued with synergy.

Value of Synergy = Value of the combined firm, with synergy - Value of the combined firm, without synergy

# Inbev + SAB Miller: Where's the synergy?

|                             | <i>Inbev</i> | <i>SABMiller</i> | <i>Combined firm (status quo)</i> | <i>Combined firm (synergy)</i> |
|-----------------------------|--------------|------------------|-----------------------------------|--------------------------------|
| Levered Beta                | 0.85         | 0.8289           | 0.84641                           | 0.84641                        |
| Pre-tax cost of debt        | 3.0000%      | 3.2000%          | 3.00%                             | 3.00%                          |
| Effective tax rate          | 18.00%       | 26.36%           | 19.92%                            | 19.92%                         |
| Debt to Equity Ratio        | 30.51%       | 23.18%           | 29.71%                            | 29.71%                         |
|                             |              |                  |                                   |                                |
| Revenues                    | \$45,762.00  | \$22,130.00      | \$67,892.00                       | \$67,892.00                    |
|                             |              |                  |                                   |                                |
| Operating Margin            | 32.28%       | 19.97%           | 28.27%                            | 30.00%                         |
| Operating Income (EBIT)     | \$14,771.97  | \$4,419.36       | \$19,191.33                       | \$20.368                       |
|                             |              |                  |                                   |                                |
| After-tax return on capital | 12.10%       | 12.64%           | 11.68%                            | 12.00%                         |
| Reinvestment Rate =         | 50.99%       | 33.29%           | 43.58%                            | 50.00%                         |
| Expected Growth Rate        | 6.17%        | 4.21%            | 5.09%                             | 6.00%                          |

# The value of synergy

|                               | <i>Inbev</i> | <i>SABMiller</i> | <i>Combined firm<br/>(status quo)</i> | <i>Combined firm<br/>(synergy)</i> |
|-------------------------------|--------------|------------------|---------------------------------------|------------------------------------|
| Cost of Equity =              | 8.93%        | 9.37%            | 9.12%                                 | 9.12%                              |
| After-tax cost of debt =      | 2.10%        | 2.24%            | 2.10%                                 | 2.10%                              |
| Cost of capital =             | 7.33%        | 8.03%            | 7.51%                                 | 7.51%                              |
|                               |              |                  |                                       |                                    |
| After-tax return on capital = | 12.10%       | 12.64%           | 11.68%                                | 12.00%                             |
| Reinvestment Rate =           | 50.99%       | 33.29%           | 43.58%                                | <b>50.00%</b>                      |
| Expected growth rate=         | 6.17%        | 4.21%            | 5.09%                                 | 6.00%                              |
|                               |              |                  |                                       |                                    |
| <i>Value of firm</i>          |              |                  |                                       |                                    |
| PV of FCFF in high growth =   | \$28,733     | \$9,806          | \$38,539                              | \$39,151                           |
| Terminal value =              | \$260,982    | \$58,736         | \$319,717                             | \$340,175                          |
| Value of operating assets =   | \$211,953    | \$50,065         | \$262,018                             | \$276,610                          |

*Value of synergy = 276,610 – 262,018 = 14,592 million*

## 6. Brand name, great management, superb product ...Are we short changing intangibles?

- There is often a temptation to add on premiums for intangibles. Here are a few examples.
  - ▣ Brand name
  - ▣ Great management
  - ▣ Loyal workforce
  - ▣ Technological prowess
- There are two potential dangers:
  - ▣ For some assets, the value may already be in your value and adding a premium will be double counting.
  - ▣ For other assets, the value may be ignored but incorporating it will not be easy.

# A Single Intangible: Valuing Brand Name at Coca Cola

|                                 | <b>Coca Cola</b> | <b>With Cott Margins</b> |
|---------------------------------|------------------|--------------------------|
| Current Revenues =              | \$21,962.00      | \$21,962.00              |
| Length of high-growth period    | 10               | 10                       |
| Reinvestment Rate =             | 50%              | 50%                      |
| Operating Margin (after-tax)    | 15.57%           | 5.28%                    |
| Sales/Capital (Turnover ratio)  | 1.34             | 1.34                     |
| Return on capital (after-tax)   | 20.84%           | 7.06%                    |
| Growth rate during period (g) = | 10.42%           | 3.53%                    |
| Cost of Capital during period = | 7.65%            | 7.65%                    |
| Stable Growth Period            |                  |                          |
| Growth rate in steady state =   | 4.00%            | 4.00%                    |
| Return on capital =             | 7.65%            | 7.65%                    |
| Reinvestment Rate =             | 52.28%           | 52.28%                   |
| Cost of Capital =               | 7.65%            | 7.65%                    |
| Value of Firm =                 | \$79,611.25      | \$15,371.24              |

# 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.

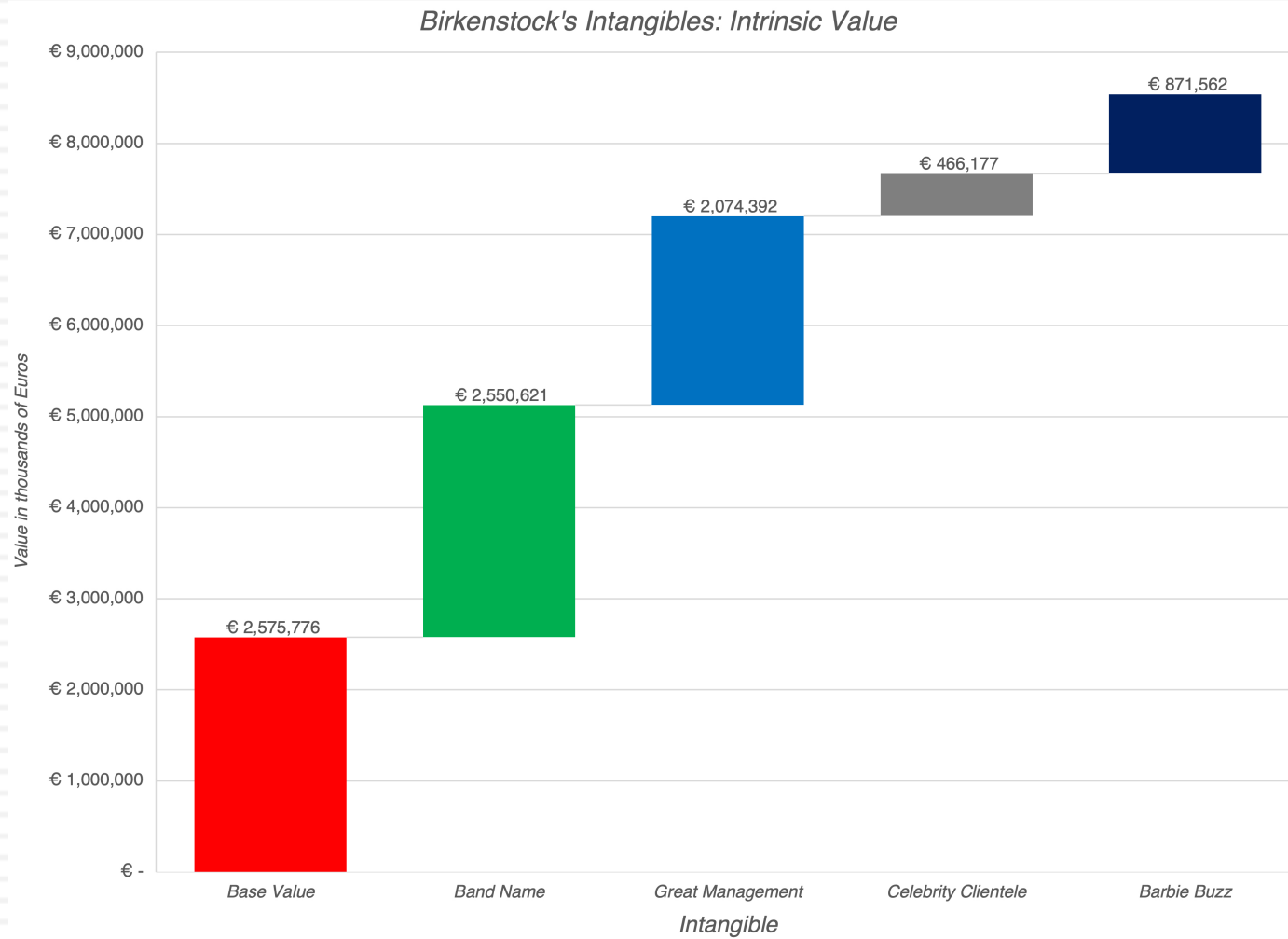
| Birkenstock IPO Valuation       |             |             |  |             |             |  |             |             |  |             |             | Sep-23                |               |             |
|---------------------------------|-------------|-------------|--|-------------|-------------|--|-------------|-------------|--|-------------|-------------|-----------------------|---------------|-------------|
| <b>Base Year and Comparison</b> |             |             | <b>Growth Story</b>  |             |             | <b>Profitability Story</b>   |             |             | <b>Growth Efficiency Story</b>   |             |             | <b>Terminal Value</b> |               |             |
|                                 | Company     | Big Apparel | Growth of 25% in year 1, followed by 15% in years 2-5  |             |             | Operating margin of 23% in year 1, rising to 25% over the following four years.        |             |             | Set to third quartile (2.62) of big brand apparel & footwear firms.                                      |             |             | Growth Rate           | 2.74%         |             |
| CAGR in Revenues (2013-22)      | 18.20%      | 8.66%       | <b>Barbie Buzz</b> in year 1. <b>Strong management</b> finds growth in new markets/products, without sacrificing brand name. |             |             | <b>Brand name</b> allows for preservation & slight growth in strong profit margins.    |             |             | <b>Free celebrity advertising</b> and more sponsorship deals will allow for more efficient reinvestment. |             |             | Cost of capital       | 7.74%         |             |
| Revenue (LTM)                   | € 1,439,976 |             |  |             |             |  |             |             |  |             |             | Return on capital     | 12.00%        |             |
| Operating Margin (LTM)          | 22.31%      | 14.74%      |  |             |             |  |             |             |  |             |             | Reinvestment Rate     | 22.83%        |             |
| Operating Income                | € 321,230   |             |  |             |             |  |             |             |  |             |             |                       |               |             |
| EBIT (1-t)                      | € 224,861   |             |  |             |             |  |             |             |  |             |             |                       |               |             |
|                                 |             |             |  |             |             |  |             |             |  |             |             |                       |               |             |
| PV(Terminal value)              | € 6,087,285 |             | 1  | 2           | 3           | 4  | 5           | 6           | 7  | 8           | 9           | 10                    | Terminal year |             |
| PV (CF over next 10 years)      | € 2,862,595 |             | Revenue Growth   | 25.00%      | 15.00%      | 15.00%   | 15.00%      | 15.00%      | 12.55%   | 10.10%      | 7.64%       | 5.19%                 | 2.74%         | 2.74%       |
| Probability of failure =        | 0.00%       |             | 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 |
| Value of operating assets =     | € 8,949,880 |             | Operating Margin   | 23.00%      | 23.80%      | 24.20%   | 24.60%      | 25.00%      | 25.00%   | 25.00%      | 25.00%      | 25.00%                | 25.00%        | 25.00%      |
| - Debt                          | € 1,874,002 |             | 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 |
| - Minority interests            | € -         |             | 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   |
| + Cash                          | € 307,078   |             | Reinvestment   | € 103,052   | € 118,509   | € 136,286  | € 156,729   | € 150,775   | € 136,535  | € 113,811   | € 83,213    | € 46,194              | € 47,460      | € 186,305   |
| + Non-operating assets          | € -         |             | FCFF   | € 186,743   | € 226,347   | € 266,964  | € 314,674   | € 400,153   | € 483,524  | € 568,848   | € 651,629   | € 726,801             | € 746,715     | € 629,630   |
| Value of equity                 | € 8,382,956 |             |  |             |             |  |             |             |  |             |             |                       | € 12,592,600  |             |
| - Value of options              | € -         |             |  |             |             |  |             |             |  |             |             |                       |               |             |
| Value of equity (common stock)  | € 8,382,956 |             | Cost of Capital  | 7.45%       | 7.45%       | 7.45%  | 7.45%       | 7.45%       | 7.51%  | 7.57%       | 7.63%       | 7.68%                 | 7.74%         |             |
| Number of shares                | 202,853.00  |             | Cumulated WACC   | 0.9306      | 0.8661      | 0.8060   | 0.7501      | 0.6980      | 0.6493   | 0.6036      | 0.5608      | 0.5208                | 0.4834        |             |
| Estimated value /share          | € 41.33     |             |  |             |             |  |             |             |  |             |             |                       |               |             |
|                                 |             |             | Sales to Capital   | 2.62        | 2.62        | 2.62   | 2.62        | 2.62        | 2.62   | 2.62        | 2.62        | 2.62                  | 2.62          |             |
| Price per share                 | € 46.50     |             | ROIC   | 7.38%       | 8.56%       | 9.73%  | 11.01%      | 12.41%      | 13.51%   | 14.44%      | 15.18%      | 15.70%                | 15.98%        | 12.00%      |
| % Under or Over Valued          | 12.52%      |             |  |             |             |  |             |             |  |             |             |                       |               |             |
|                                 |             |             | <b>Risk Story</b>  |             |             | <b>Competitive Advantages</b>  |             |             |  |             |             |                       |               |             |
|                                 |             |             | Cost of capital reflecting business mix, geography & debt policy.  |             |             | Competitive advantages will persist.   |             |             |  |             |             |                       |               |             |
|                                 |             |             | <b>Centering production in Germany</b> reduces supply chain & country risk.  |             |             | <b>Intangibles</b> collectively sustain a return on capital above the cost of capital. |             |             |  |             |             |                       |               |             |



# Where are the intangibles?

| <i>Intangible</i>     | <i>Input with intangible</i>  | <i>Input without Intangible</i>  | <i>Value Without</i> | <i>Value Effect</i> |
|-----------------------|---|--|----------------------|---------------------|
| Barbie Buzz Effect    | Higher revenue growth in the next year (25%)  | Revenue growth in year 1 reverts to CAGR of 15% in years 2-5.                      | € 7,666,966          | € 871,562           |
| Celebrity Clientele   | Growth delivered more efficiently, with sales to capital of 2.62 (third quartile of big brand apparel/footwear) | Growth delivered as efficiently as typical brand name company (1.59)               | € 7,200,789          | € 466,177           |
| Good/Great Management | Expected CAGR of 15% in revenues, tripling revenues over next decade.   | Expected CAGR of 8.66%, matching growth at big, brand name apparel/footwear firms. | € 5,126,397          | € 2,074,392         |
| Brand Name            | Operating margin of 23% next year, rising to 25% in year 5.   | Operating margin set to 14.74%, average for entire apparel/footwear sector.        | € 2,575,776          | € 2,550,621         |

# Birkenstock: Intangibles in Value



# Valuing a Franchise: Star Wars

## Star Wars Franchise Valuation: December 2015

|                    | Add-on \$ per Box Office \$ |
|--------------------|-----------------------------|
| Streaming/Video    | \$1.20                      |
| Toys & Merchandise | \$2.00                      |
| Books/eBooks       | \$0.20                      |
| Gaming             | \$0.50                      |
| Other              | \$0.50                      |

*Main Movies*  
World Box office of \$1.5 billion,  
adjusted for 2% inflation.

*Spin Off Movies*  
World Box office is 50% of  
main movies.

| Add on \$<br>per box<br>office \$  | Main Star Wars Movies                   |                 |                 | Star Wars Spin offs |                |                |        |
|--|---|-----------------|-----------------|---------------------|----------------|----------------|--------|
|  | Star Wars VII                           | Star Wars VIII  | Star Wars IX    | Rogue One           | Hans Solo?     | Boba Fett?     |        |
| Years from now   | 0.0                                     | 2.0             | 4.0             | 1.0                 | 3.0            | 5.0            |        |
| Movies - Revenues  | \$2,000                                 | \$2,081         | \$2,165         | \$1,020             | \$1,061        | \$1,104        |        |
| Streaming/Video - Revenues   | \$2,400                                 | \$2,497         | \$2,598         | \$1,224             | \$1,273        | \$1,325        |        |
| Toys & Merchandise - Revenues  | \$4,000                                 | \$4,162         | \$4,330         | \$2,040             | \$2,122        | \$2,208        |        |
| Books/eBooks - Revenues  | \$400                                   | \$416           | \$433           | \$204               | \$212          | \$221          |        |
| Gaming - Revenues  | \$1,000                                 | \$1,040         | \$1,082         | \$510               | \$531          | \$552          |        |
| Other - Revenues   | \$1,000                                 | \$1,040         | \$1,082         | \$510               | \$531          | \$552          |        |
| <b>Total - Revenues</b>  | <b>\$10,800</b>                         | <b>\$11,236</b> | <b>\$11,690</b> | <b>\$5,508</b>      | <b>\$5,731</b> | <b>\$5,962</b> |        |
| Operating Margin<br>20.14% for movies<br>15% for non-movies<br>30% tax rate    | After-tax Operating Income (movies)     | \$ 282          | \$ 293          | \$ 305              | \$ 144         | \$ 150         | \$ 156 |
|  | After-tax Operating Income (non-movies) | \$ 924          | \$ 961          | \$ 1,000            | \$ 471         | \$ 490         | \$ 510 |
|  | Present Value                           | \$ 1,206        | \$ 1,083        | \$ 973              | \$ 572         | \$ 514         | \$ 461 |
| Discounted back<br>@ 7.61% cost of<br>capital of<br>entertainment<br>companies | Value of new Star Wars movies =         | \$4,809         |                 |                     |                |                |        |
|  | Value of continuing income =            | \$5,163         |                 |                     |                |                |        |
|  | Value of Star Wars =                    | \$9,972         |                 |                     |                |                |        |

Assumes that revenues from add ons  
continue after 2020, growing at 2% a year,  
with 15% operating margin

## 7. 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

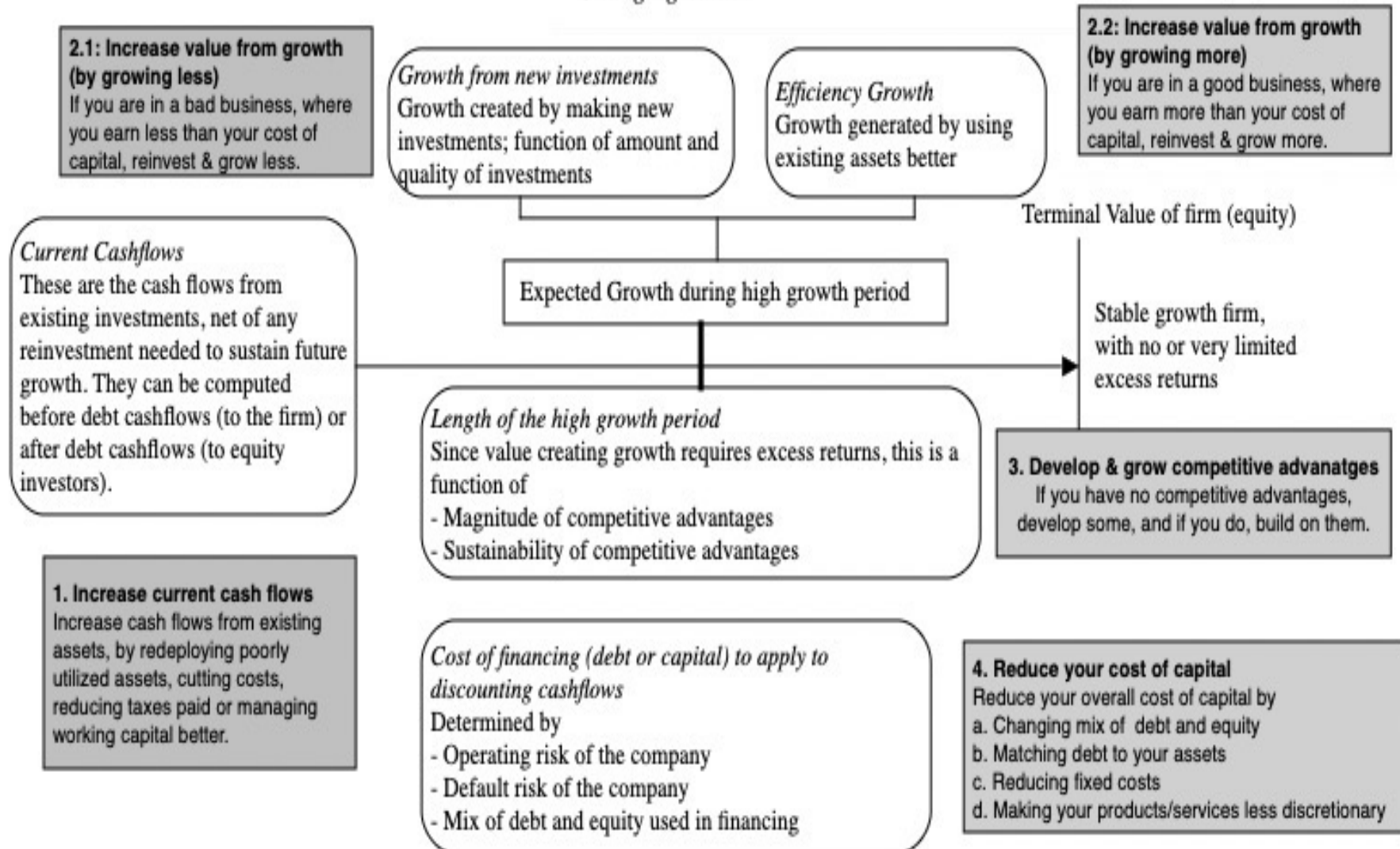
## But should consider other potential liabilities when getting to equity value...

- 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

## 8. The Value of Control

- The value of the control premium that will be paid to acquire a block of equity will depend upon two factors -
  - Probability that control of firm will change: This refers to the probability that incumbent management will be replaced. this can be either through acquisition or through existing stockholders exercising their muscle.
  - Value of Gaining Control of the Company: The value of gaining control of a company arises from two sources - the increase in value that can be wrought by changes in the way the company is managed and run, and the side benefits and perquisites of being in control
  - Value of Gaining Control = Present Value (Value of Company with change in control - Value of company without change in control) + Side Benefits of Control

## Changing Value



# Adris Grupa (Status Quo): 4/2010

**Current Cashflow to Firm**  
 EBIT(1-t) : 436 HRK  
 - Nt CpX 3 HRK  
 - Chg WC -118 HRK  
 = FCFF 551 HRK  
 Reinv Rate =  $(3-118)/436 = -26.35\%$ ;  
 Tax rate = 17.35%  
 Return on capital = 8.72%

Average from 2004-09  
 70.83%

Reinvestment Rate  
 70.83%

**Expected Growth from new inv.**  
 $.7083 \times .0969 = 0.0686$   
 or 6.86%

Average from 2004-09  
 9.69%

Return on Capital  
 9.69%

**Stable Growth**  
 $g = 4\%$ ; Beta = 0.80  
 Country Premium = 2%  
 Cost of capital = 9.92%  
 Tax rate = 20.00%  
 ROC = 9.92%;  
 Reinvestment Rate =  $g/ROC = 4/9.92 = 40.32\%$

Terminal Value<sub>5</sub> =  $365 / (.0992 - .04) = 6170$  HRK

Op. Assets 4312  
 + Cash: 1787  
 - Debt 141  
 - Minority int 465  
 = Equity 5,484  
 / (Common + Preferred shares)  
 Value non-voting share 335 HRK/share

| Year           | 1       | 2       | 3       | 4       | 5       |                   |
|----------------|---------|---------|---------|---------|---------|-------------------|
| EBIT (1-t)     | HRK 466 | HRK 498 | HRK 532 | HRK 569 | HRK 608 | 612<br>246<br>365 |
| - Reinvestment | HRK 330 | HRK 353 | HRK 377 | HRK 403 | HRK 431 |                   |
| FCFF           | HRK 136 | HRK 145 | HRK 155 | HRK 166 | HRK 177 |                   |

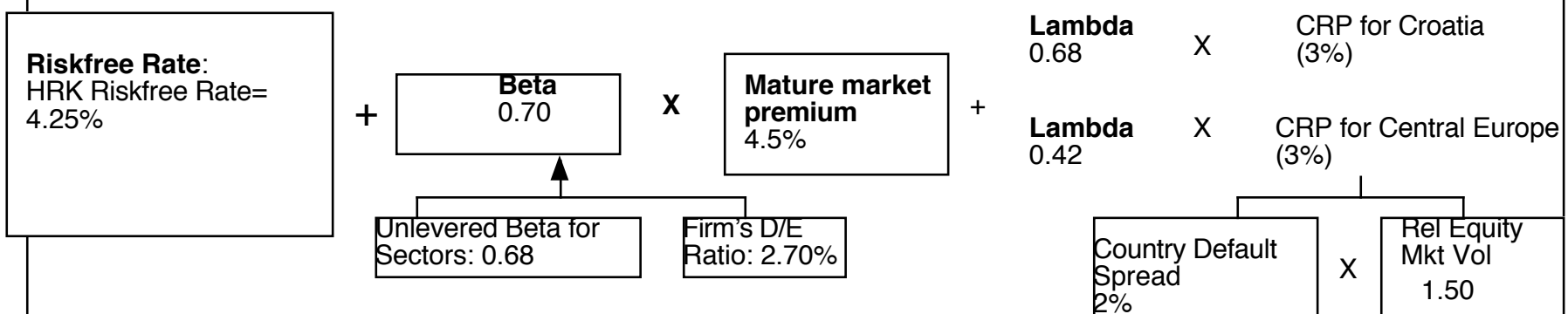
Discount at \$ Cost of Capital (WACC) = 10.7% (.974) + 5.40% (0.026) = 10.55%

**Cost of Equity**  
 10.70%

**Cost of Debt**  
 $(4.25\% + 0.5\% + 2\%)(1 - .20) = 5.40\%$

**Weights**  
 E = 97.4% D = 2.6%

On May 1, 2010  
 AG Pfd price = 279 HRK  
 AG Common = 345 HRK





### Adris Grupa: 4/2010 (Restructured)

Current Cashflow to Firm  
 EBIT(1-t) : 436 HRK  
 - Nt CpX 3 HRK  
 - Chg WC -118 HRK  
 = FCFF 551 HRK  
 Reinv Rate= (3-118)/436=-26.35%;  
 Tax rate = 17.35%  
 Return on capital = 8.72%

Increased ROIC to cost of capital

Reinvestment Rate  
70.83%

Expected Growth from new inv.  
 $.7083 \times .01054 = 0.0747$   
 or 7.47%

Return on Capital  
10.54%

Stable Growth  
 g = 4%; Beta = 0.80  
 Country Premium= 2%  
 Cost of capital = 9.65%  
 Tax rate = 20.00%  
 ROC=9.65%;  
 Reinvestment Rate=g/ROC  
 =4/9.65%= 41.47%

Op. Assets 4545  
 + Cash: 1787  
 - Debt 141  
 - Minority int 465  
 =Equity 5,735  
 Value/non-voting 334  
 Value/voting 362

HKR Cashflows

| Year           | 1       | 2       | 3       | 4       | 5       |                   |
|----------------|---------|---------|---------|---------|---------|-------------------|
| EBIT (1-t)     | HRK 469 | HRK 503 | HRK 541 | HRK 581 | HRK 623 |                   |
| - Reinvestment | HRK 332 | HRK 356 | HRK 383 | HRK 411 | HRK 442 |                   |
| FCFF           | HRK 137 | HRK 147 | HRK 158 | HRK 169 | HRK 182 |                   |
|                |         |         |         |         |         | 628<br>246<br>367 |

Terminal Value<sub>5</sub> =  $367 / (.0965 - .04) = 6508$  HRK

Discount at \$ Cost of Capital (WACC) =  $11.12\% (.90) + 8.20\% (0.10) = 10.54\%$

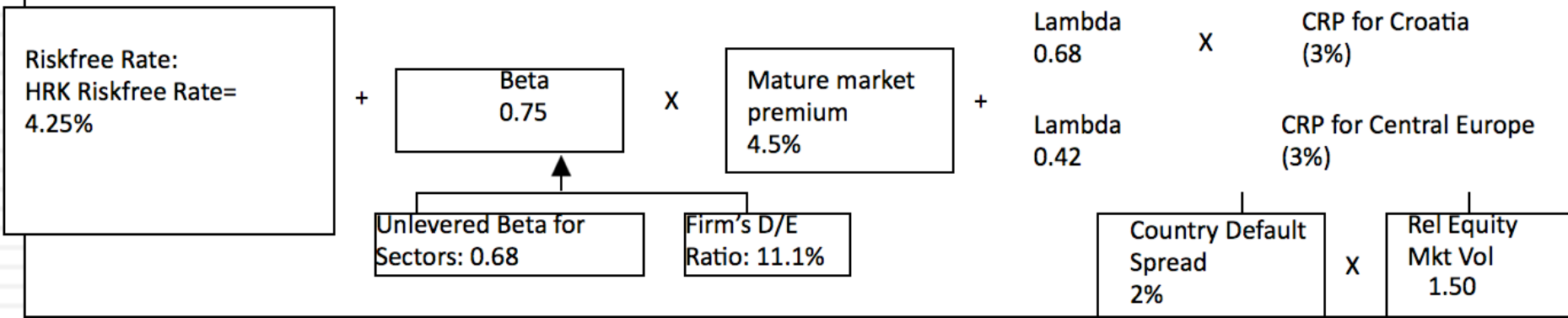
Changed mix of debt and equity to optimal

Cost of Equity  
11.12%

Cost of Debt  
 $(4.25\% + 4\% + 2\%) (1 - .20) = 8.20\%$

Weights  
 E = 90 % D = 10 %

On May 1, 2010  
 AG Pfd price = 279 HRK  
 AG Common = 345 HRK



# Value of Control and the Value of Voting Rights

- Adris Grupa has two classes of shares outstanding: 9.616 million voting shares and 6.748 million non-voting shares.
- To value a non-voting share, we assume that all non-voting shares essentially have to settle for status quo value. All shareholders, common and preferred, get an equal share of the status quo value.

Status Quo Value of Equity = 5,484 million HKR

Value for a non-voting share =  $5484 / (9.616 + 6.748) = 334$  HKR/share

- To value a voting share, we first value control in Adris Grup as the difference between the optimal and the status quo value:

Value of control at Adris Grupa =  $5,735 - 5484 = 249$  million HKR

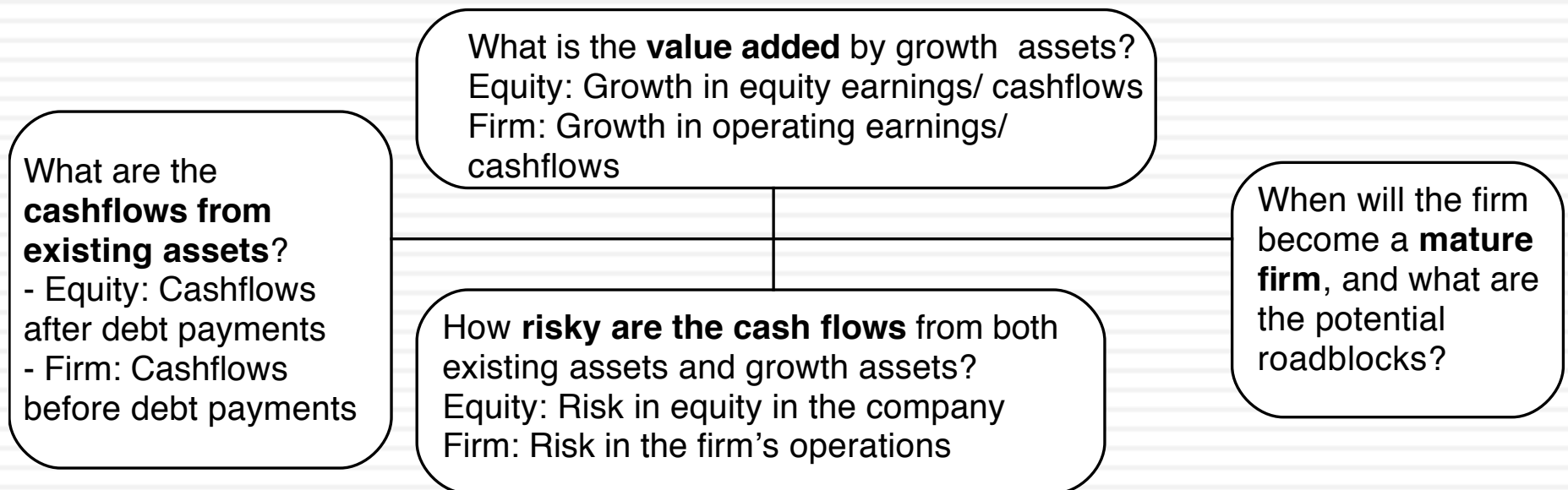
Value per voting share =  $334$  HKR +  $249 / 9.616 = 362$  HKR



# Intrinsic Valuation: The Dark Side

Valuing difficult-to-value companies!

# 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)

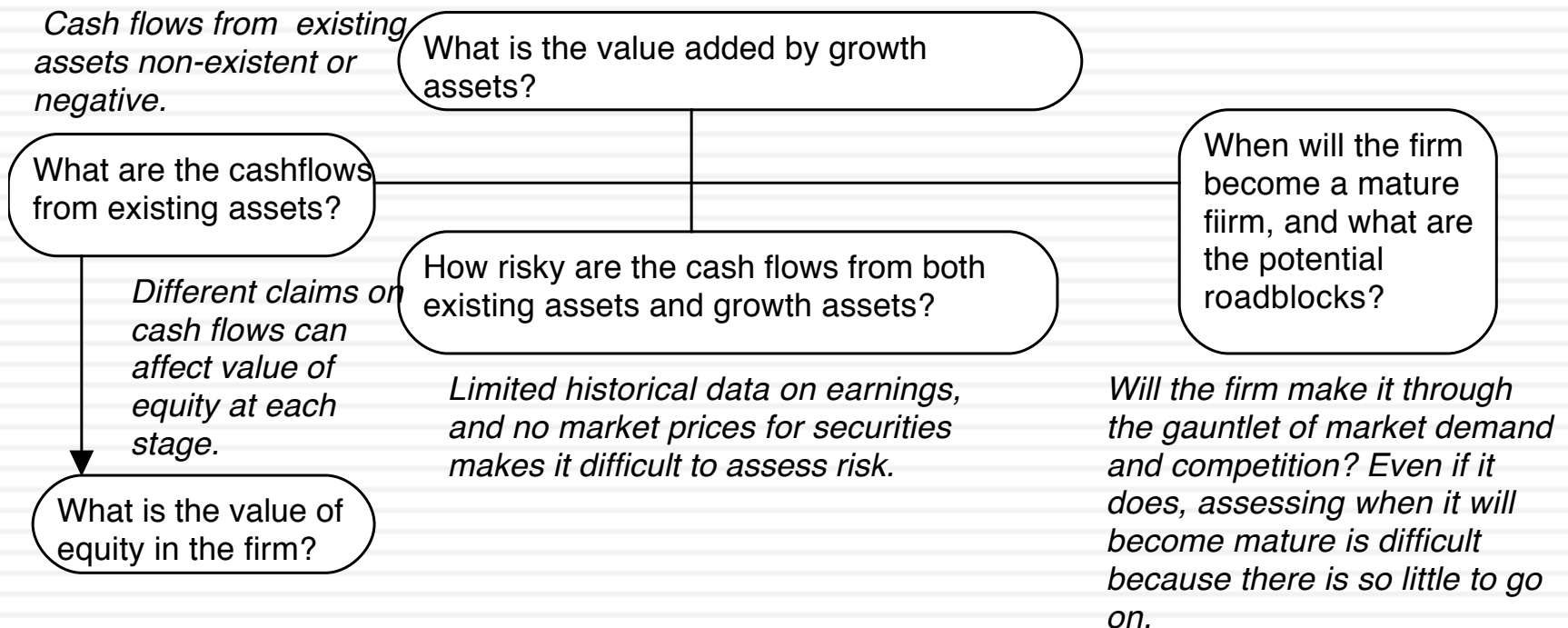
# Difficult to value companies...

- 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 transition: 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 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.
- Across the ownership cycle
  - ▣ Privately owned businesses: Exposure to firm specific risk and illiquidity bedevil valuations.
  - ▣ Venture Capital (VC) and private equity: Different equity investors, with different perceptions of risk.
  - ▣ Closely held public firms: Part private and part public, sharing the troubles of both.

# I. The challenge with young companies...

Figure 5.2: Estimation Issues - Young and Start-up Companies

*Making judgments on revenues/ profits difficult because 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.*

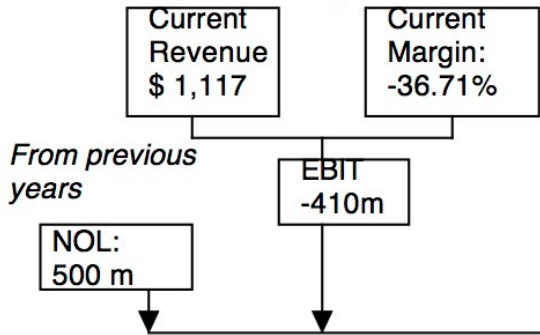


# Upping the ante.. Young companies in young businesses...

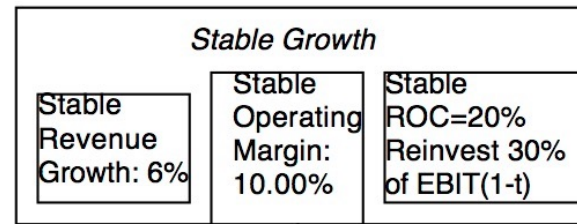
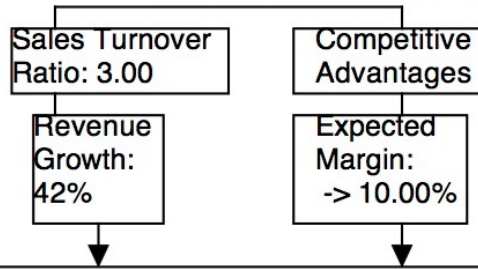
- When valuing a business, we generally draw on three sources of information
  - The firm's current financial statement
    - How much did the firm sell?
    - How much did it earn?
  - The firm's financial history, usually summarized in its financial statements.
    - How fast have the firm's revenues 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 comparable firm data
    - What happens to firms as they mature? (Margins.. Revenue growth... Reinvestment needs... Risk)
- 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...



### Amazon in January 2000



Sales to capital ratio and expected margin are retail industry average numbers



Terminal Value =  $18817 / (.0961 - .06)$   
= 52,148

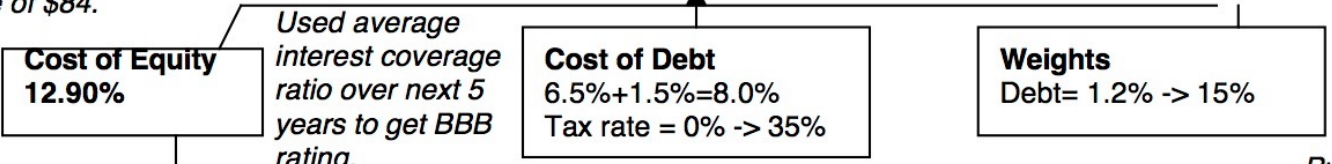
| Term. Year |
|------------|
| 6%         |
| \$ 41,346  |
| 10.00%     |
| \$4,135    |
| \$2,688    |
| \$155      |
| \$1,881    |

Value of Op Assets \$ 15,170  
 + Cash \$ 26  
 = Value of Firm \$14,936  
 - Value of Debt \$ 349  
 = Value of Equity \$14,847  
 - Equity Options \$ 2,892  
 Value per share \$ 35.08

|                  | 150.00%  | 100.00%  | 75.00%   | 50.00%    | 30.00%    | 25.20%    | 20.40%    | 15.60%    | 10.80%    | 6.00%     |
|------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Revenues         | \$ 2,793 | \$ 5,585 | \$ 9,774 | \$ 14,661 | \$ 19,059 | \$ 23,862 | \$ 28,729 | \$ 33,211 | \$ 36,798 | \$ 39,006 |
| Operating Margin | -13.35%  | -1.68%   | 4.16%    | 7.08%     | 8.54%     | 9.27%     | 9.64%     | 9.82%     | 9.91%     | 9.95%     |
| EBIT             | -\$373   | -\$94    | \$407    | \$1,038   | \$1,628   | \$2,212   | \$2,768   | \$3,261   | \$3,646   | \$3,883   |
| EBIT(1-t)        | -\$373   | -\$94    | \$407    | \$871     | \$1,058   | \$1,438   | \$1,799   | \$2,119   | \$2,370   | \$2,524   |
| - Reinvestment   | \$600    | \$967    | \$1,420  | \$1,663   | \$1,543   | \$1,688   | \$1,721   | \$1,619   | \$1,363   | \$961     |
| FCFF             | -\$931   | -\$1,024 | -\$989   | -\$758    | -\$408    | -\$163    | \$177     | \$625     | \$1,174   | \$1,788   |

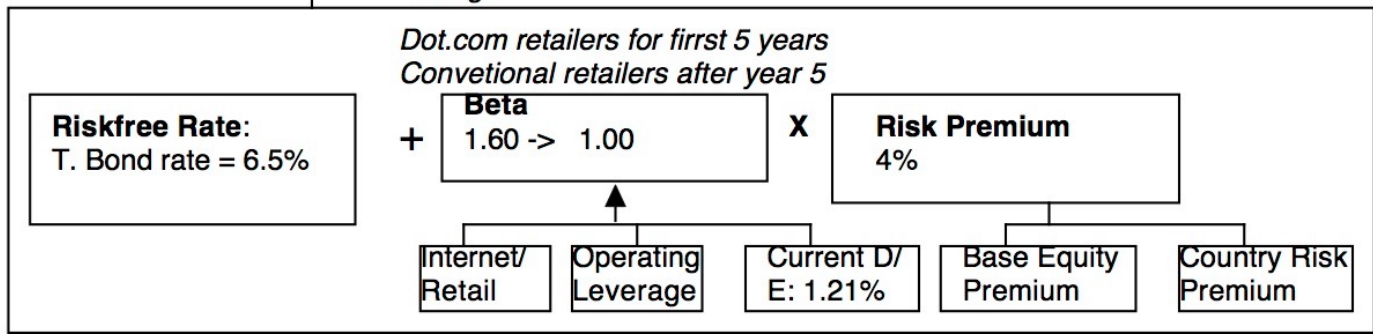
|                        | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | Forever |
|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Cost of Equity         | 12.90% | 12.90% | 12.90% | 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%  |         |

All existing options valued as options, using current stock price of \$84.



Amazon was trading at \$84 in January 2000.

Pushed debt ratio to retail industry average of 15%.



# Lesson 1: Don't trust regression betas....

<HELP> for explanation, <MENU> for similar functions.

DG26 Equity **BETA**

## HISTORICAL BETA

AMZN

US

AMAZON.COM INC

Relative Index

SPX

S&P 500 INDEX

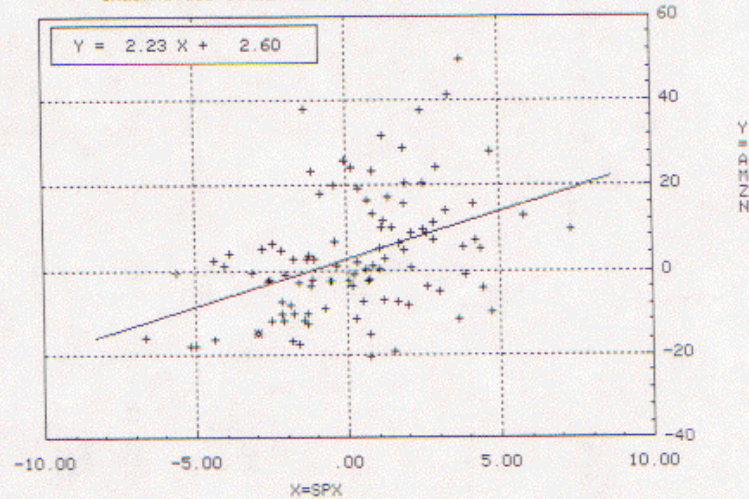
\* Identifies latest observation

Period  Weekly

Range **2/27/98** To **2/18/00**

Market  Trade

|                   |       |
|-------------------|-------|
| ADJ BETA          | 1.82  |
| RAW BETA          | 2.23  |
| Alpha (Intercept) | 2.60  |
| R2 (Correlation)  | .17   |
| Std Dev of Error  | 13.20 |
| Std Error of Beta | .50   |
| Number of Points  | 103   |



Adj beta = (0.67) \* Raw Beta  
+ (0.33) \* 1.0

Copyright 2000 BLOOMBERG L.P. Frankfurt:69-920410 Hong Kong:2-977-6000 London:171-330-7500 New York:212-318-2000  
Princeton:609-279-3000 Singapore:226-3000 Sydney:2-9777-8686 Tokyo:3-3201-8900 Sao Paulo:11-3048-4500  
1257-602-0 22-Feb-00 16:21:23

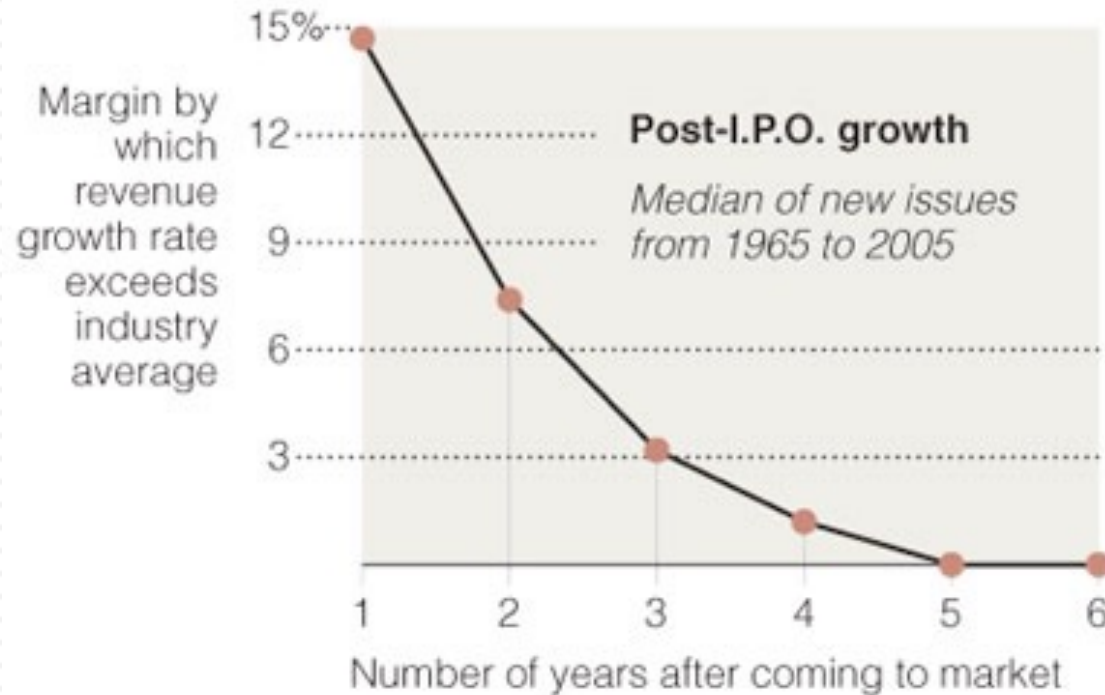
**Bloomberg**  
PROFESSIONAL

## 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...

Typically, the revenue growth rate of a newly public company outpaces its industry average for only about five years.



Source: Andrew Metrick

The New York Times

# Lesson 4: Don't forget to pay for growth...

Invested Capital in year t = Invested Capital in year t-1 +  
Reinvestment in year t-1

| 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%      |

Return on Capital in year t = EBIT (1-t) in year t / Invested Capital  
in year t-1

# Lesson 5: There are always scenarios where the market price can be justified...

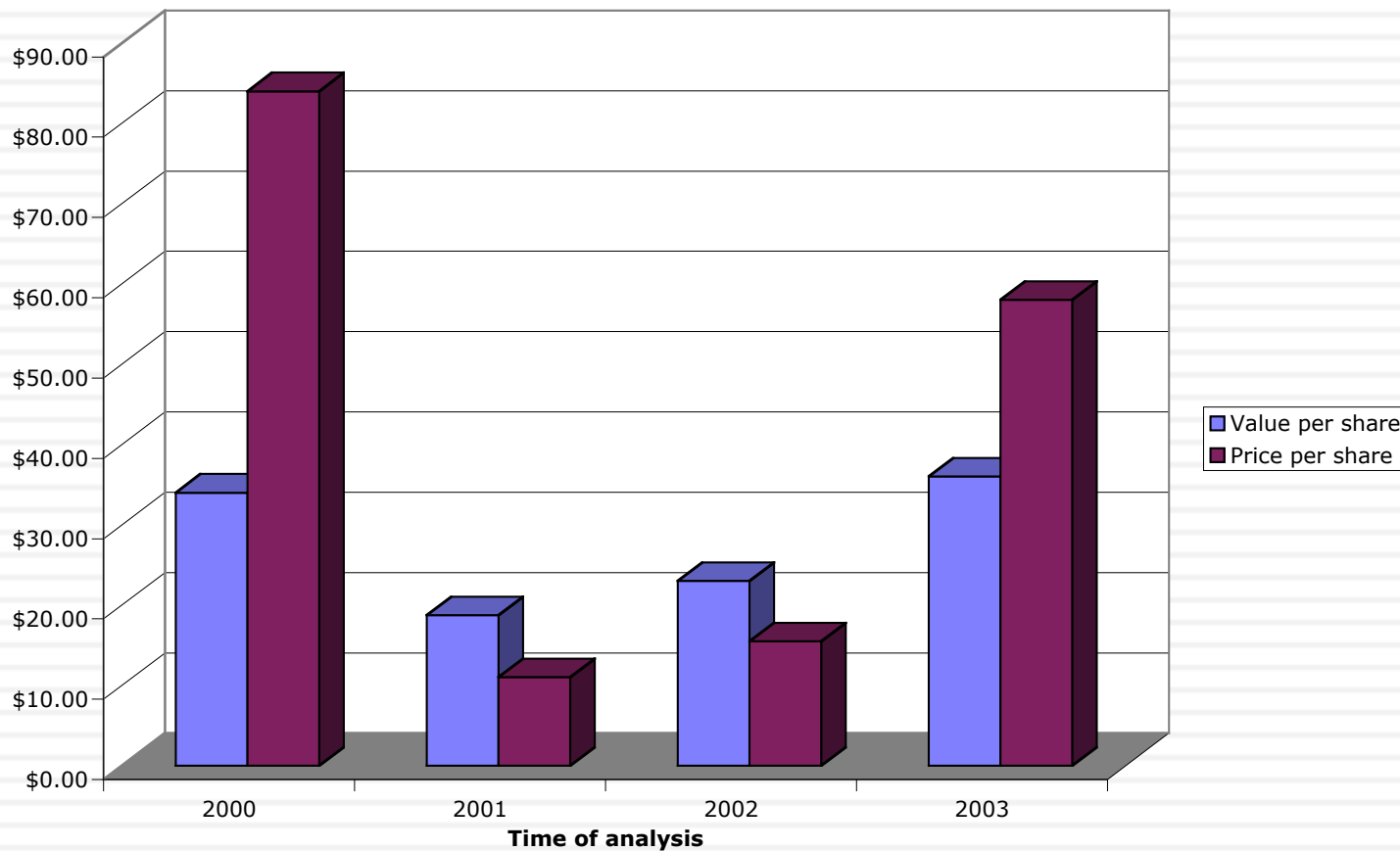
|  |     | Target pre-tax Operating Margin |          |           |           |           |
|--|-----|---------------------------------|----------|-----------|-----------|-----------|
|  |     | 6%                              | 8%       | 10%       | 12%       | 14%       |
| Compounded annual<br>Revenue Growth rate | 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 6: You will be wrong 100% of the time... and it really is not (always) 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” ....

**Amazon: Value and Price**





# Valuing an IPO

- Valuation issues:
  - *Use of the proceeds from the offering*: The proceeds from the offering can be held as cash by the firm to cover future investment needs, paid to existing equity investors who want to cash out or used to pay down debt.
  - *Warrants/ Special deals with prior equity investors*: If venture capitalists and other equity investors from earlier iterations of fund raising have rights to buy or sell their equity at pre-specified prices, it can affect the value per share offered to the public.
- Pricing issues:
  - *Institutional set-up*: Most IPOs are backed by investment banking guarantees on the price, which can affect how they are priced.
  - *Follow-up offerings*: The proportion of equity being offered at initial offering and subsequent offering plans can affect pricing.

| Zomato   |                     |                     |  |                                    |                      | Jul-21   |
|--|---------------------|---------------------|--|------------------------------------|----------------------|--|
| <b>The Story</b>   |                     |                     |  |                                    |                      |  |
| Zomato will benefit as the Indian food delivery market grows, driven by overall economic growth and more digital access, and it will be one of a few (two or three) players who will dominate the market; there will be a near term COVID bounceback effect. While Amazon Food remains the wild card, economies of scales will allow the company to generate high operating margins, and the company will continue to reinvest (acquisitions and technology) as it grows. The risk of failure is low, given the company's post-IPO cash balance and access to capital and its operating risk reflects its exposure to Indian country risk. |                     |                     |  |                                    |                      |  |
| <b>The Assumptions</b>   |                     |                     |  |                                    |                      |  |
|  | <i>Base year</i>    | <i>Next year</i>    | <i>Years 2-5</i>                                 | <i>Years 6-10</i>                  | <i>After year 10</i> | <i>Link to story</i>   |
| Indian Food Delivery   | ₹ 225,000           | ₹ 337,500           | 30.00%   | 15.27%                             | ₹ 1,961,979          | Indian food market rebounds in 2021 and grows to about \$25 billion in year 10 |
| Market Share   | 42.15%              | 41.72%              | →  | 40.00%                             | 40.00%               | Zomato is one of two or three lead players in Indian food delivery market      |
| Revenues as % of GOV   | 21.03%              | 22.00%              |  |                                    | 22.00%               |  |
| Revenues (a)   | ₹ 19,937.89         | ₹ 30,975            | Total Market * Market Share* Revenue as % of GOV |                                    | ₹ 172,654            | COVID rebound in 2021 + Growth in food delivery market in India long term      |
| Operating margin (b)   | -24.10%             | -10.0%              | -10.00%  | → 35.00%                           | 35.00%               | Margins improve as growth wanes  |
| Tax rate   | 30.00%              |                     | 30.00%   | → 30.00%                           | 30.00%               | Indian corporate tax rate over time  |
| Reinvestment (c)   |                     | 5.00                | 2.50   | 3.00                               | 35.42%               | Acquisitions & technology investments needed to sustain growth                 |
| Return on capital  | -7.15%              | Marginal ROIC =     | 127.01%  |                                    | 12.00%               | Newworking benefits allow for high ROIC, near and long term.                   |
| Cost of capital (d)  |                     |                     | 10.25%   | → 8.97%                            | 8.97%                | Cost of capital reflects Indian country risk                                   |
| <b>The Cash Flows</b>  |                     |                     |  |                                    |                      |  |
|  | <i>Total Market</i> | <i>Market Share</i> | <i>Revenues</i>                                  | <i>EBIT (1-t)</i>                  | <i>Reinvestment</i>  | <i>FCFF</i>  |
| 1  | ₹ 337,500           | 41.72%              | ₹ 30,974.78                                      | -₹ 3,097.48                        | ₹ 2,207.38           | -₹ 5,304.86  |
| 2  | ₹ 438,750           | 41.29%              | ₹ 39,852.91                                      | ₹ 498.16                           | ₹ 3,551.25           | -₹ 3,053.09  |
| 3  | ₹ 570,375           | 40.86%              | ₹ 51,270.19                                      | ₹ 3,247.17                         | ₹ 4,566.91           | -₹ 1,319.74  |
| 4  | ₹ 741,488           | 40.43%              | ₹ 65,951.07                                      | ₹ 5,770.72                         | ₹ 5,872.35           | -₹ 101.64  |
| 5  | ₹ 963,934           | 40.00%              | ₹ 84,826.17                                      | ₹ 10,762.32                        | ₹ 6,291.70           | ₹ 4,470.62   |
| 6  | ₹ 1,203,471         | 40.00%              | ₹ 105,905.47                                     | ₹ 14,994.01                        | ₹ 7,026.43           | ₹ 7,967.57   |
| 7  | ₹ 1,440,555         | 40.00%              | ₹ 126,768.85                                     | ₹ 24,503.10                        | ₹ 6,954.46           | ₹ 17,548.64  |
| 8  | ₹ 1,650,156         | 40.00%              | ₹ 145,213.72                                     | ₹ 35,577.36                        | ₹ 6,148.29           | ₹ 29,429.07  |
| 9  | ₹ 1,805,271         | 40.00%              | ₹ 158,863.81                                     | ₹ 38,921.63                        | ₹ 4,550.03           | ₹ 34,371.60  |
| 10   | ₹ 1,881,995         | 40.00%              | ₹ 165,615.52                                     | ₹ 40,575.80                        | ₹ 2,250.57           | ₹ 38,325.23  |
| Terminal year  | ₹ 1,961,979         | 40.00%              | ₹ 172,654.18                                     | ₹ 42,300.27                        | ₹ 14,981.35          | ₹ 27,318.93  |
| <b>The Value</b>   |                     |                     |  |                                    |                      |  |
| Terminal value   |                     |                     | ₹ 578,790.83                                     |                                    |                      |  |
| PV(Terminal value)   |                     |                     | ₹ 225,869.40                                     |                                    |                      |  |
| PV (CF over next 10 years)   |                     |                     | ₹ 50,979.90                                      |                                    |                      |  |
| Value of operating assets =  |                     |                     | ₹ 276,849.30                                     |                                    |                      |  |
| Adjustment for distress  |                     |                     | ₹ 13,842.46                                      | Probability of failure =           |                      | 10.00%   |
| - Debt & Minority Interests  |                     |                     | ₹ 1,591.72                                       |                                    |                      |  |
| + Cash & Other Non-operating assets  |                     |                     | ₹ 135,959.70                                     | Includes cash proceeds from IPO of |                      | ₹ 90,000   |
| Value of equity  |                     |                     | ₹ 397,374.81                                     |                                    |                      |  |
| - Value of equity options  |                     |                     | ₹ 73,244.53                                      |                                    |                      |  |
| Number of shares   |                     |                     | 7,946.68   |                                    |                      |  |
| Value per share  |                     |                     | ₹ 40.79  | Stock was offered at =             |                      | ₹ 70.00  |

## II. Dealing with decline and distress...

*Historical 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?

*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?

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

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

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

*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.*

# 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 cash flows (a distress sale value), DCF valuations will understate 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 over 10 years
  - 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%

Reinvestment:  
Capital expenditures include cost of new casinos and working capital

**Stable Growth**  
Stable Revenue Growth: 3%  
Stable Operating Margin: 17%  
Stable ROC=10% Reinvest 30% of EBIT(1-t)

EBIT  
\$ 209m

Extended reinvestment break, due ot investment in past

Industry average

Expected Margin:  
-> 17%

Terminal Value=  $758(.0743-.03)$   
=\$ 17,129

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

|                 |  | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | 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      |
| Beta            |  | 3.14    | 3.14    | 3.14    | 3.14    | 3.14    | 2.75    | 2.36    | 1.97    | 1.59    | 1.20    | Forever    |
| 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%   |            |

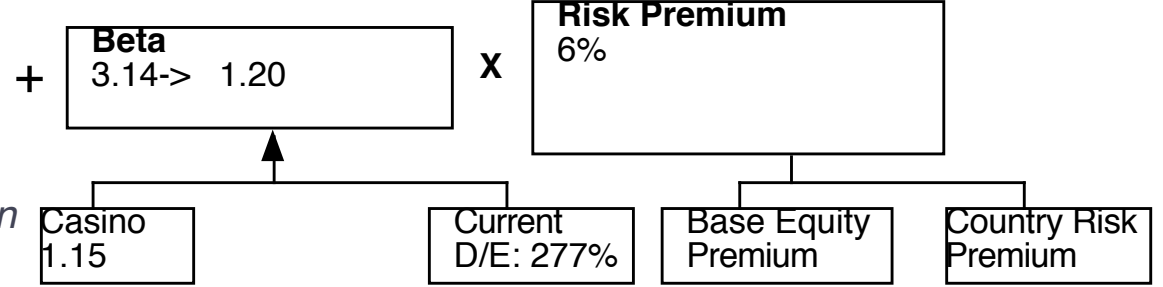
**Cost of Equity**  
21.82%

**Cost of Debt**  
 $3%+6%= 9%$   
 $9% (1-.38)=5.58%$

**Weights**  
Debt= 73.5% ->50%

**Riskfree Rate:**  
T. Bond rate = 3%

*Aswath Damodaran*



**Las Vegas Sands**  
**Feburary 2009**  
**Trading @ \$4.25**

# 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:

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

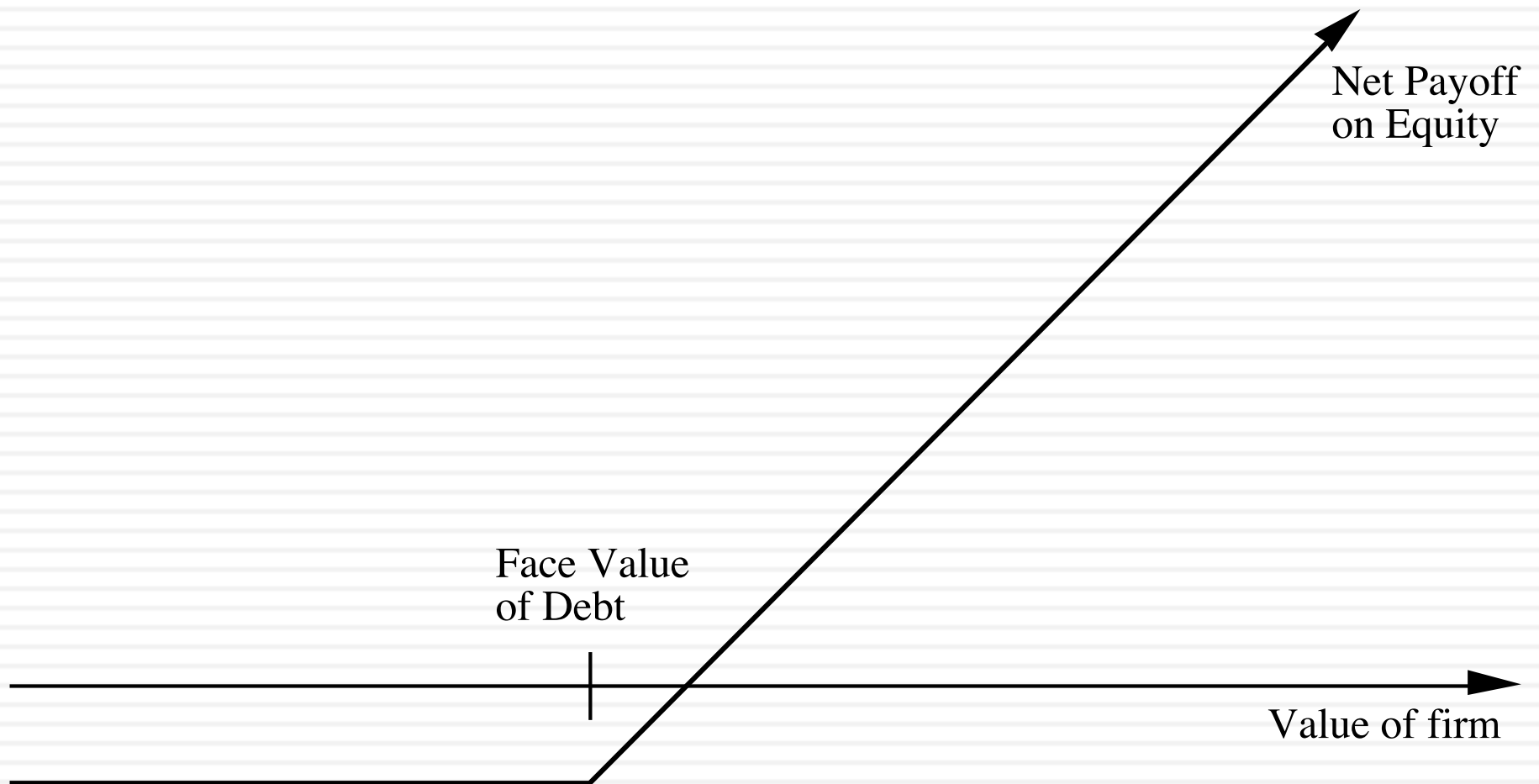
$\pi_{\text{Distress}}$  = Annual probability of default = 13.54%

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:  $\$8.12 (1 - .7666) + \$0.00 (.7666) = \$1.92$

# The “sunny” side of distress: Equity as a call option to liquidate the firm



# Application to valuation: A simple example

- Assume that you have a firm whose assets are currently valued at \$100 million and that the standard deviation in this asset value is 40%.
- Further, assume that the face value of debt is \$80 million (It is zero coupon debt with 10 years left to maturity).
- If the ten-year treasury bond rate is 10%,
  - ▣ how much is the equity worth?
  - ▣ What should the interest rate on debt be?

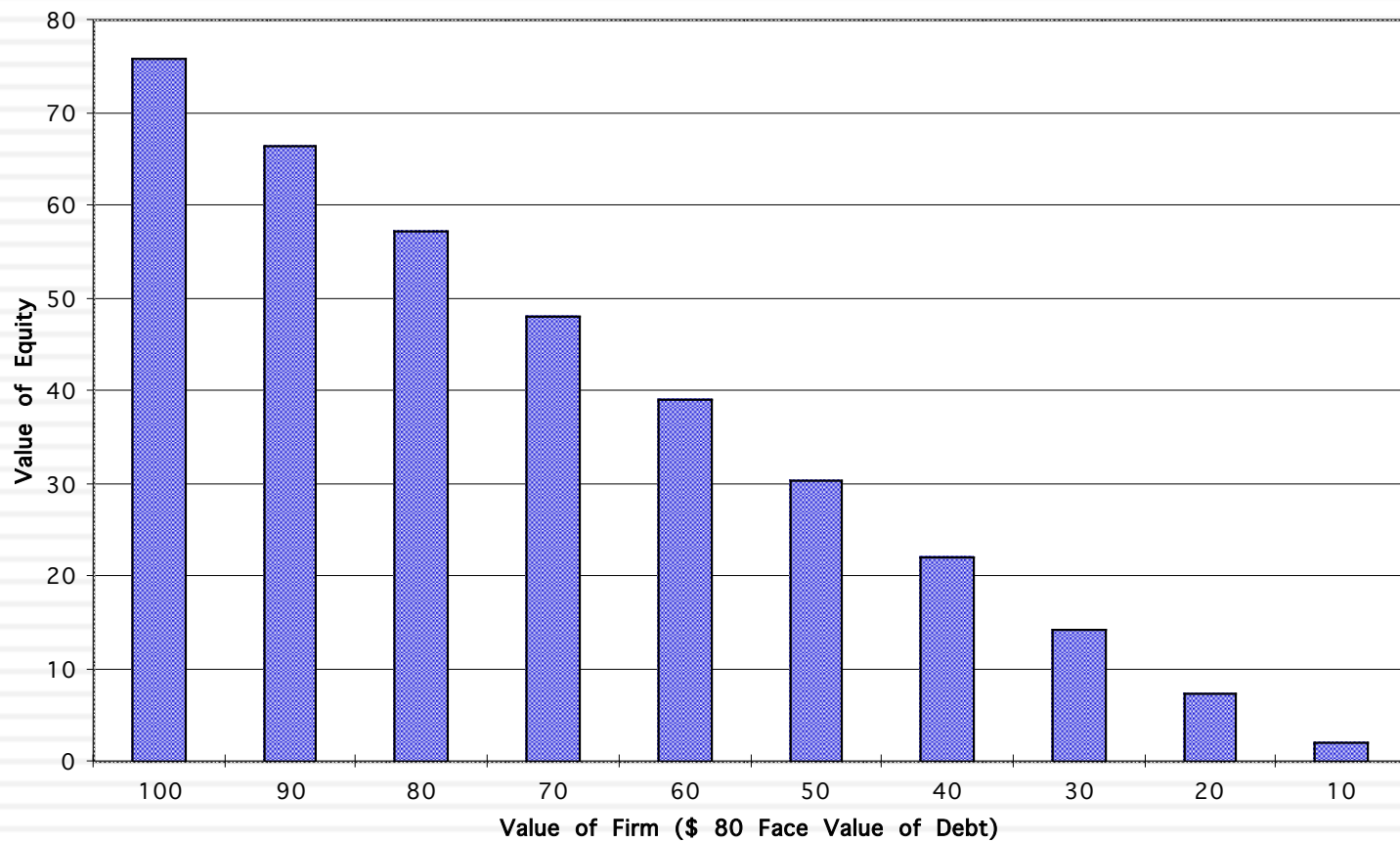






# Equity value persists .. As firm value declines..

Value of Equity as Firm Value Changes



# III. 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 firm, and what are the potential roadblocks?

*Preferred stock is a significant source of capital.*

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

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 to regulators. If they do not, they can be taken over and shut down.*

# Lesson 1: Debt to a bank is raw material, not a source of capital

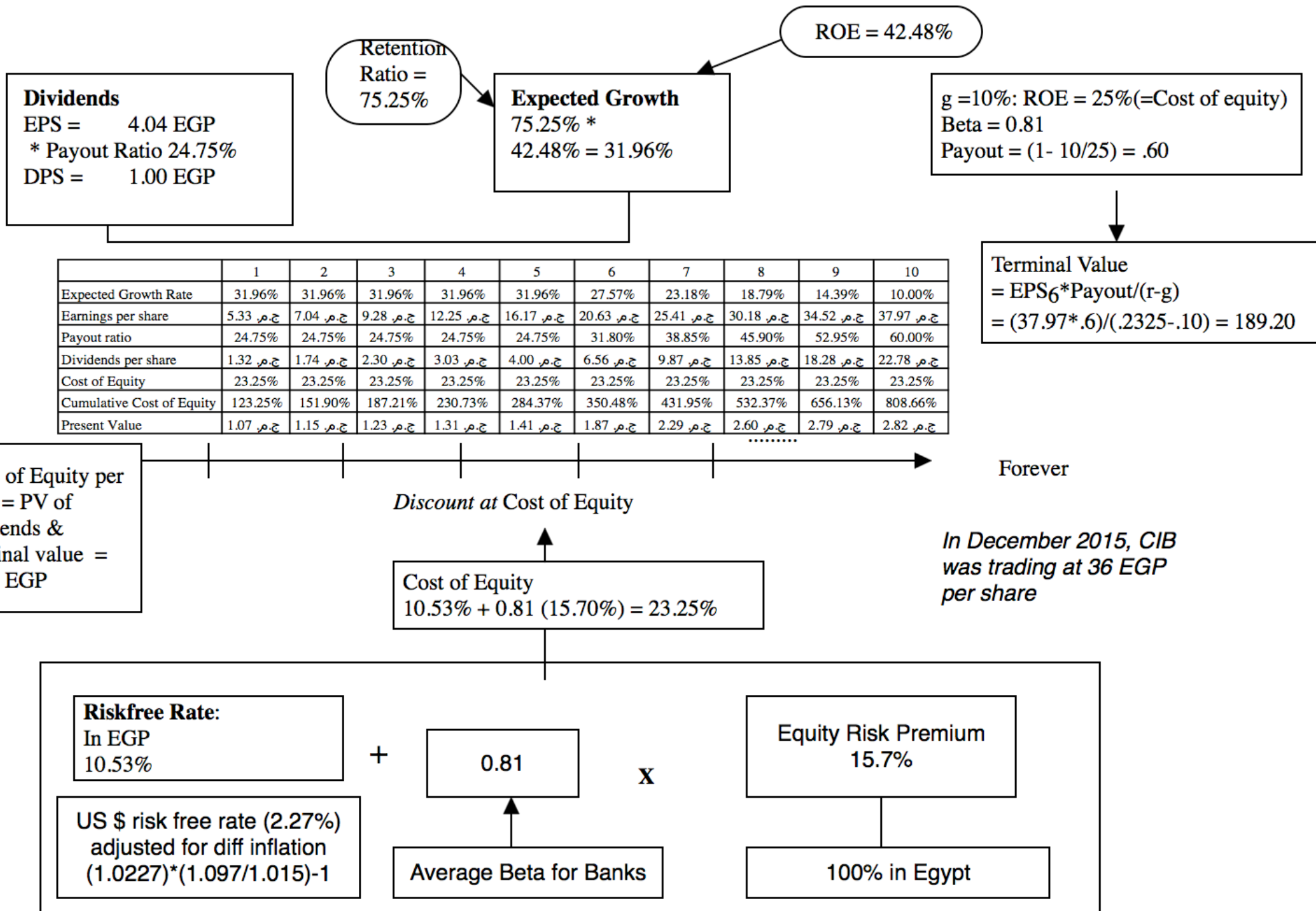
- With conventional firms, you often face a choice of either valuing the entire business (using cash flows to the firm and a cost of capital) or valuing equity. Often, valuing the firm is both easier and more robust, and you subtract out debt to get to value of equity.
- With financial service firms, valuing the firm is often a non-starter, since debt to a bank is not a source of capital but raw material.
- **Status Quo 1: When you value a bank, it is almost always on an equity basis.**

## Lesson 2: Estimating cash flows for a bank is difficult to do..

- Assuming that you want to go down the road of valuing equity using a DCF, the standard definition of cash flows is
  - ▣  $FCFE = \text{Net Income} + \text{Depreciation} - \text{Cap Ex} - \text{Change in Non-cash Working Capital}$
- Defining cap ex and working capital for a bank is close to impossible. Consequently, most analysts give up and make one of the two following choices:
  - ▣ The indefensible: Discount earnings at the cost of equity, which gives you basically nothing.
  - ▣ The defensible: Discount dividends at the cost of equity
- **Status Quo 2: The dividend discount model's last stand was with financial service companies.**

# CIB Egypt in December 2015

## Valuation in Egyptian Pounds



# Lesson 3: 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:
  - $FCFE = \text{Net Income} - \text{Reinvestment in regulatory capital (book equity)}$



### Stodgy and Low-profitability Bank, with investment potential

Citi has fallen behind its biggest rivals on growth and profitability, and investors have built in their low regard for it into its pricing. In my story, Ciit will continue on its cautious path of low growth, while earning a return on equity that is well below its cost of equity, but it is well capitalized (even with the write downs on investment securities that may be coming) and continues to earn a lucrative spread on its core banking business.

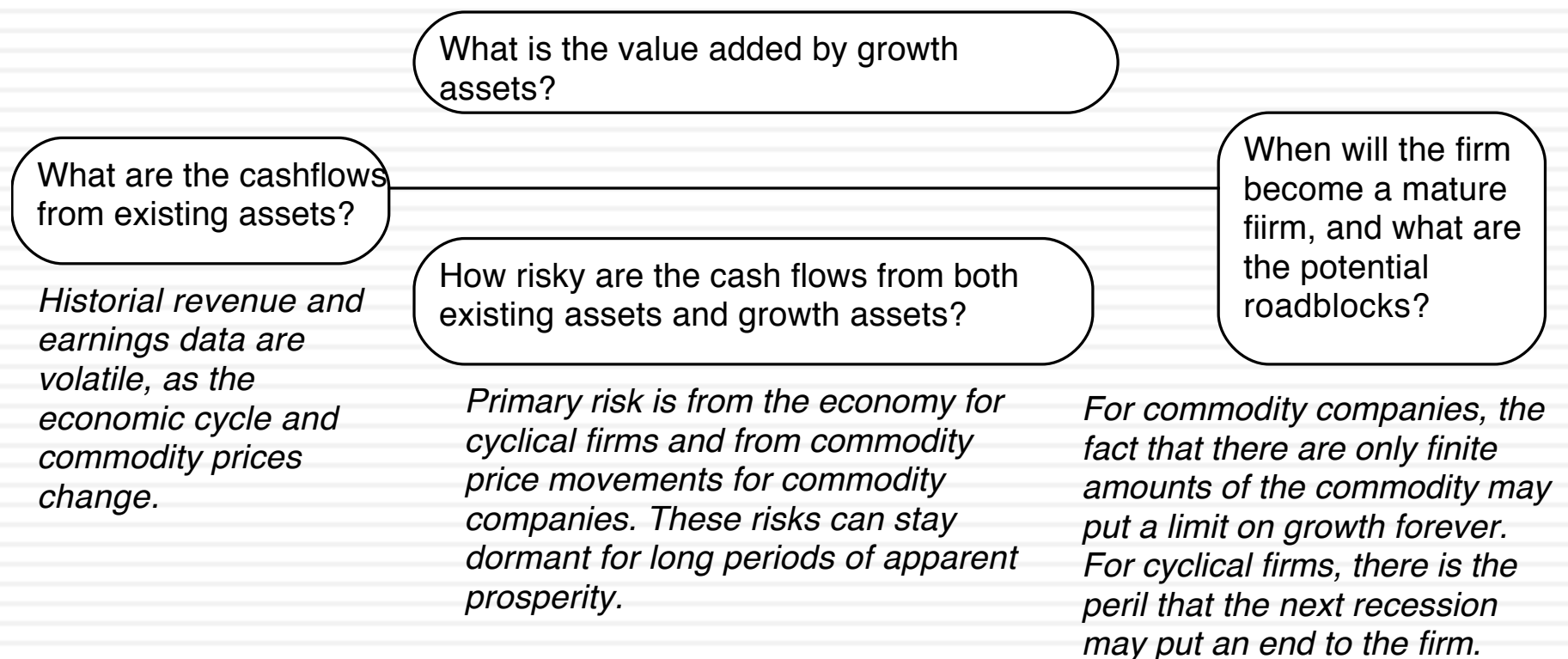
|                                       | Current     | 1           | 2           | 3           | 4           | 5            | Steady state | Estimation notes                             |
|---------------------------------------|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--|
| Risk Adjusted Assets                  | \$1,142,985 | \$1,177,275 | \$1,212,593 | \$1,248,971 | \$1,286,440 | \$1,325,033  | \$1,364,784  | Grows 3% a year in perpetuity                |
| Tier 1 Capital ratio                  | 14.80%      | 14.84%      | 14.88%      | 14.92%      | 14.96%      | 15.00%       | 15.00%       | Improves to 15% over 5 years                 |
| Tier 1 Capital                        | \$169,145   | \$174,694   | \$180,423   | \$186,339   | \$192,448   | \$198,755    | \$204,718    | Risk Adjusted Assets * Tier 1 Capital Ratio  |
| Change in regulatory capital (Tier 1) |             | \$5,549     | \$5,729     | \$5,916     | \$6,109     | \$6,307      | \$5,963      | Change in Tier 1 capital from year to year   |
| Book Equity                           | \$182,194   | \$187,743   | \$193,472   | \$199,388   | \$205,497   | \$211,804    | \$218,158    | Book equity + (Net Income - FCFE)            |
| ROE                                   | 8.78%       | 8.92%       | 9.07%       | 9.21%       | 9.36%       | 9.50%        | 9.50%        | Improves to 9.5% (5-year average) over time  |
| Net Income                            | \$14,845    | \$16,254    | \$17,021    | \$17,820    | \$18,653    | \$19,522     | \$20,121     | Book Equity * ROE                            |
| - Investment in Regulatory Capital    |             | \$5,549     | \$5,729     | \$5,916     | \$6,109     | \$6,307      | \$6,354      | Change in regulatory capital                 |
| FCFE                                  |             | \$10,705    | \$11,291    | \$11,904    | \$12,545    | \$13,215     | \$13,767     | Net Income - Change in regulatory capital    |
| Terminal value of equity              |             |             |             |             |             | 158,791.87 € |              | 3% growth in perpetuity on steady state CF   |
| Present value                         |             | 9,586.43 €  | 9,054.51 €  | 8,548.36 €  | 8,067.12 €  | 99,051.91 €  |              | PV of cash flows (and terminal equity value) |
| Cost of equity                        | 11.67%      | 11.67%      | 11.67%      | 11.67%      | 11.67%      | 11.67%       | 11.67%       | Implied cost of equity of 25 biggest banks   |
| Value of equity today =               | \$134,308   |             |             |             |             |              |              |  |
| Number of shares outstanding =        | 1958.30     |             |             |             |             |              |              |  |
| Value per share =                     | \$68.58     |             |             |             |             |              |              |  |
| Stock price in May 2023 =             | \$46.32     |             |             |             |             |              |              |  |
| % Under or over valued =              | -32.46%     |             |             |             |             |              |              |  |

#### Implied cost of equity for big banks

Median price to book = 1.04  
 Median ROE in 2022 = 12.00%  
 Expected growth rate = 3.3% (equal to T.Bond rate)  
 $PBV = (ROE - g) / (Cost\ of\ equity - g)$   
 $1.04 = (.12 - .033) / (Cost\ of\ equity - .033)$   
 Solving, Cost of equity = 11.67%

# IV. Valuing cyclical and commodity companies

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

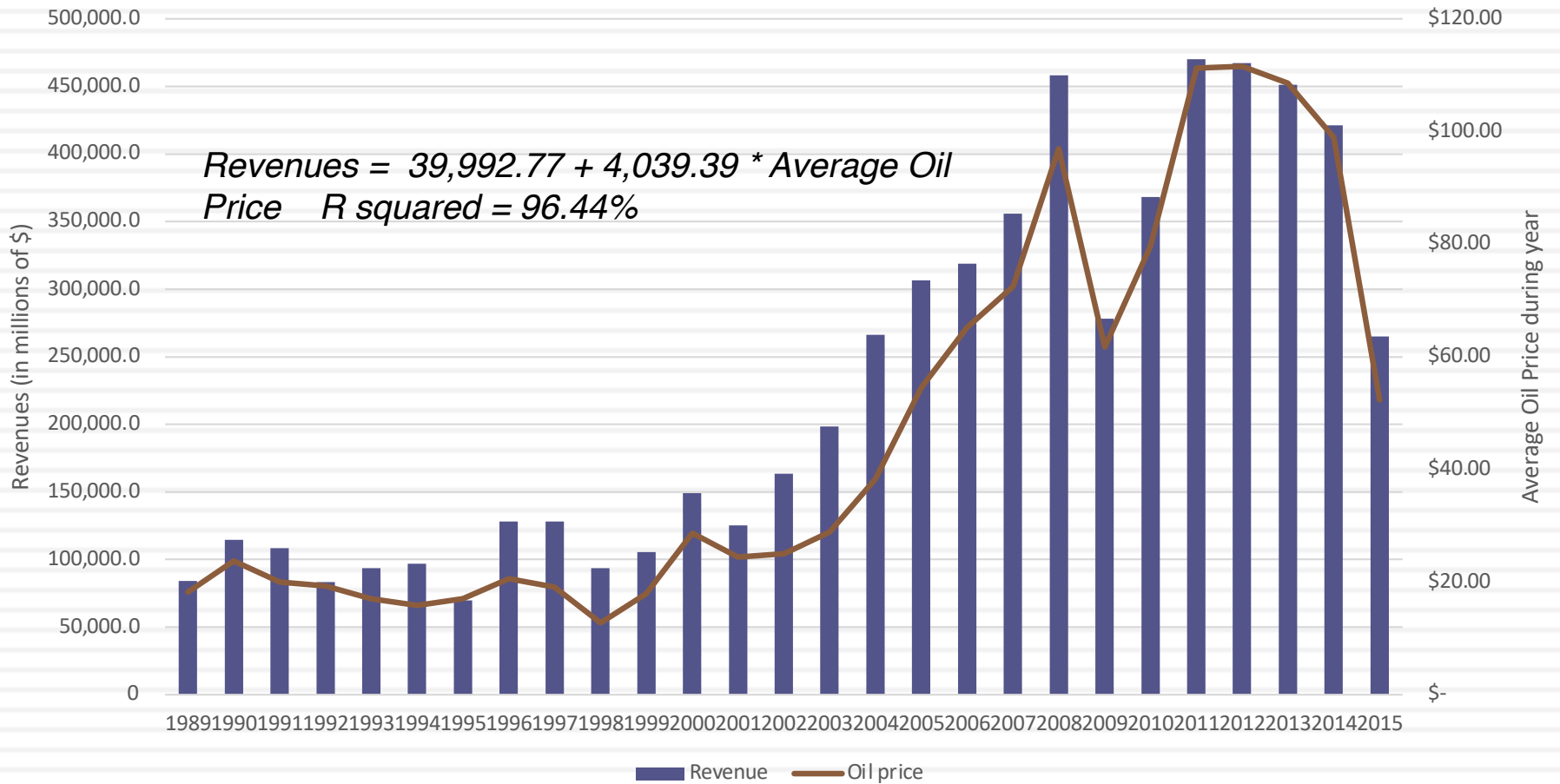


# Lesson 1: With “macro” companies, it is easy to get lost in “macro” assumptions...

- 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.

# Shell's Revenues & Oil Prices

Shell: Revenues vs Oil Price



## 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 Interests      | \$ 1,245.00   |              |              |              |              |               |               |
| Value of Equity           | \$ 165,477.41 |              |              |              |              |               |               |
| Number of shares          | 4209.7        |              |              |              |              |               |               |
| Value per share           | \$ 39.31      |              |              |              |              |               |               |

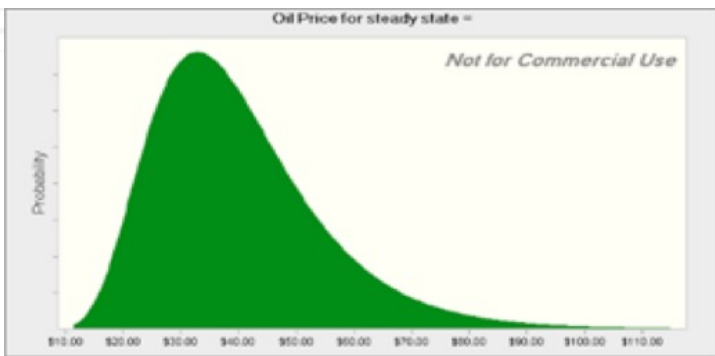
Operating margin converges on Shell's historical average margin of 9.35% from 200-2015

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

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

## 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)



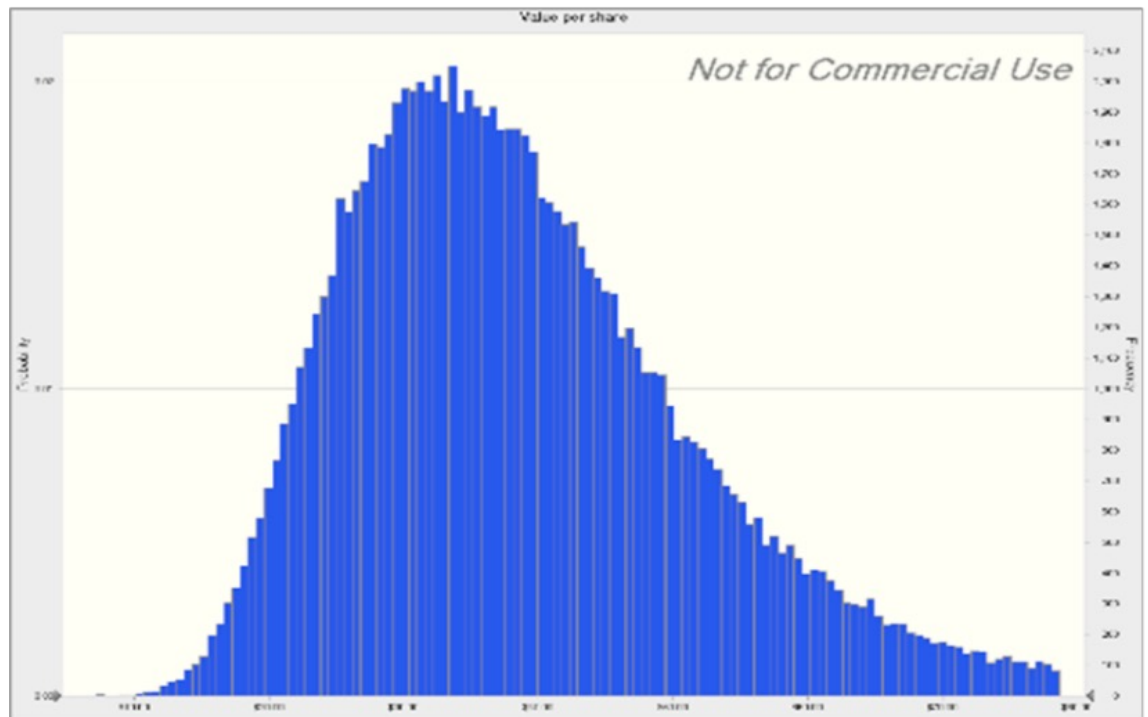
**Revenue calculated from the oil price drawn from distribution**  
 $Revenue = 39992.77 + 4039.40 * Oil\ Price/Barrel$

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

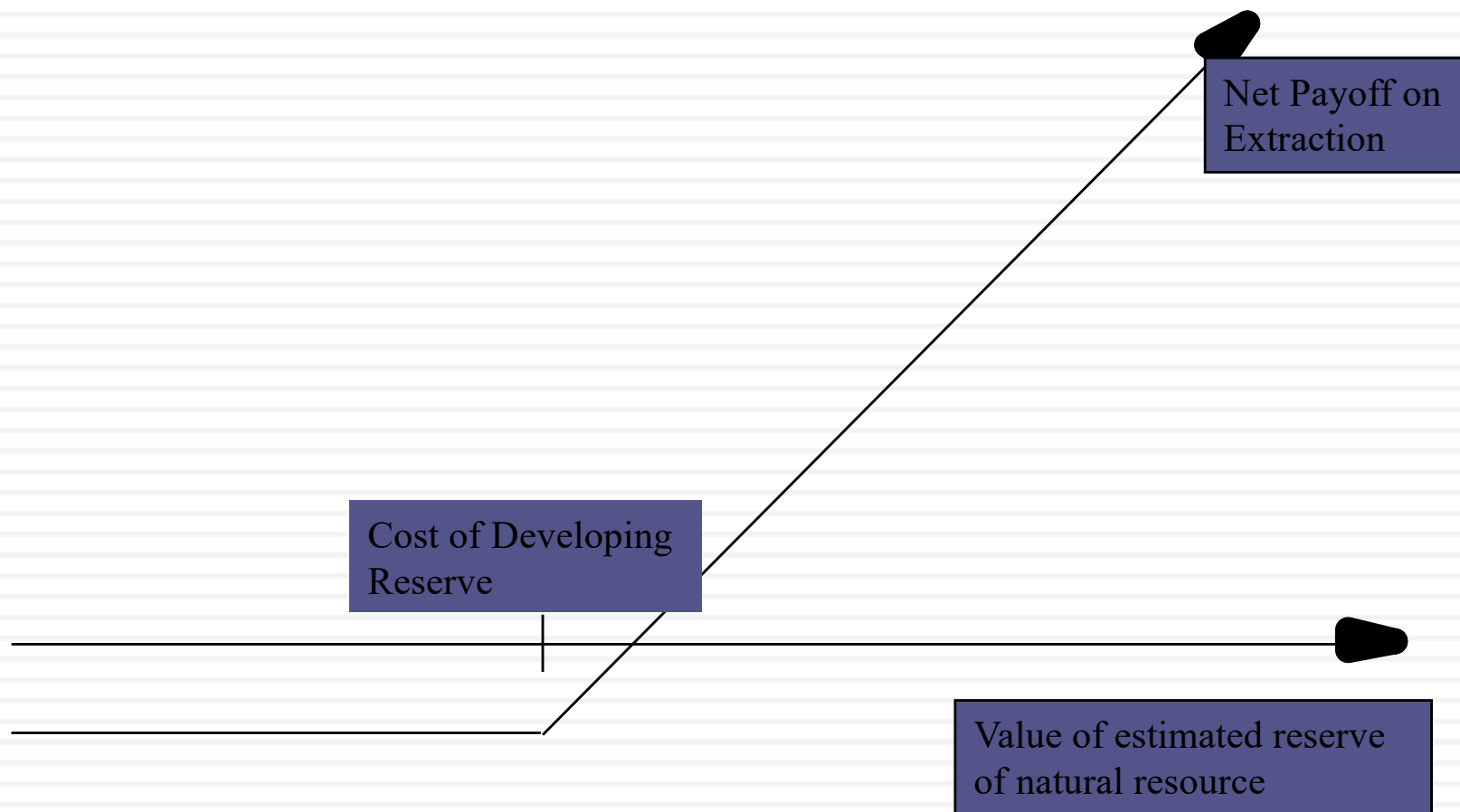


Value Shell based on operating income, assuming other assumptions (tax rate, revenue growth, cost of capital)

| 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        |



# The optionality in commodities: Undeveloped reserves as an option





# Implications

- Optionality Premium: Undeveloped reserves have option value that will give them a premium over their DCF value. Put simply, even non-viable reserves have value, because commodity prices can bounce back.
  - The option premium will be greater when commodity prices are low, rather than when oil prices are high.
  - The option premium will increase if commodity prices are expected to become more volatile.
- Level + Variance: The value of a commodity company is affected by both the level of oil prices, as well as the volatility in that level. The former affects your DCF and the latter the optionality.

# V. Valuing Companies across the ownership cycle

*Reported income and balance sheet are heavily affected by tax considerations rather than information disclosure requirements. The line between the personal and business expenses is a fine one.*

What are the **cashflows from existing assets**?  
- Equity: Cashflows after debt payments  
- Firm: Cashflows before debt payments

*Reversing investment mistakes is difficult to do. The need for and the cost of illiquidity has to be incorporated into current*

What is the **value added** by growth assets?  
Equity: Growth in equity earnings/ cashflows  
Firm: Growth in operating earnings/ cashflows

How **risky are the cash flows** from both existing assets and growth assets?  
Equity: Risk in equity in the company  
Firm: Risk in the firm's operations

*Different buyers can perceive risk differently in the same private business, largely because what they see as risk will be a function of how diversified they are. The fall back positions of using market prices to extract risk measures does not*

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

*Many private businesses are finite life enterprises, not expected to last into perpetuity*

# Kristin's Kandy: Valuation in March 2006

**Current Cashflow to Firm**  
 EBIT(1-t) : 300  
 - Nt CpX 100  
 - Chg WC 40  
 = FCFF 160  
 Reinvestment Rate = 46.67%

Reinvestment Rate  
 46.67%

**Expected Growth in EBIT (1-t)**  
 $.4667 \times .1364 = .0636$   
**6.36%**

Return on Capital  
 13.64%

Stable Growth  
 $g = 4\%$ ;  $\text{Beta} = 3.00$ ;  
 $\text{ROC} = 12.54\%$   
 Reinvestment Rate = 31.90%

Terminal Value<sub>5</sub> =  $289 / (.1254 - .04) = 3,403$

Firm Value: 2,571  
 + Cash 125  
 - Debt: 900  
 = Equity 1,796  
 - Illiq Discount 12.5%  
 Adj Value 1,571

| Year           | 1     | 2     | 3     | 4     | 5     | Term Yr |
|----------------|-------|-------|-------|-------|-------|---------|
| EBIT (1-t)     | \$319 | \$339 | \$361 | \$384 | \$408 | 425     |
| - Reinvestment | \$149 | \$158 | \$168 | \$179 | \$191 | 136     |
| =FCFF          | \$170 | \$181 | \$193 | \$205 | \$218 | 289     |

Discount at Cost of Capital (WACC) =  $16.26\% (.70) + 3.30\% (.30) = 12.37\%$

**Cost of Equity**  
**16.26%**

**Cost of Debt**  
 $(4.5\% + 1.00)(1 - .40) = 3.30\%$   
 Synthetic rating = A-

**Weights**  
 E = 70% D = 30%

**Riskfree Rate:**  
 Riskfree rate = 4.50%  
 (10-year T.Bond rate)

**Total Beta**  
 2.94

**Risk Premium**  
 4.00%

1/3 of risk is market risk

Adjusted for ownr non-diversification

Market Beta: 0.98

Mature risk premium  
 4%

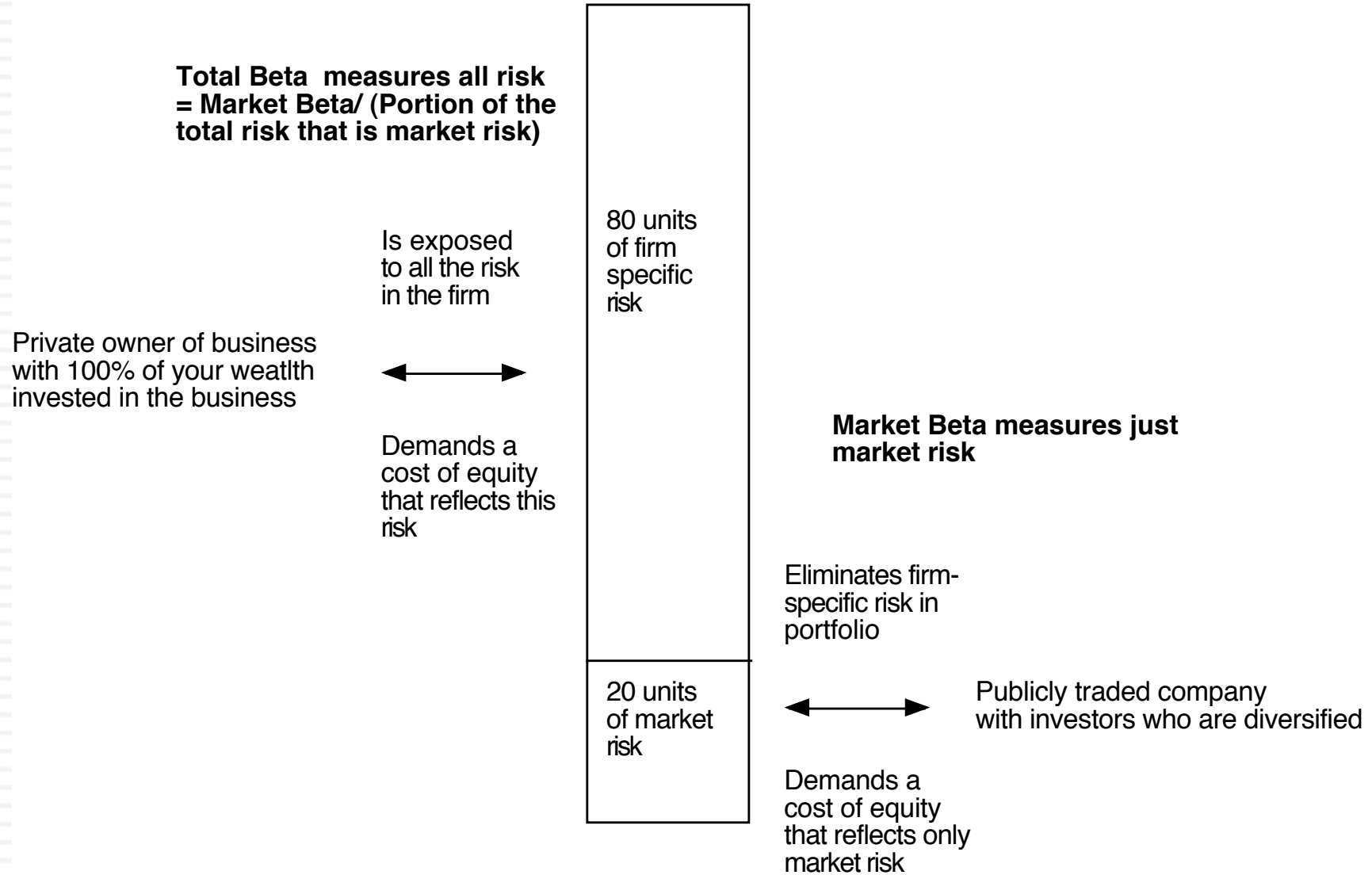
Country Risk Premium  
 0%

*Aswath Damodaran*

Unlevered Beta for Sectors: 0.78

Firm's D/E Ratio: 30/70

# Private Owner versus Publicly Traded Company Perceptions of Risk in an Investment



# Total Risk versus Market Risk

- Adjust the beta to reflect total risk rather than market risk. This adjustment is a relatively simple one, since the R squared of the regression measures the proportion of the risk that is market risk.
  - Total Beta = Market Beta / Correlation of the sector with the market
- To estimate the beta for Kristin Kandy, we begin with the bottom-up unlevered beta of food processing companies:
  - Unlevered beta for publicly traded food processing companies = 0.78
  - Average correlation of food processing companies with market = 0.333
  - Unlevered total beta for Kristin Kandy =  $0.78/0.333 = 2.34$
  - Debt to equity ratio for Kristin Kandy =  $0.3/0.7$  (assumed industry average)
  - Total Beta =  $2.34 ( 1 - (1-.40)(30/70)) = 2.94$
  - Total Cost of Equity =  $4.50\% + 2.94 (4\%) = 16.26\%$

## Lesson 2: With financials, trust but verify..

- Different Accounting Standards: The accounting statements for private firms are often based upon different accounting standards than public firms, which operate under much tighter constraints on what to report and when to report.
- Intermingling of personal and business expenses: In the case of private firms, some personal expenses may be reported as business expenses.
- Separating “Salaries” from “Dividends”: It is difficult to tell where salaries end and dividends begin in a private firm, since they both end up with the owner.
- The Key person issue: In some private businesses, with a personal component, the cashflows may be intertwined with the owner being part of the business.

## Lesson 3: Illiquidity is a clear and present danger..

- In private company valuation, illiquidity is a constant theme. All the talk, though, seems to lead to a rule of thumb. The illiquidity discount for a private firm is between 20-30% and does not vary across private firms.
- But illiquidity should vary across:
  - Companies: Healthier and larger companies, with more liquid assets, should have smaller discounts than money-losing smaller businesses with more illiquid assets.
  - Time: Liquidity is worth more when the economy is doing badly and credit is tough to come by than when markets are booming.
  - Buyers: Liquidity is worth more to buyers who have shorter time horizons and greater cash needs than for longer term investors who don't need the cash and are willing to hold the investment.

# Estimating an Illiquidity Discount

1. The Bludgeon Approach: Many practitioners use a fixed illiquidity discount, often around 25%, to reduce the values of all private business, no matter who the buyer, what the firm looks like or market conditions.
2. The Refined Bludgeon Approach: Start with a fixed discount, but alter it (subjectively or numerically) to reflect business, buyer and market conditions.
3. Illiquidity as an option: In a sense, liquidity provides the option to an asset's holder to sell at the prevailing market price, and not having it therefore can be viewed as the loss of this put option.
4. The Bid Ask Spread Variant: All investments, including the most liquid publicly traded stock, are illiquid, with the bid ask spread (as percent of the price) representing the magnitude of the illiquidity.



# And it is not just in private businesses..

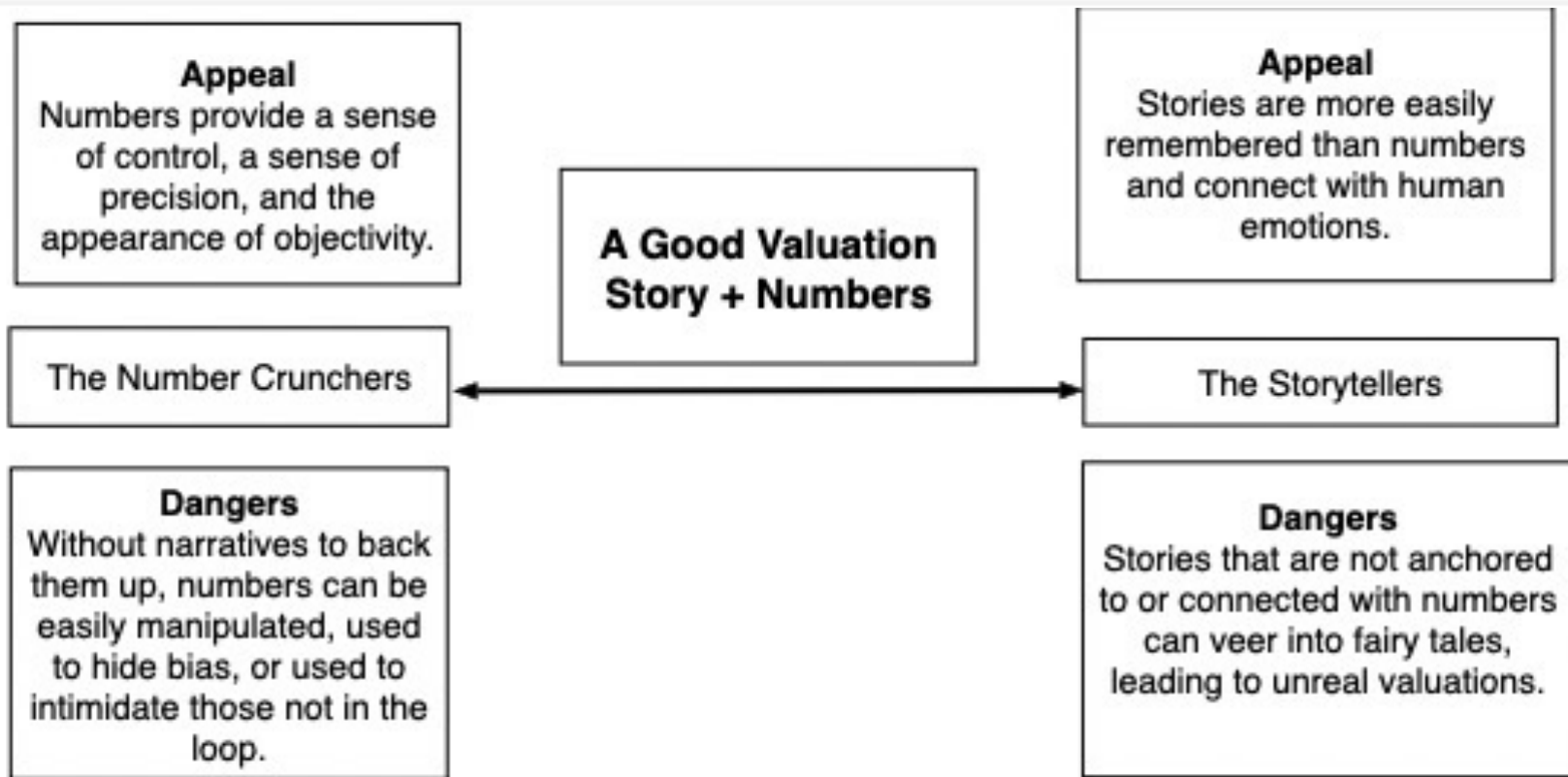
- Assume that you are valuing a closely held company in a lightly traded market. Will the possibility of illiquidity affect your valuation of the company?
  - a. Yes
  - b. No
- If it will affect your valuation, how will it show up?
- If it will not affect your valuation, how would it show up in your investment process?



# Intrinsic Value: Story + Numbers

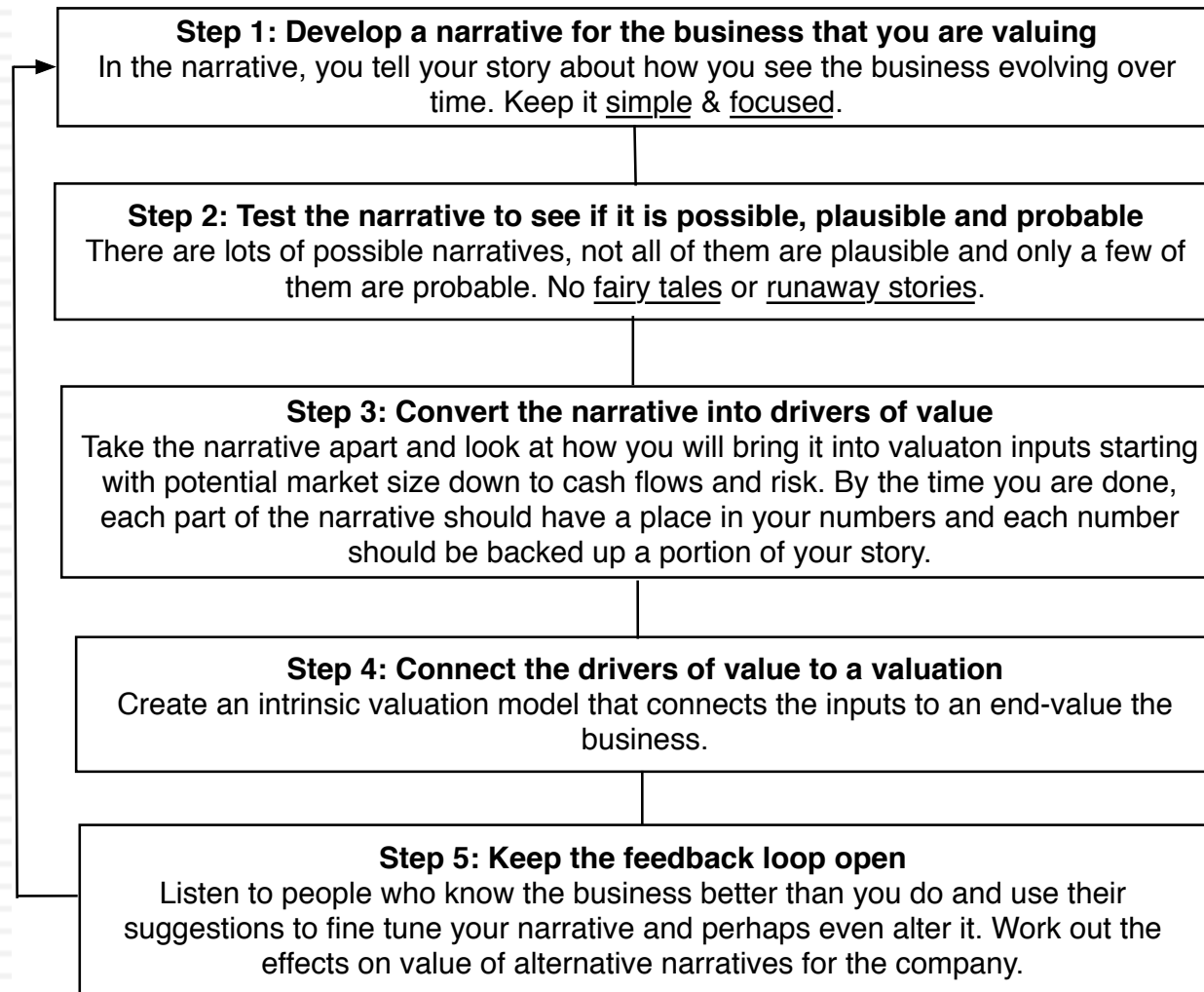
Work on your weak side...

# Valuation as a bridge



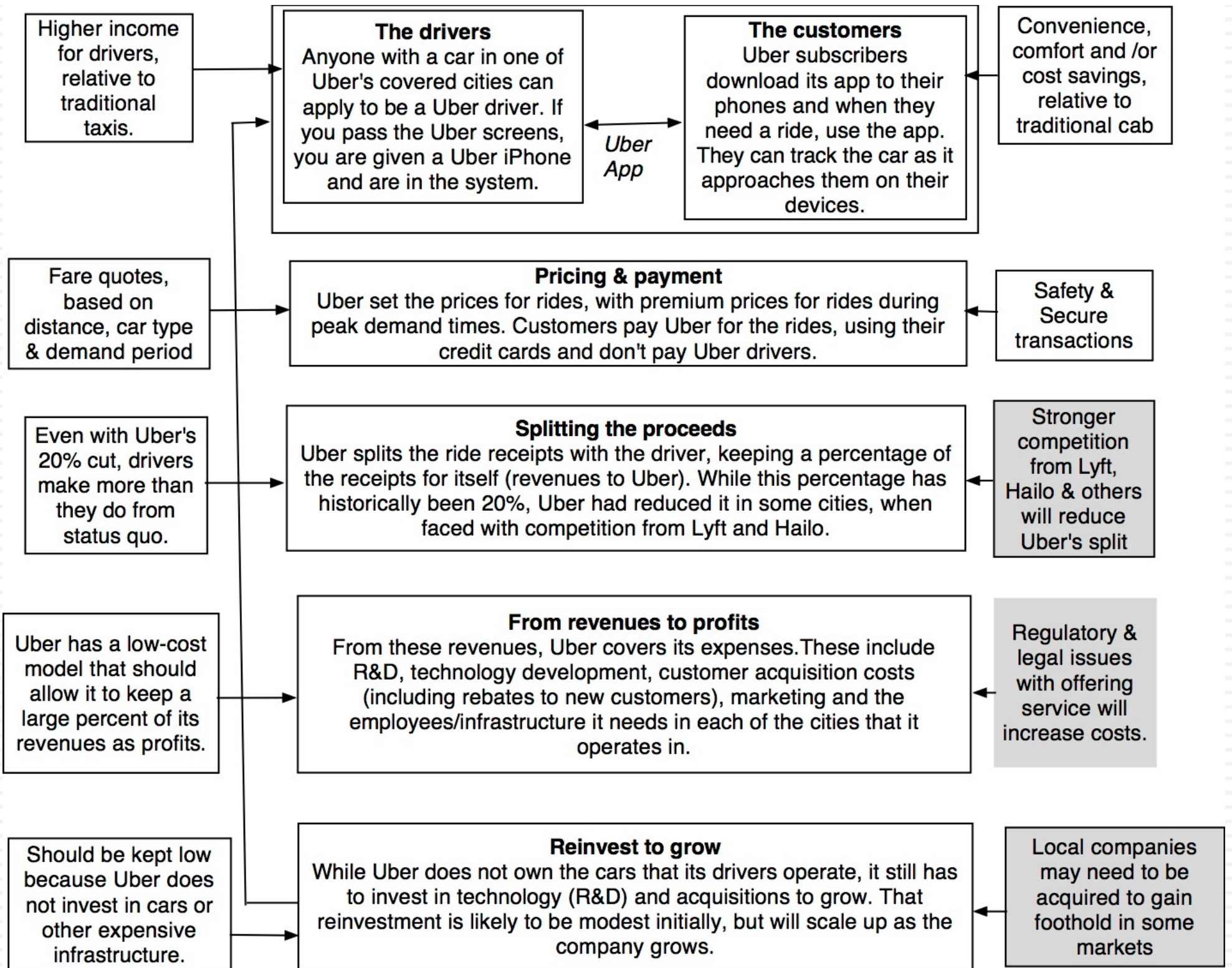
# From story to numbers and beyond..

140



# Step 1a: Survey the landscape

- 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 and its history).
  - ▣ The market or markets that you see it growing in.
  - ▣ The competition it faces and will face.
  - ▣ The macro environment in which it operates.



# Low Growth

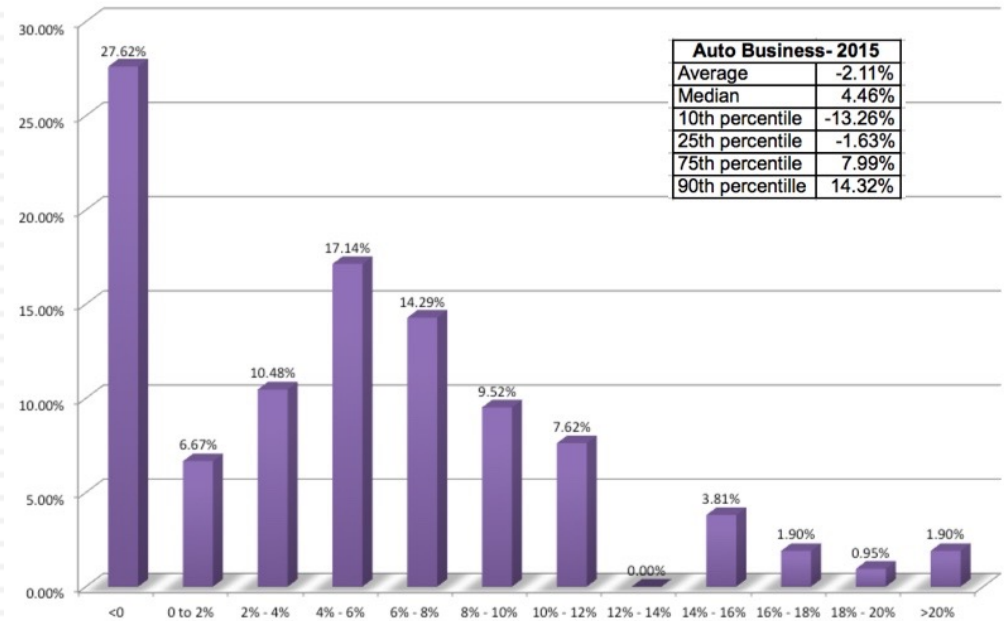
# The Auto Business

# Low Margins

| Year              | Revenues (\$) | % Growth Rate |
|-------------------|---------------|---------------|
| 2005              | 1,274,716.60  |               |
| 2006              | 1,421,804.20  | 11.54%        |
| 2007              | 1,854,576.40  | 30.44%        |
| 2008              | 1,818,533.00  | -1.94%        |
| 2009              | 1,572,890.10  | -13.51%       |
| 2010              | 1,816,269.40  | 15.47%        |
| 2011              | 1,962,630.40  | 8.06%         |
| 2012              | 2,110,572.20  | 7.54%         |
| 2013              | 2,158,603.00  | 2.28%         |
| 2014              | 2,086,124.80  | -3.36%        |
| Rounded Average = |               | 5.63%         |

+

The Automobile Business: Pre-tax Operating Margins in 2015

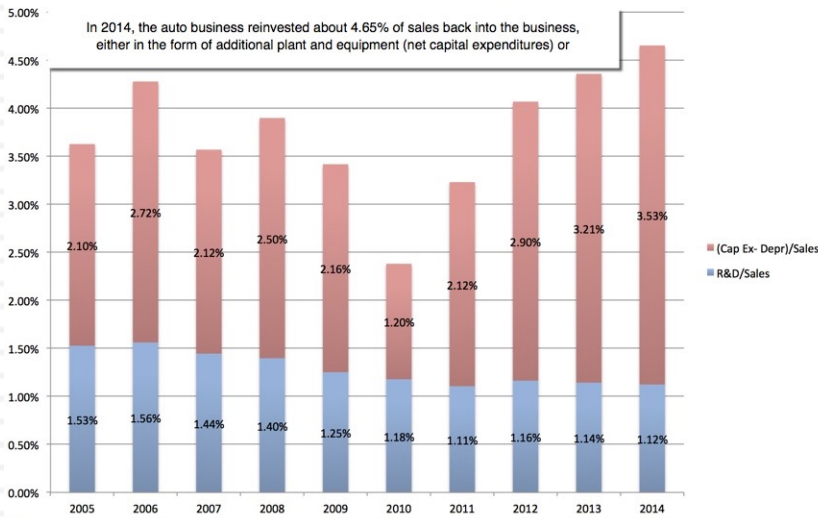


| Auto Business-2015 |         |
|--------------------|---------|
| Average            | -2.11%  |
| Median             | 4.46%   |
| 10th percentile    | -13.26% |
| 25th percentile    | -1.63%  |
| 75th percentile    | 7.99%   |
| 90th percentile    | 14.32%  |

# High & Increasing Reinvestment

# Bad Business

The Reinvestment Burden: Investment as % of Sales for Auto Business



=

|      | ROIC   | Cost of capital | ROIC - Cost of capital |
|------|--------|-----------------|------------------------|
| 2004 | 6.82%  | 7.93%           | -1.11%                 |
| 2005 | 10.47% | 7.02%           | 3.45%                  |
| 2006 | 4.60%  | 7.97%           | -3.37%                 |
| 2007 | 7.62%  | 8.50%           | -0.88%                 |
| 2008 | 3.48%  | 8.03%           | -4.55%                 |
| 2009 | -4.97% | 8.58%           | -13.55%                |
| 2010 | 5.16%  | 8.03%           | -2.87%                 |
| 2011 | 7.55%  | 8.15%           | -0.60%                 |
| 2012 | 7.80%  | 8.55%           | -0.75%                 |
| 2013 | 7.83%  | 8.47%           | -0.64%                 |
| 2014 | 6.47%  | 7.53%           | -1.06%                 |

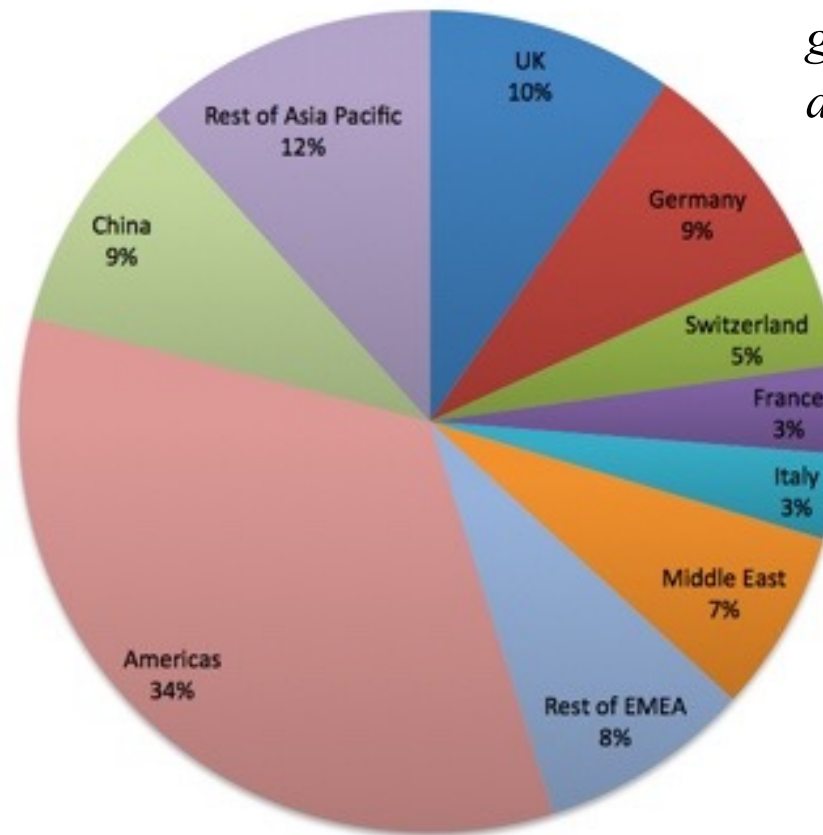
Only once in the last 10 years have auto companies collectively earned more than their cost of capital

# What makes Ferrari different?

*Ferrari sold only 7,255 cars in all of 2014*

*Ferrari had a profit margin of 18.2%, in the 95<sup>th</sup> percentile, partly because of its high prices and partly because it spends little on advertising.*

*Ferrari: Geographical Sales (2014)*



*Ferrari sales (in units) have grown very little in the last decade & have been stable*

*Ferrari has not invested in new plants.*



# Step 1b: Create a narrative for the future

- 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.
  - ▣ Rule 1: Keep it simple.
  - ▣ Rule 2: Keep it focused.

# The Uber Narrative

In June 2014, my initial narrative for Uber was that it would be

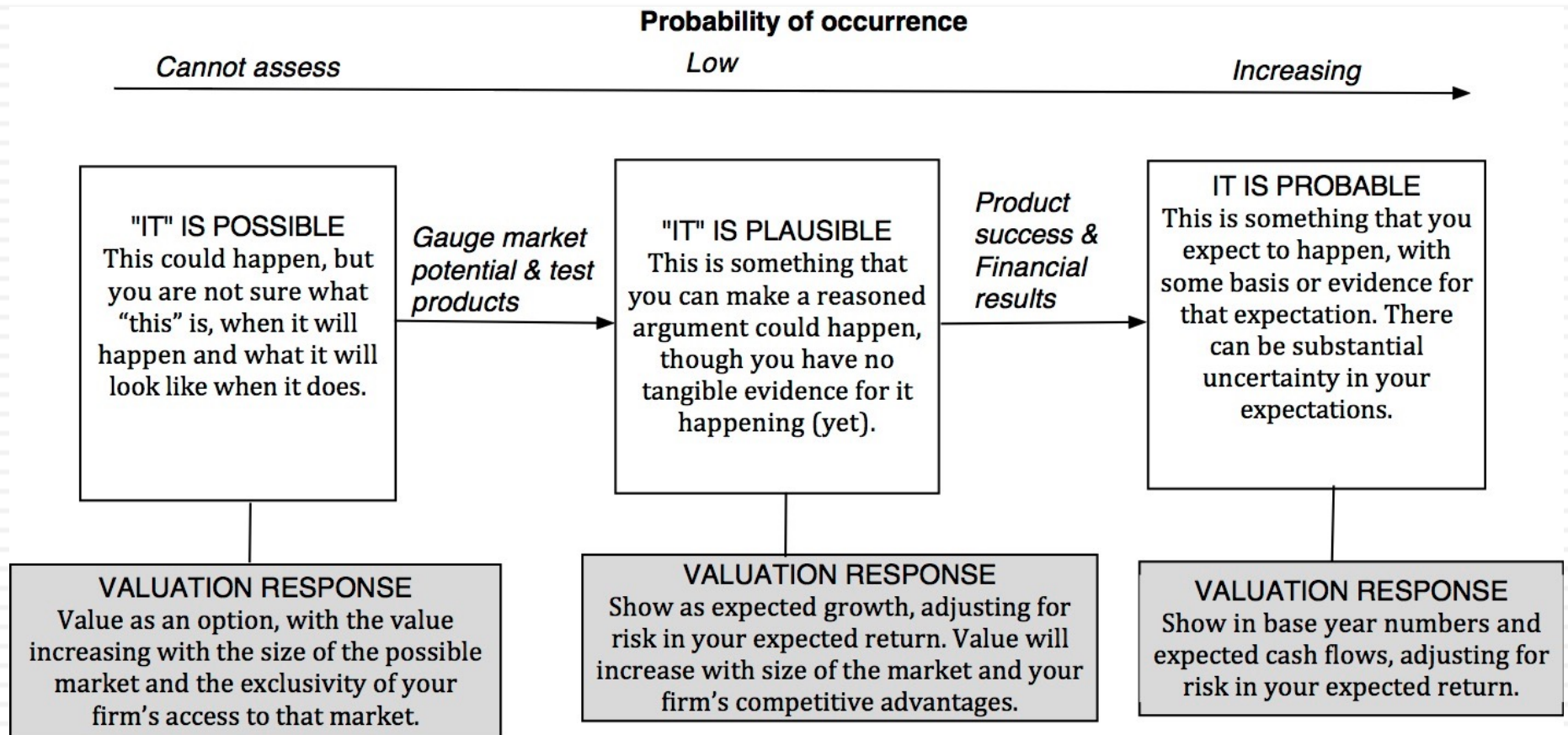
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will quickly become larger, but that will be of little help when it enters a new city.
4. Maintain its revenue sharing (20%) system due to strong competitive advantages (from being a first mover).
5. And its existing low-capital business model, with drivers as contractors and very little investment in infrastructure.

# The Ferrari Narrative

- Ferrari will stay an exclusive auto club, deriving its allure from its scarcity and the fact that only a few own Ferraris.
- By staying exclusive, the company gets three benefits:
  - ▣ It can continue to charge nose bleed prices for its cars and sell them with little or no advertising.
  - ▣ It does not need to invest in new assembly plants, since it does not plan to ramp up production.
  - ▣ It sells only to the super rich, who are unaffected by overall economic conditions or market crises.

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

148



# The Impossible, The Implausible and the Improbable

149

## The Impossible

### Bigger than the economy

Assuming Growth rate for company in perpetuity > Growth rate for economy

### Bigger than the total market

Allowing a company's revenues to grow so much that it has more than a 100% market share of whatever business it is in.

### Profit margin > 100%

Assuming earnings growth will exceed revenue growth for a long enough period, and pushing margins above 100%

### Depreciation without cap ex

Assuming that depreciation will exceed cap ex in perpetuity.

## The Implausible

### Growth without reinvestment

Assuming growth forever without reinvestment.

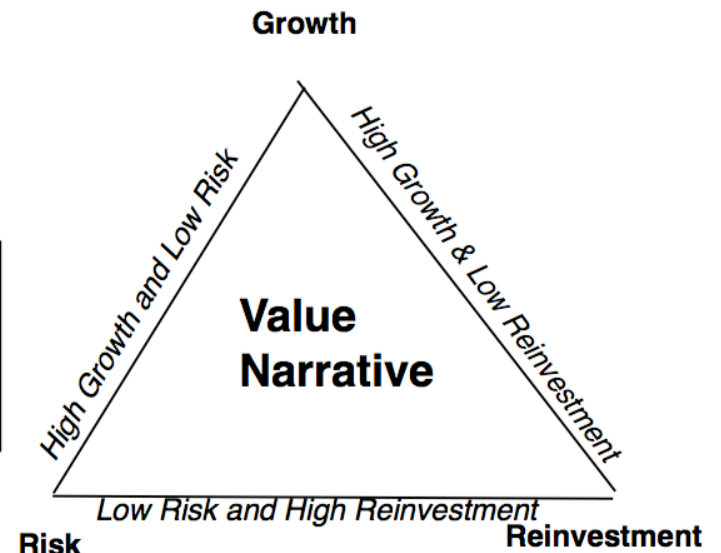
### Profits without competition

Assuming that your company will grow and earn higher profits, with no competition.

### Returns without risk

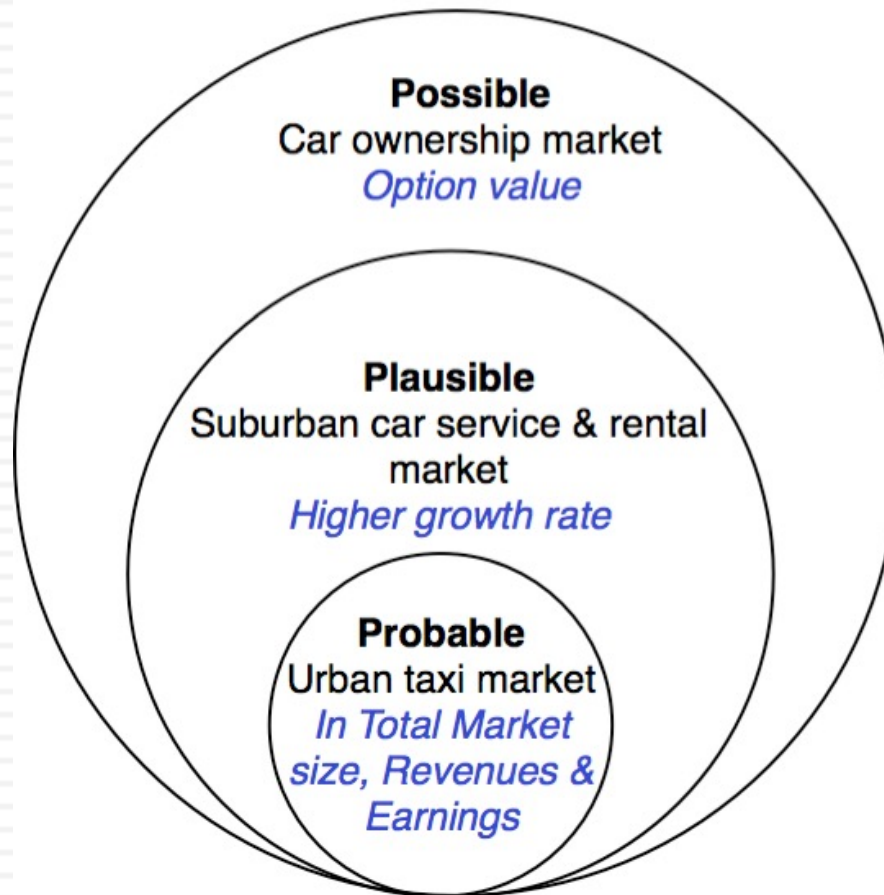
Assuming that you can generate high returns in a business with no risk.

## The Improbable



# Uber: Possible, Plausible and Probable

## Uber (My narrative))

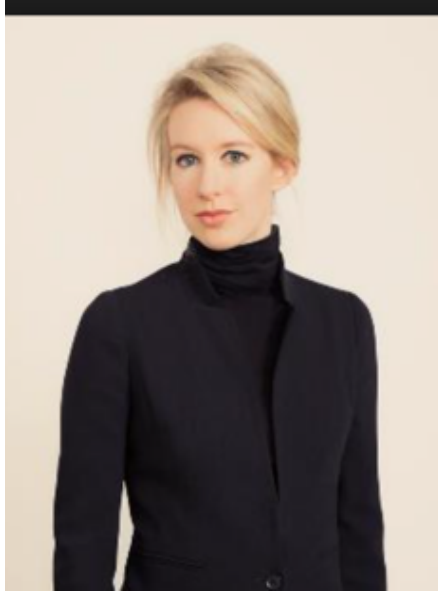


# The Runaway Story: When you want a story to be true...

- With a runaway business story, you usually have three ingredients:
  1. Charismatic, likeable Narrator: The narrator of the business story is someone that you want to see succeed, either because you like the narrator or because he/she will be a good role model.
  2. Telling a story about disrupting a much business, where you dislike the status quo: The status quo in the business that the story is disrupting is dissatisfying (to everyone involved)>
  3. With a societal benefit as bonus: And if the story holds, society and humanity will benefit.
- Since you want this story to work out, you stop asking questions, because the answers may put the story at risk.

# The Impossible: The Runaway Story

## The Story



+

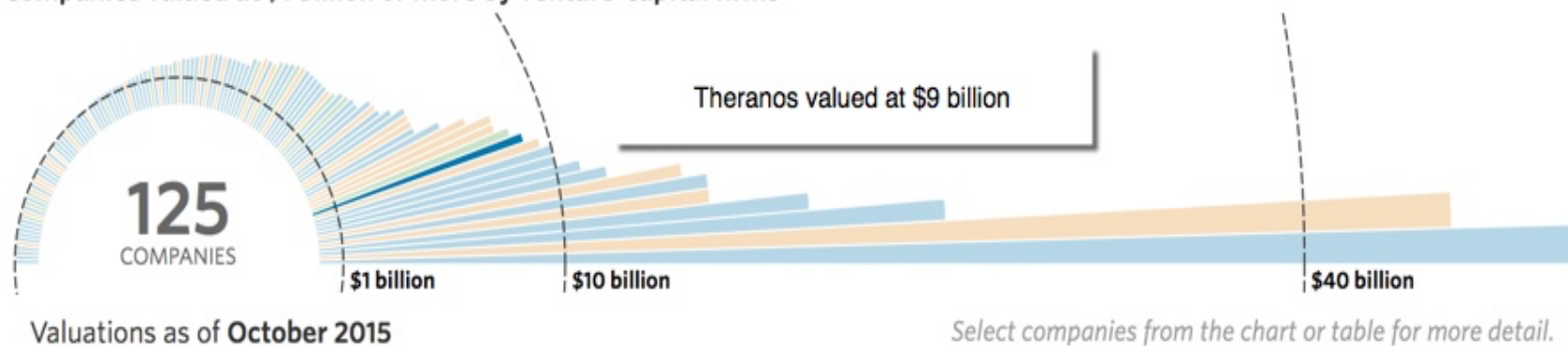
## The Checks (?)

| Board Member     | Designation                   | Age |
|------------------|-------------------------------|-----|
| Henry Kissinger  | Former Secretary of State     | 92  |
| Bill Perry       | Former Secretary of Defense   | 88  |
| George Schultz   | Former Secretary of State     | 94  |
| Bill Frist       | Former Senate Majority Leader | 63  |
| Sam Nunn         | Former Senator                | 77  |
| Gary Roughead    | Former Navy Admiral           | 64  |
| James Mattis     | Former Marine Corps General   | 65  |
| Dick Kovocovich  | Former CEO of Wells Fargo     | 72  |
| Riley Bechtel    | Former CEO of Bechtel         | 63  |
| William Foege    | Epidemiologist                | 79  |
| Elizabeth Holmes | Founder & CEO, Theranos       | 31  |
| Sunny Balwani    | President & COO, Theranos     | NA  |

+

Money

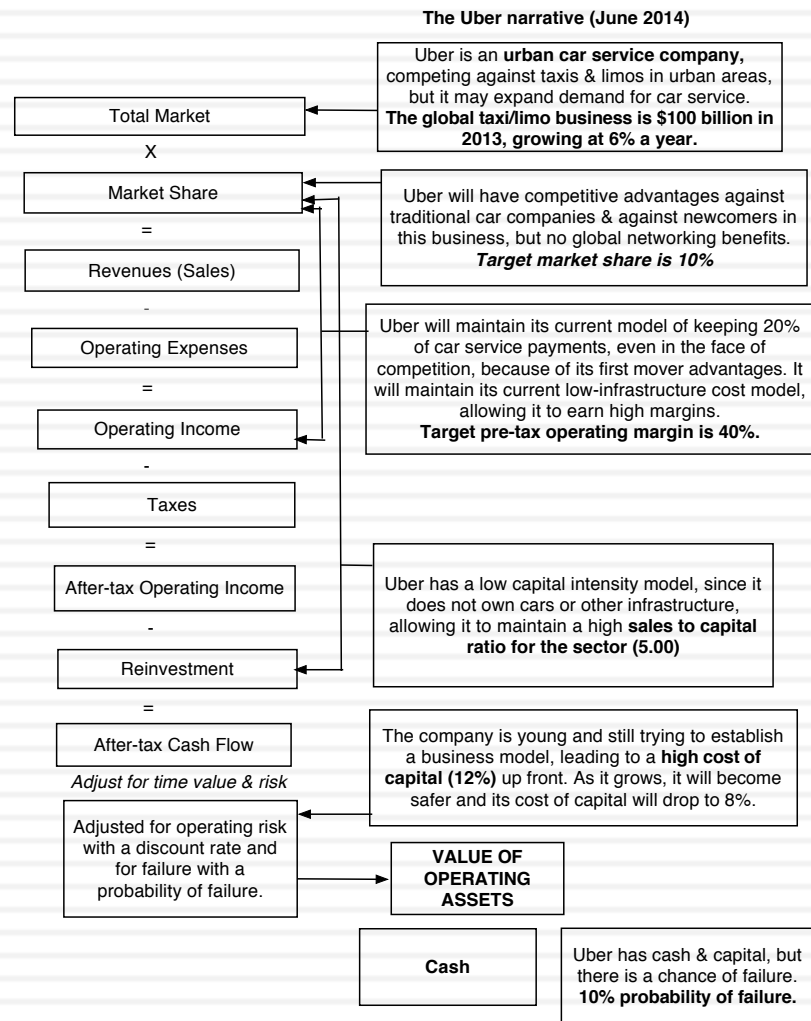
## Companies valued at \$1 billion or more by venture-capital firms



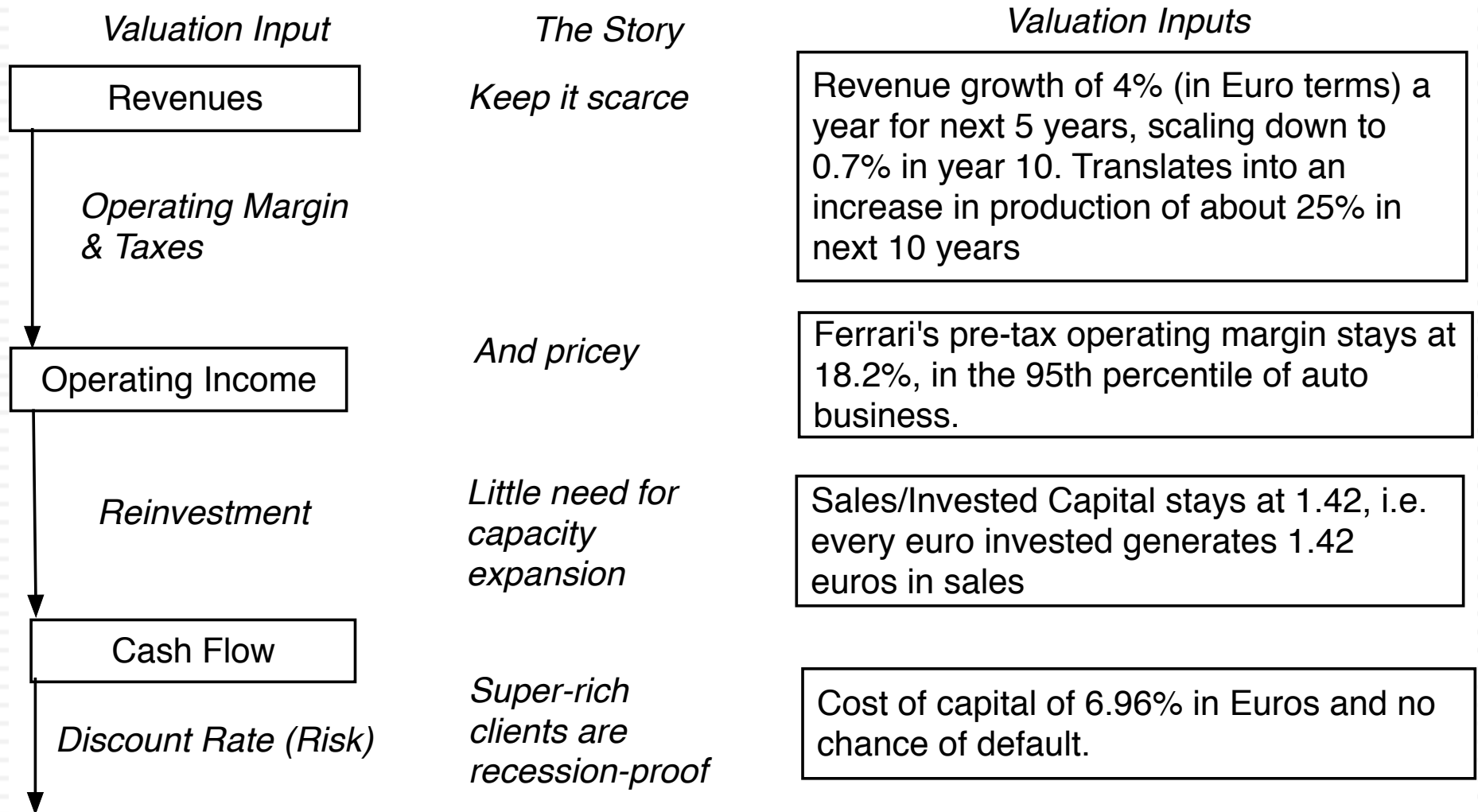




# Step 3: Connect your narrative to key drivers of value



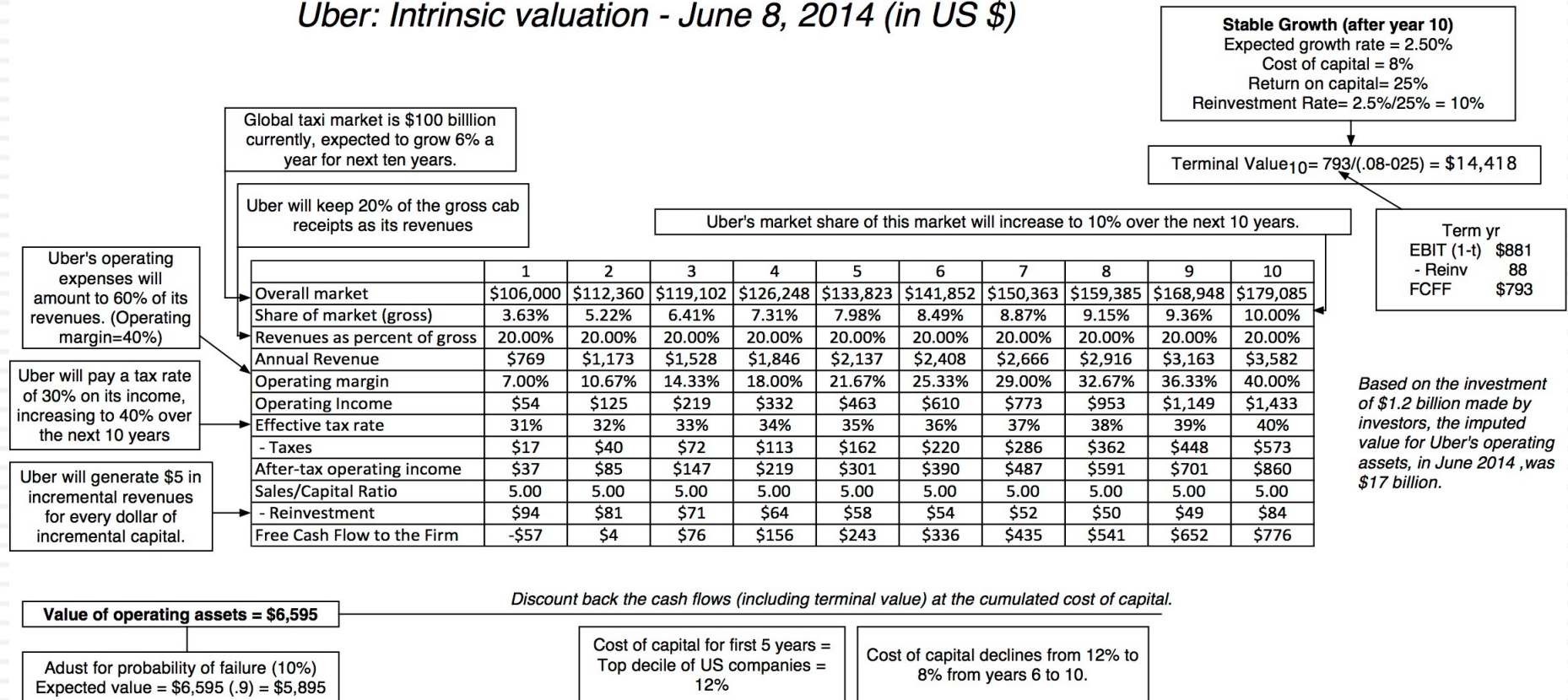
# Ferrari: From story to numbers



# Step 4: Value the company (Uber)

156

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



# Ferrari: The “Exclusive Club” Value

Stay Super Exclusive: Revenue growth is low

|                             | Base year | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | Terminal year |
|-----------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|
| Revenue growth rate         |           | 4.00%   | 4.00%   | 4.00%   | 4.00%   | 4.00%   | 3.34%   | 2.68%   | 2.02%   | 1.36%   | 0.70%   | 0.70%         |
| Revenues                    | € 2,763   | € 2,874 | € 2,988 | € 3,108 | € 3,232 | € 3,362 | € 3,474 | € 3,567 | € 3,639 | € 3,689 | € 3,714 | € 3,740       |
| EBIT (Operating) margin     | 18.20%    | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%  | 18.20%        |
| EBIT (Operating income)     | € 503     | € 523   | € 544   | € 566   | € 588   | € 612   | € 632   | € 649   | € 662   | € 671   | € 676   | € 681         |
| Tax rate                    | 33.54%    | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%        |
| EBIT(1-t)                   | € 334     | € 348   | € 361   | € 376   | € 391   | € 407   | € 420   | € 431   | € 440   | € 446   | € 449   | € 452         |
| - Reinvestment              |           | € 78    | € 81    | € 84    | € 87    | € 91    | € 79    | € 66    | € 51    | € 35    | € 18    | € 22          |
| FCFF                        |           | € 270   | € 281   | € 292   | € 303   | € 316   | € 341   | € 366   | € 389   | € 411   | € 431   | € 431         |
| Cost of capital             |           | 6.96%   | 6.96%   | 6.96%   | 6.96%   | 6.96%   | 6.96%   | 6.97%   | 6.98%   | 6.99%   | 7.00%   | 7.00%         |
| PV(FCFF)                    |           | € 252   | € 245   | € 238   | € 232   | € 225   | € 228   | € 228   | € 227   | € 224   | € 220   |               |
| Terminal value              | € 6,835   |         |         |         |         |         |         |         |         |         |         |               |
| PV(Terminal value)          | € 3,485   |         |         |         |         |         |         |         |         |         |         |               |
| PV (CF over next 10 years)  | € 2,321   |         |         |         |         |         |         |         |         |         |         |               |
| Value of operating assets = | € 5,806   |         |         |         |         |         |         |         |         |         |         |               |
| - Debt                      | € 623     |         |         |         |         |         |         |         |         |         |         |               |
| - Minority interests        | € 13      |         |         |         |         |         |         |         |         |         |         |               |
| + Cash                      | € 1,141   |         |         |         |         |         |         |         |         |         |         |               |
| Value of equity             | € 6,311   |         |         |         |         |         |         |         |         |         |         |               |

High Prices  
+ No selling  
cost =  
Preserve  
current  
operating  
margin

Minimal  
Reinvestment  
due to low  
growth

The super  
rich are not  
sensitive to  
economic  
downturns

# Step 5: Keep the feedback loop

158

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

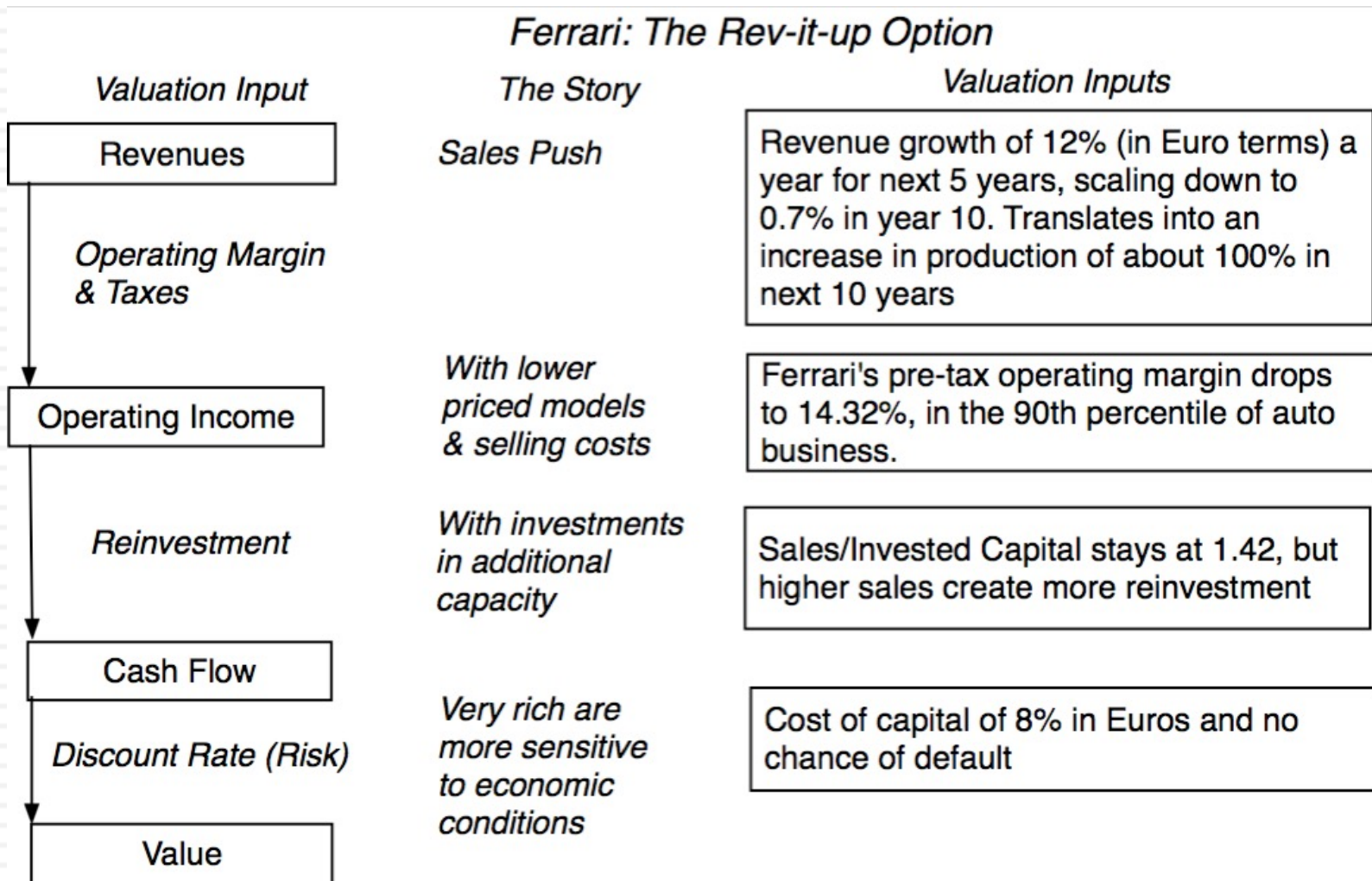
|                      | <i>Uber (Gurley)</i>   | <i>Uber (Gurley Mod)</i>  | <i>Uber (Damodaran)</i>   |
|----------------------|--|---|---|
| Narrative            | Uber will <u>expand the car service market substantially</u> , bringing in mass transit users & non-users from the suburbs into the market, 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                |



# The Ferrari Counter Narrative



# Ferrari: The “Rev-it-up” Alternative

Get less exclusive: Double number of cars sold over next decade

|                             | Base year | 1       | 2       | 3       | 4       | 5       | 6       | 7       | 8       | 9       | 10      | Terminal year |
|-----------------------------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|
| Revenue growth rate         |           | 12.00%  | 12.00%  | 12.00%  | 12.00%  | 12.00%  | 9.74%   | 7.48%   | 5.22%   | 2.96%   | 0.70%   | 0.70%         |
| Revenues                    | € 2,763   | € 3,095 | € 3,466 | € 3,882 | € 4,348 | € 4,869 | € 5,344 | € 5,743 | € 6,043 | € 6,222 | € 6,266 | € 6,309       |
| EBIT (Operating) margin     | 18.20%    | 17.81%  | 17.42%  | 17.04%  | 16.65%  | 16.26%  | 15.87%  | 15.48%  | 15.10%  | 14.71%  | 14.32%  | 14.32%        |
| EBIT (Operating income)     | € 503     | € 551   | € 604   | € 661   | € 724   | € 792   | € 848   | € 889   | € 912   | € 915   | € 897   | € 904         |
| Tax rate                    | 33.54%    | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%  | 33.54%        |
| EBIT(1-t)                   | € 334     | € 366   | € 401   | € 439   | € 481   | € 526   | € 564   | € 591   | € 606   | € 608   | € 596   | € 600         |
| - Reinvestment              |           | € 233   | € 261   | € 293   | € 328   | € 367   | € 334   | € 281   | € 211   | € 126   | € 31    | € 35          |
| FCFF                        |           | € 133   | € 140   | € 147   | € 153   | € 159   | € 230   | € 310   | € 395   | € 482   | € 566   | € 565         |
| Cost of capital             |           | 8.00%   | 8.00%   | 8.00%   | 8.00%   | 8.00%   | 7.90%   | 7.80%   | 7.70%   | 7.60%   | 7.50%   | 7.50%         |
| PV(FCFF)                    |           | € 123   | € 120   | € 117   | € 113   | € 108   | € 145   | € 181   | € 215   | € 244   | € 266   |               |
| Terminal value              | € 8,315   |         |         |         |         |         |         |         |         |         |         |               |
| PV(Terminal value)          | € 3,906   |         |         |         |         |         |         |         |         |         |         |               |
| PV (CF over next 10 years)  | € 1,631   |         |         |         |         |         |         |         |         |         |         |               |
| Value of operating assets = | € 5,537   |         |         |         |         |         |         |         |         |         |         |               |
| - Debt                      | € 623     |         |         |         |         |         |         |         |         |         |         |               |
| - Minority interests        | € 13      |         |         |         |         |         |         |         |         |         |         |               |
| + Cash                      | € 1,141   |         |         |         |         |         |         |         |         |         |         |               |
| Value of equity             | € 6,042   |         |         |         |         |         |         |         |         |         |         |               |

Lower Prices +  
Some selling  
cost = Lower  
operating  
margin

Reinvestment  
reflects  
higher sales

The very  
rich are  
more  
sensitive to  
economic  
conditions

# And the world is full of feedback.. My Ferrari afterthought!



# Zomato IPO: Alternate Stories (and Values)

| Story   | TAM (in ₹ millions) | Market Share | Revenue Slice | Target Margin | Cost of Capital | Value/share |           |
|---|---------------------|--------------|---------------|---------------|-----------------|-------------|-----------|
| Delivery Juggernaut                                   | ₹ 5,000,000.00      | 40%          | 25%           | 45%           | 9.50%           | ₹ 150.02    | Plausible |
| Delivery Star   | ₹ 5,000,000.00      | 40%          | 22%           | 35%           | 9.50%           | ₹ 93.00     |           |
| Delivery Leader + Competition                         | ₹ 5,000,000.00      | 40%          | 15%           | 35%           | 10.99%          | ₹ 61.55     |           |
| Restaurant Delivery Juggernaut + High Growth India    | ₹ 3,000,000.00      | 40%          | 25%           | 45%           | 9.50%           | ₹ 94.31     | Probable  |
| Restaurant Delivery Star + High Growth India          | ₹ 3,000,000.00      | 40%          | 22%           | 35%           | 9.50%           | ₹ 59.02     |           |
| Restaurant Delivery + Competition + High Growth India | ₹ 3,000,000.00      | 40%          | 20%           | 25%           | 10.99%          | ₹ 35.52     |           |
| Base Case, Positive                                   | ₹ 2,000,000.00      | 40%          | 25%           | 45%           | 10.25%          | ₹ 56.66     |           |
| Base Case   | ₹ 2,000,000.00      | 40%          | 22%           | 35%           | 10.25%          | ₹ 39.48     |           |
| Base Case, Negative                                   | ₹ 2,000,000.00      | 40%          | 20%           | 25%           | 10.25%          | ₹ 26.16     | Plausible |
| Restaurant Delivery Juggernaut + Low Growth India     | ₹ 1,125,000.00      | 40%          | 25%           | 45%           | 9.50%           | ₹ 36.48     |           |
| Restaurant Delivery Star + Low Growth India           | ₹ 1,125,000.00      | 40%          | 22%           | 35%           | 9.50%           | ₹ 24.02     |           |
| Restaurant Delivery + Competition + low Growth India  | ₹ 1,125,000.00      | 40%          | 20%           | 25%           | 10.99%          | ₹ 16.58     |           |

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

165

| Narrative Break/End   | Narrative Shift  | Narrative Change<br>(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   |



# Pricing 101

Aswath Damodaran

# Relative valuation is pervasive...

- Most asset valuations are relative.
- Most equity valuations on Wall Street are relative valuations.
  - Almost 85% of equity research reports are based upon a multiple and comparables.
  - More than 50% of all acquisition valuations are based upon multiples
  - Rules of thumb based on multiples are not only common but are often the basis for final valuation judgments.
- While there are more discounted cashflow valuations in consulting and corporate finance, they are often relative valuations masquerading as discounted cash flow valuations.
  - The objective in many discounted cashflow valuations is to back into a number that has been obtained by using a multiple.
  - The terminal value in a significant number of discounted cashflow valuations is estimated using a multiple.

# Why relative valuation?

168

“If you think I’ m crazy, you should see the gu  
lives across the hall”

Jerry Seinfeld talking about Kramer in a Seinfeld episode



*“A little inaccuracy sometimes saves tons of explanation”*

*H.H. Munro*

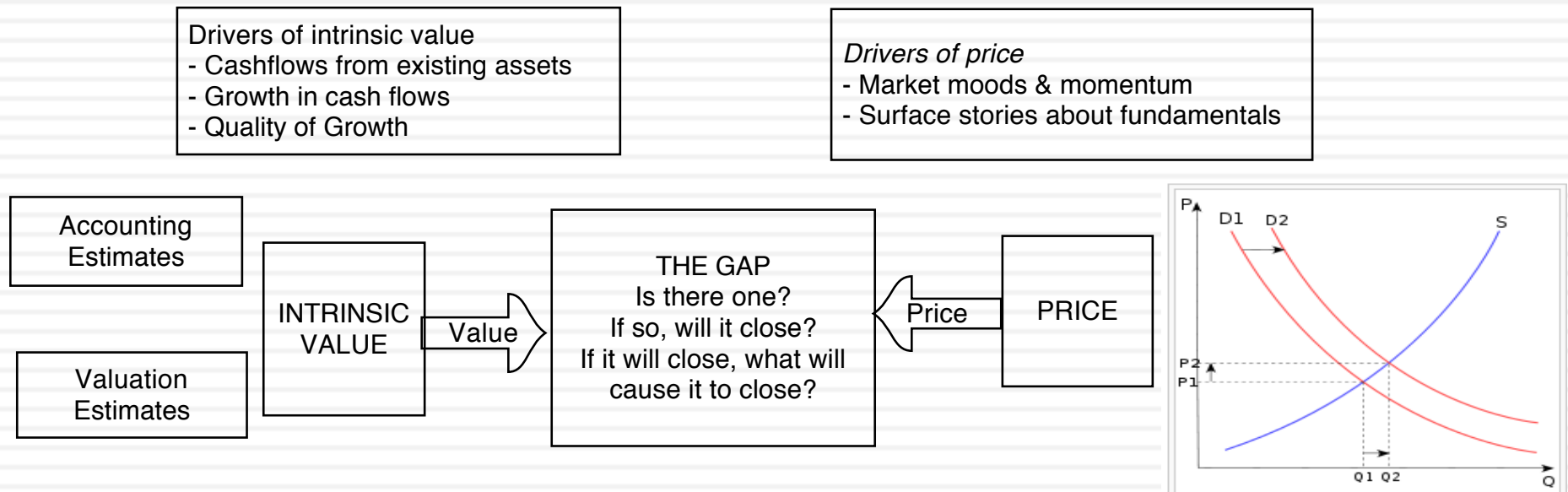
*“If you are going to screw up, make sure that you have  
lots of company”*

*Ex-portfolio manager*




# Pricing versus Valuation

169



# Test 1: Are you pricing or valuing?

170



**5369 La Jolla Mesa Dr**  
La Jolla, CA 92037  
Status: Active

**\$995,000**  
Price

**3**  
Beds


**2.5**  
Baths

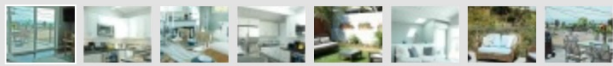
**1,440** Sq. Ft.  
\$691 / Sq. Ft.

Built: 1955   Lot Size: 3,000 Sq. Ft.   On Redfin: 12 days

Favorite   X-Out   Share...   Tour Home

Overview   Property Details   Tour Insights   Property History   Public Records   Activity   Schools   Neighborhood & Offer Insights   Similar Homes




1 of 25      Play Video

**Lisa Padilla**  
REDFIN Real Estate Agent

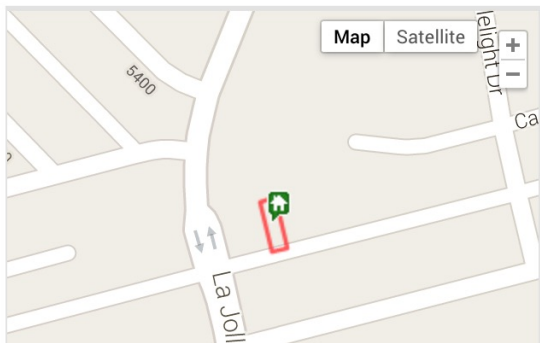
★★★★★  
47 client reviews

\$8,726 commission refund

 Go Tour This Home

[Ask Lisa a Question](#) or [Start an Offer](#)

1 of 4 Redfin Agents in this area



# Test 2: Are you pricing or valuing?

171

Europe  
Switzerland  
  
Biotechnology  
Biotechnology

Reuters  
BION.S

Bloomberg  
BION SW

Exchange  
SWX  
Ticker  
BION

|                            |                |
|----------------------------|----------------|
| Price at 12 Aug 2013 (CHF) | 124.00         |
| Price Target (CHF)         | 164.50         |
| 52-week range (CHF)        | 128.40 - 84.90 |

## Strong sector and stock-picking continue

### Impressive performance

Over the past two years, BB Biotech shares have roughly tripled, which could tempt investors to take profits. However, this performance has been well backed by a deserved revival of the biotech industry, encouraging fundamental news, M&A, and increased money flow into health care stocks. In addition, BBB returned to index outperformance by modifying its stock-picking approach. Hence, despite excellent performance, the shares still trade at a 23% discount to the net asset value of the portfolio. Hence, the shares are an attractive value vehicle to capture growth opportunities in an attractive sector.

### Biotech industry remains attractive

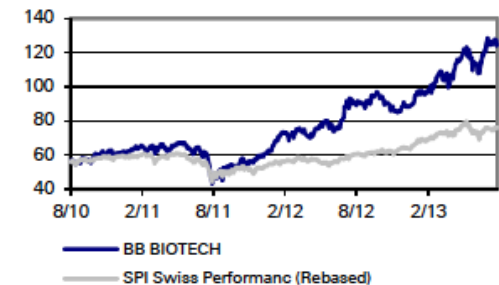
With the re-rating of the pharma sector, investors have also showed increased interest in biotech stocks. Established biotech stocks have delivered encouraging financial results and approvals, while there has also been substantial industry consolidation, which is not surprising in times of "cheap" money and high liquidity. BB Biotech remains an attractive vehicle to capture the future potential of the biotech sector. In addition, investors benefit from a 23% discount to NAV and attractive cash distribution policy of 5% yield p.a. Hence, we reiterate our Buy on BB Biotech shares.

### Key changes

Target Price 106.50 to 164.50 ↑ 54.5%

Source: Deutsche Bank

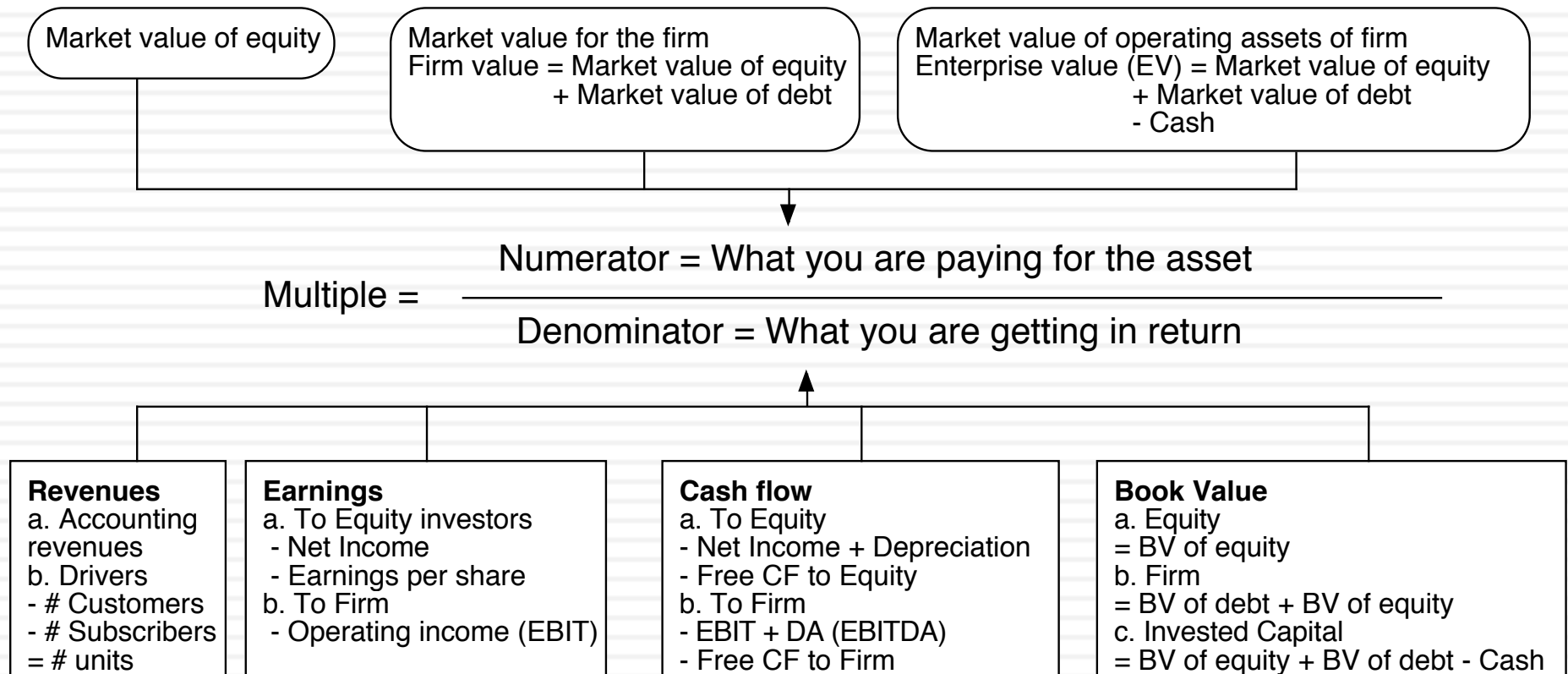
### Price/price relative



| Performance (%) | 1m   | 3m  | 12m  |
|-----------------|------|-----|------|
| Absolute        | -1.4 | 5.4 | 37.4 |

# The tool for pricing: A multiple

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# The Four Steps to Deconstructing Multiples

- Define the multiple
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- Describe the multiple
  - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.
- Analyze the multiple
  - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.
- Apply the multiple
  - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.

# Definitional Tests

- Is the multiple consistently defined?
  - Proposition 1: Both the value (the numerator) and the standardizing variable (the denominator) should be to the same claimholders in the firm. In other words, the value of equity should be divided by equity earnings or equity book value, and firm value should be divided by firm earnings or book value.
- Is the multiple uniformly estimated?
  - The variables used in defining the multiple should be estimated uniformly across assets in the “comparable firm” list.
  - If earnings-based multiples are used, the accounting rules to measure earnings should be applied consistently across assets. The same rule applies with book-value based multiples.

# Example 1: Price Earnings Ratio: Definition

PE = Market Price per Share / Earnings per Share

- There are a number of variants on the basic PE ratio in use. They are based upon how the price and the earnings are defined.

Price: is usually the current price

is sometimes the average price for the year

EPS: EPS in most recent financial year

EPS in trailing 12 months (Trailing PE)

Forecasted EPS for next year (Forward PE)

Forecasted EPS in future year

## Example 2: Enterprise Value /EBITDA Multiple

- The enterprise value to EBITDA multiple is obtained by netting cash out against debt to arrive at enterprise value and dividing by EBITDA.

$$\frac{\text{Enterprise Value}}{\text{EBITDA}} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Earnings before Interest, Taxes and Depreciation}}$$

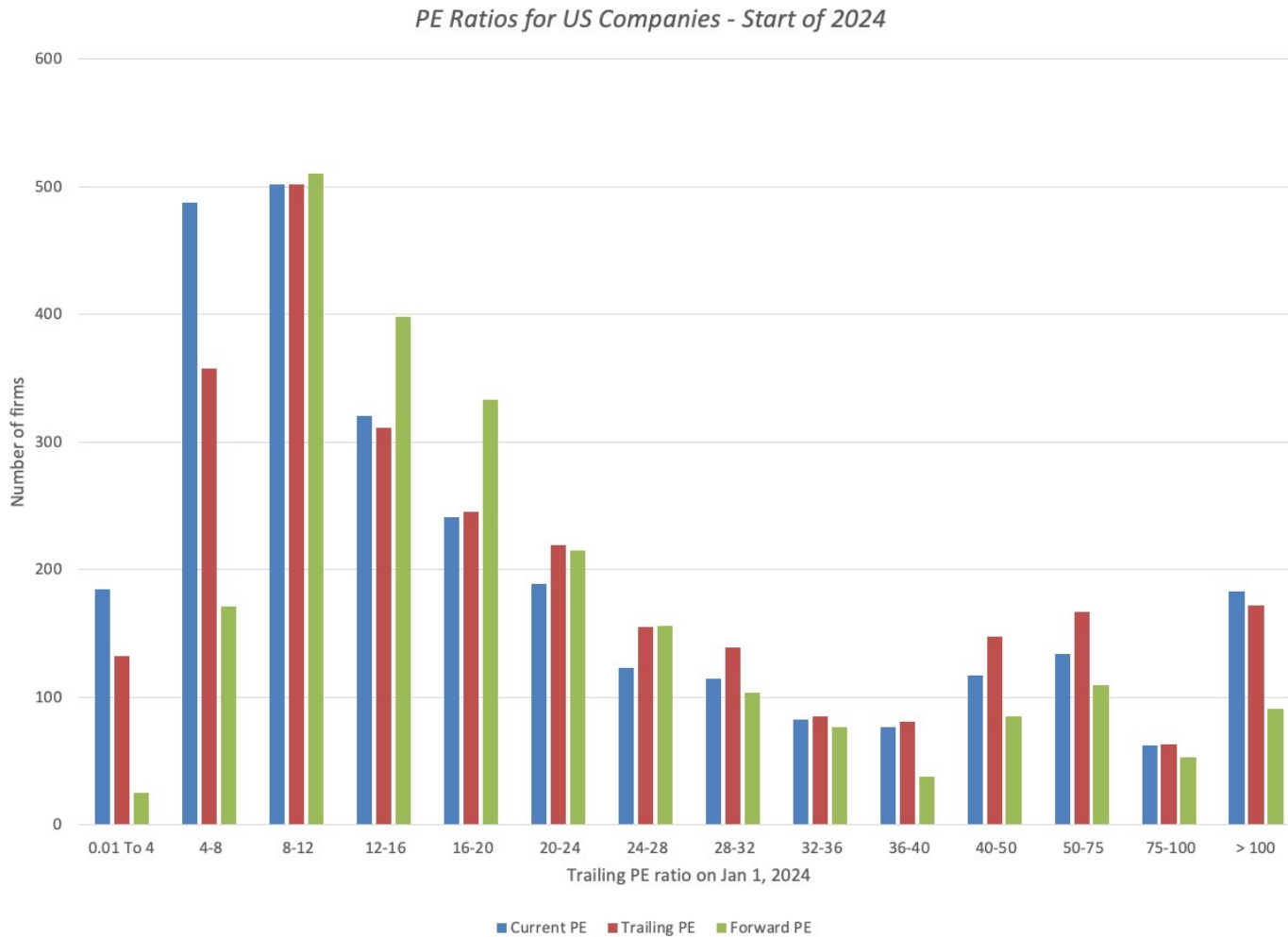
- Why do we net out cash from firm value?
- What happens if a firm has cross holdings which are categorized as:
  - ▣ Minority interests?
  - ▣ Majority active interests?



# Descriptive Tests

- What is the average and standard deviation for this multiple, across the universe (market)?
- What is the median for this multiple?
  - The median for this multiple is often a more reliable comparison point.
- How large are the outliers to the distribution, and how do we deal with the outliers?
  - Throwing out the outliers may seem like an obvious solution, but if the outliers all lie on one side of the distribution (they usually are large positive numbers), this can lead to a biased estimate.
- Are there cases where the multiple cannot be estimated? Will ignoring these cases lead to a biased estimate of the multiple?
- How has this multiple changed over time?

# 1. Multiples have skewed distributions...



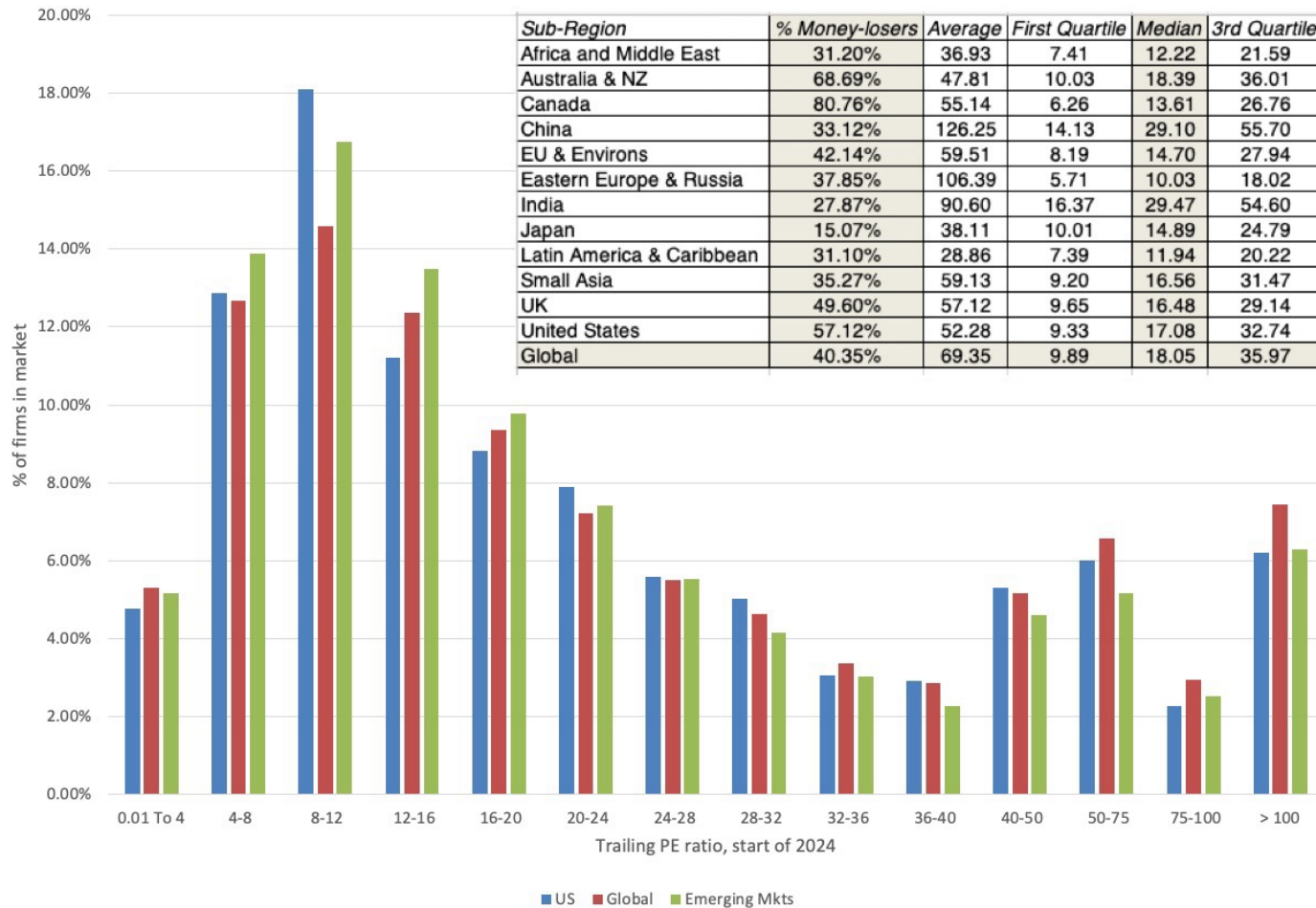
## 2. Making statistics “dicey”

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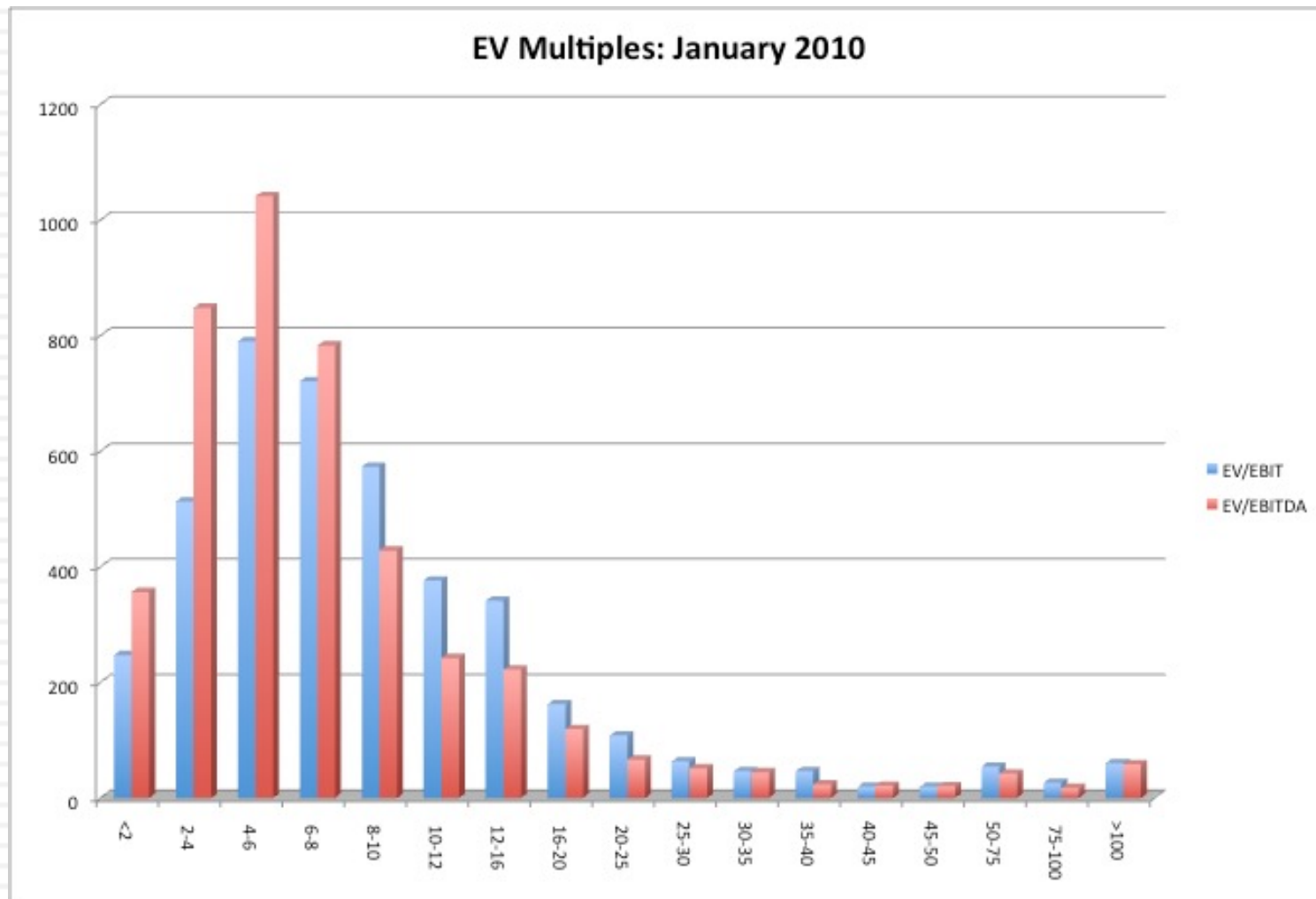
|                    | <i>Current</i> | <i>Trailing</i> | <i>Forward</i> |
|--------------------|----------------|-----------------|----------------|
| # firms            | 6481           | 6481            | 6481           |
| # firms with PE    | 2817           | 2779            | 2363           |
| % with no PE       | 56.53%         | 57.12%          | 63.54%         |
| Average            | 121.65         | 52.28           | 31.98          |
| 25h Percentile     | 8.19           | 9.34            | 11.19          |
| Median             | 14.95          | 17.08           | 16.85          |
| 75th Percentile    | 29.89          | 32.71           | 27.20          |
| Maximum            | 103000.00      | 6471.43         | 2183.33        |
| Standard Deviation | 2207.22        | 254.86          | 84.26          |
| Standard Error     | 41.59          | 4.83            | 1.73           |
| Skewness           | 39.11          | 15.71           | 15.83          |

# 3. Markets have a lot in common : Comparing Global PEs

PE Ratios across the Globe - Start of 2024

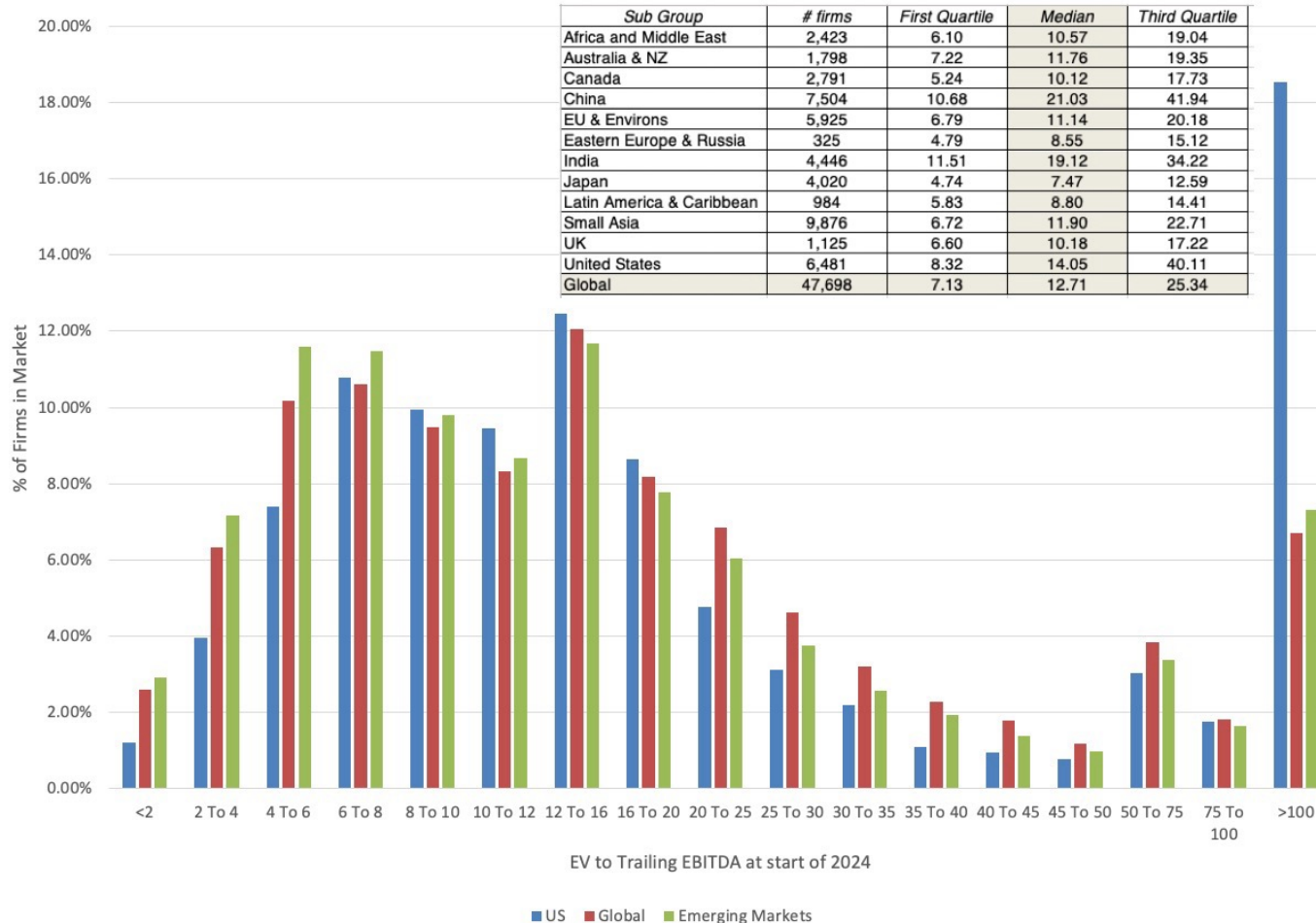


# 4. Simplistic rules almost always break down...6 times EBITDA was not cheap in the US in 2010



# But it may be in 2024, unless you in Japan or Russia...

EV to EBITDA at the start of 2024

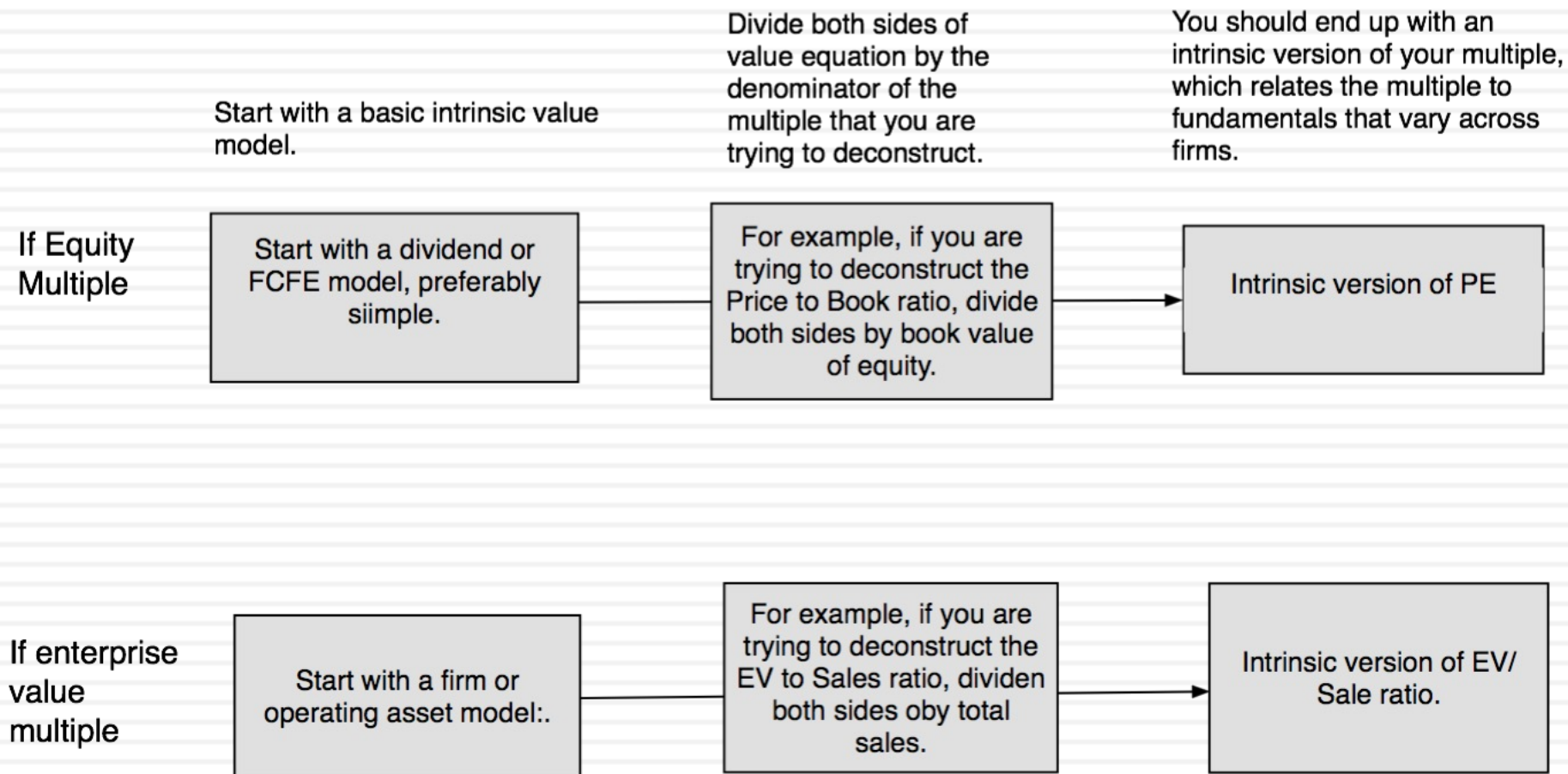


# Analytical Tests

- What are the fundamentals that determine and drive these multiples?
  - Proposition 2: Embedded in every multiple are all of the variables that drive every discounted cash flow valuation - growth, risk and cash flow patterns.
  - In fact, using a simple discounted cash flow model and basic algebra should yield the fundamentals that drive a multiple
- How do changes in these fundamentals change the multiple?
  - The relationship between a fundamental (like growth) and a multiple (such as PE) is seldom linear. For example, if firm A has twice the growth rate of firm B, it will generally not trade at twice its PE ratio
  - Proposition 3: It is impossible to properly compare firms on a multiple, if we do not know the nature of the relationship between fundamentals and the multiple.

# A Simple Analytical device

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# PE Ratio: Understanding the Fundamentals

- To understand the fundamentals, start with a basic equity discounted cash flow model.
- With the dividend discount model,

$$P_0 = \frac{DPS_1}{r - g_n}$$

- Dividing both sides by the current earnings per share,

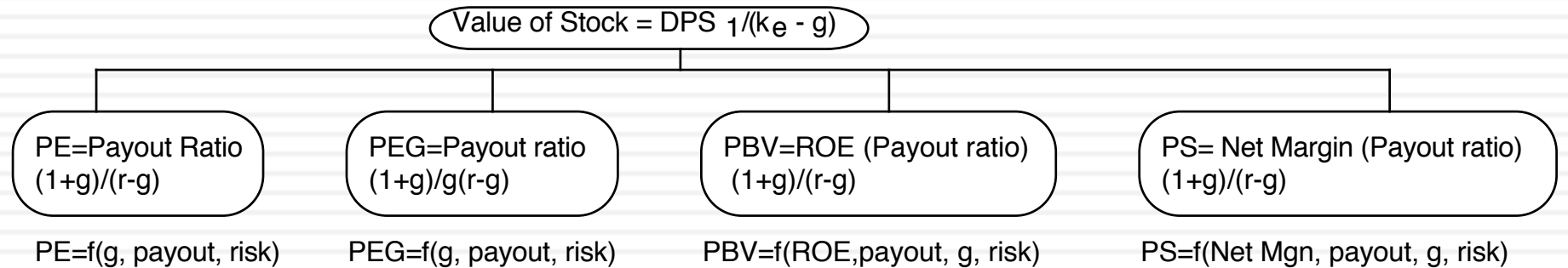
$$\frac{P_0}{EPS_0} = PE = \frac{\text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

- If this had been a FCFE Model,

$$P_0 = \frac{FCFE_1}{r - g_n}$$

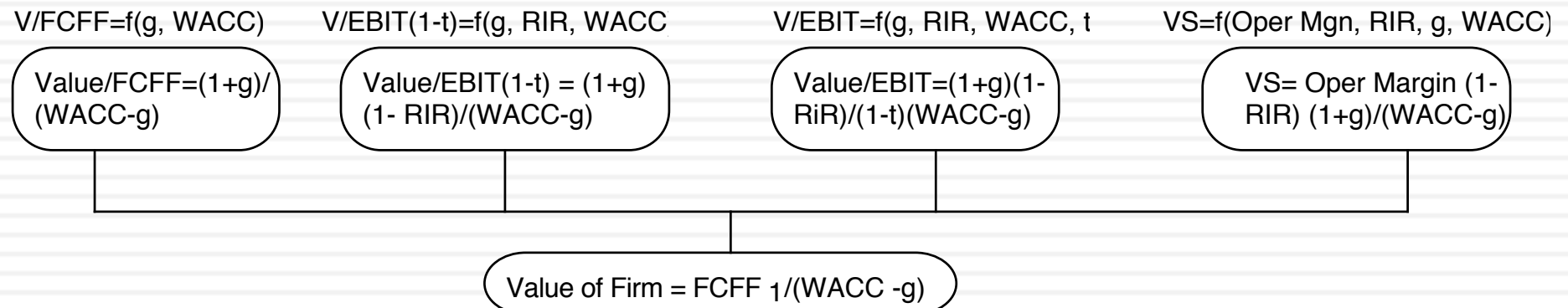
$$\frac{P_0}{EPS_0} = PE = \frac{(FCFE/Earnings) * (1 + g_n)}{r - g_n}$$

# The Determinants of Multiples...



## Equity Multiples

## Firm Multiples



# Application Tests

- Given the firm that we are valuing, what is a “comparable” firm?
  - While traditional analysis is built on the premise that firms in the same sector are comparable firms, valuation theory would suggest that a comparable firm is one which is similar to the one being analyzed in terms of fundamentals.
  - Proposition 4: There is no reason why a firm cannot be compared with another firm in a very different business, if the two firms have the same risk, growth and cash flow characteristics.
- Given the comparable firms, how do we adjust for differences across firms on the fundamentals?
  - Proposition 5: It is impossible to find an exactly identical firm to the one you are valuing.

# An Example: Comparing PE Ratios across a Sector: PE

| <i>Company Name</i>                                     | <i>PE</i> | <i>Growth</i> |
|---|-----------|---------------|
| <i>PT Indosat ADR</i>                                   | 7.8       | 0.06          |
| <i>Telebras ADR</i>                                     | 8.9       | 0.075         |
| <i>Telecom Corporation of New Zealand ADR</i>           | 11.2      | 0.11          |
| <i>Telecom Argentina Stet - France Telecom SA ADR B</i> | 12.5      | 0.08          |
| <i>Hellenic Telecommunication Organization SA ADR</i>   | 12.8      | 0.12          |
| <i>Telecomunicaciones de Chile ADR</i>                  | 16.6      | 0.08          |
| <i>Swisscom AG ADR</i>                                  | 18.3      | 0.11          |
| <i>Asia Satellite Telecom Holdings ADR</i>              | 19.6      | 0.16          |
| <i>Portugal Telecom SA ADR</i>                          | 20.8      | 0.13          |
| <i>Telefonos de Mexico ADR L</i>                        | 21.1      | 0.14          |
| <i>Matav RT ADR</i>                                     | 21.5      | 0.22          |
| <i>Telstra ADR</i>                                      | 21.7      | 0.12          |
| <i>Gilat Communications</i>                             | 22.7      | 0.31          |
| <i>Deutsche Telekom AG ADR</i>                          | 24.6      | 0.11          |
| <i>British Telecommunications PLC ADR</i>               | 25.7      | 0.07          |
| <i>Tele Danmark AS ADR</i>                              | 27        | 0.09          |
| <i>Telekomunikasi Indonesia ADR</i>                     | 28.4      | 0.32          |
| <i>Cable &amp; Wireless PLC ADR</i>                     | 29.8      | 0.14          |
| <i>APT Satellite Holdings ADR</i>                       | 31        | 0.33          |
| <i>Telefonica SA ADR</i>                                | 32.5      | 0.18          |
| <i>Royal KPN NV ADR</i>                                 | 35.7      | 0.13          |
| <i>Telecom Italia SPA ADR</i>                           | 42.2      | 0.14          |
| <i>Nippon Telegraph &amp; Telephone ADR</i>             | 44.3      | 0.2           |
| <i>France Telecom SA ADR</i>                            | 45.2      | 0.19          |
| <i>Korea Telecom ADR</i>                                | 71.3      | 0.44          |

# PE, Growth and Risk

- Dependent variable is: PE
- R squared = 66.2%    R squared (adjusted) = 63.1%

| <i>Variable</i>             |           | <i>Coefficient</i>   | <i>SE</i> | <i>t-ratio</i> | <i>Probability</i> |
|-----------------------------|-----------|----------------------|-----------|----------------|--------------------|
| Constant                    | 13.1151   | 3.471                | 3.78      | 0.0010         |                    |
| Growth rate                 |           | 121.223              | 19.27     | 6.29           | ≤ 0.0001           |
| Emerging Market             | -13.853 1 | 3.606                | -3.84     | 0.0009         |                    |
| Emerging Market is a dummy: |           | 1 if emerging market |           |                |                    |
|                             |           | 0 if not             |           |                |                    |

- Is Indosat cheap?

$$PE = 13.13 + 121.22 (.06) - 13.85 (1) = 6.55$$

At 7.8 times earnings, Indosat is over valued.

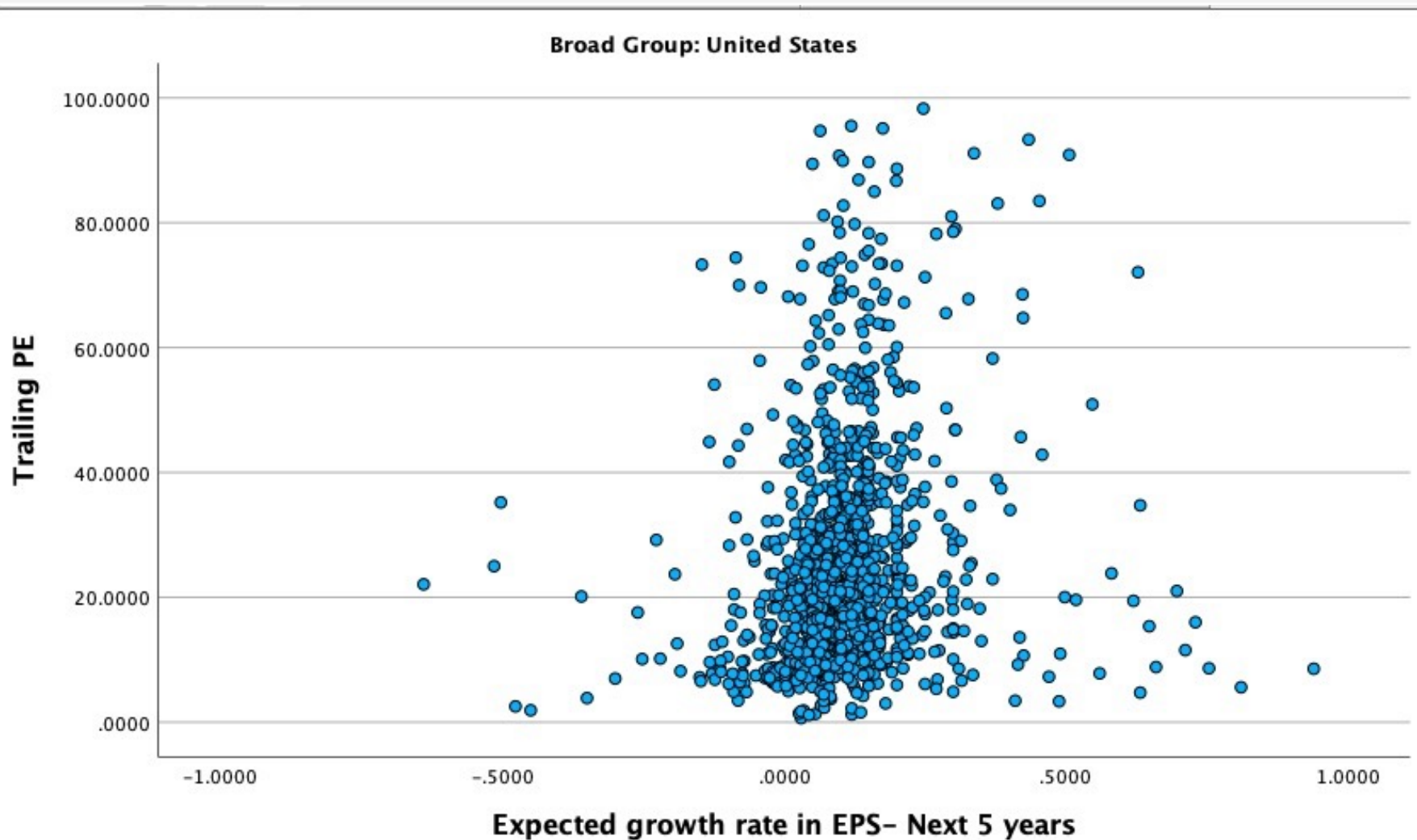
# Comparisons to the entire market: Why not?

- In contrast to the 'comparable firm' approach, the information in the entire cross-section of firms can be used to predict PE ratios.
- The simplest way of summarizing this information is with a multiple regression, with the PE ratio as the dependent variable, and proxies for risk, growth and payout forming the independent variables.

# I. PE Ratio versus the market

## PE versus Expected EPS Growth: January 2024

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# PE Ratio: Standard Regression for US stocks - January 2024

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| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .580 <sup>b</sup> | .336     | .334              | 3090.43701                 |

a. Broad Group = United States  
b. Predictors: (Constant), Expected growth rate in EPS- Next 5 years, Payout ratio, Beta

*The regression is run with growth and payout entered as decimals, i.e., 25% is entered as 0.25)*

| Model |   | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig.  |
|-------|---|-----------------------------|------------|---------------------------|--------|-------|
|       |   | B                           | Std. Error | Beta                      |        |       |
| 1     | (Constant)                                | -2.109                      | 1.885      |                           | -1.119 | .264  |
|       | Beta                                      | 20.755                      | 1.501      | .399                      | 13.831 | <.001 |
|       | Payout ratio                              | 11.378                      | 1.447      | .222                      | 7.865  | <.001 |
|       | Expected growth rate in EPS- Next 5 years | 69.566                      | 5.125      | .377                      | 13.574 | <.001 |

a. Broad Group = United States  
b. Dependent Variable: Trailing PE  
c. Weighted Least Squares Regression - Weighted by Market Cap (in US \$)



# PE ratio regressions across markets

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| Regression |             |         |           |                | R Squared | Region           |
|------------|-------------|---------|-----------|----------------|-----------|------------------|
| PE = 19.34 | Beta        | + 68.70 | $g_{EPS}$ | + 10.37 Payout | 33.6%     | US               |
| (23.78)    |             | (68.70) |           | (10.37)        |           |                  |
| PE = 11.89 | + 1.47 Beta | + 32.44 | $g_{EPS}$ | + 13.18 Payout | 15.5%     | Europe           |
| (8.82)     | (1.93)      | (9.96)  |           | (10.01)        |           |                  |
| PE = 4.65  | + 6.94 Beta | + 25.75 | $g_{EPS}$ | + 17.17 Payout | 23.2%     | Japan            |
| (2.38)     | (6.92)      | (3.80)  |           | (7.84)         |           |                  |
| PE = 15.02 | + 0.06 Beta | + 41.70 | $g_{EPS}$ | + 3.71 Payout  | 24.8%     | Aus, NZ & Canada |
| (15.78)    | (0.12)      | (22.31) |           | (3.91)         |           |                  |
| PE = 14.41 | - 1.24 Beta | + 92.94 | $g_{EPS}$ | + 7.49 Payout  | 40.5%     | Emerging Markets |
| (6.91)     | (0.74)      | (14.80) |           | (5.31)         |           |                  |
| PE = 16.90 | + 3.20 Beta | + 51.53 | $g_{EPS}$ | + 2.68 Payout  | 17.2%     | Global           |
| (22.96)    | (6.53)      | (27.77) |           | (3.98)         |           |                  |

$g_{EPS}$  = Expected Growth: Expected growth in EPS or Net Income: Next 5 years (decimals)

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

# Choosing Between the Multiples

- As presented in this section, there are dozens of multiples that can be potentially used to value an individual firm.
- In addition, relative valuation can be relative to a sector (or comparable firms) or to the entire market (using the regressions, for instance)
- Since there can be only one final estimate of value, there are three choices at this stage:
  - Use a simple average of the valuations obtained using a number of different multiples
  - Use a weighted average of the valuations obtained using a number of different multiples
  - Choose one of the multiples and base your valuation on that multiple

# Picking one Multiple

- This is usually the best way to approach this issue. While a range of values can be obtained from a number of multiples, the “best estimate” value is obtained using one multiple.
- The multiple that is used can be chosen in one of two ways:
  - Use the multiple that best fits your objective. Thus, if you want the company to be undervalued, you pick the multiple that yields the highest value.
  - Use the multiple that has the highest R-squared in the sector when regressed against fundamentals. Thus, if you have tried PE, PBV, PS, etc. and run regressions of these multiples against fundamentals, use the multiple that works best at explaining differences across firms in that sector.
  - Use the multiple that seems to make the most sense for that sector, given how value is measured and created.

# Conventional usage...

| Sector                       | Multiple Used                                 | Rationale                               |
|------------------------------|---|---|
| Cyclical Manufacturing       | PE, Relative PE                               | Often with normalized earnings          |
| Growth firms                 | PEG ratio                                     | Big differences in growth rates         |
| Young growth firms w/ losses | Revenue Multiples                             | What choice do you have?                |
| Infrastructure               | EV/EBITDA                                     | Early losses, big DA                    |
| REIT                         | P/CFE (where CFE = Net income + Depreciation) | Big depreciation charges on real estate |
| Financial Services           | Price/ Book equity                            | Marked to market?                       |
| Retailing                    | Revenue multiples                             | Margins equalize sooner or later        |

# A closing thought...

