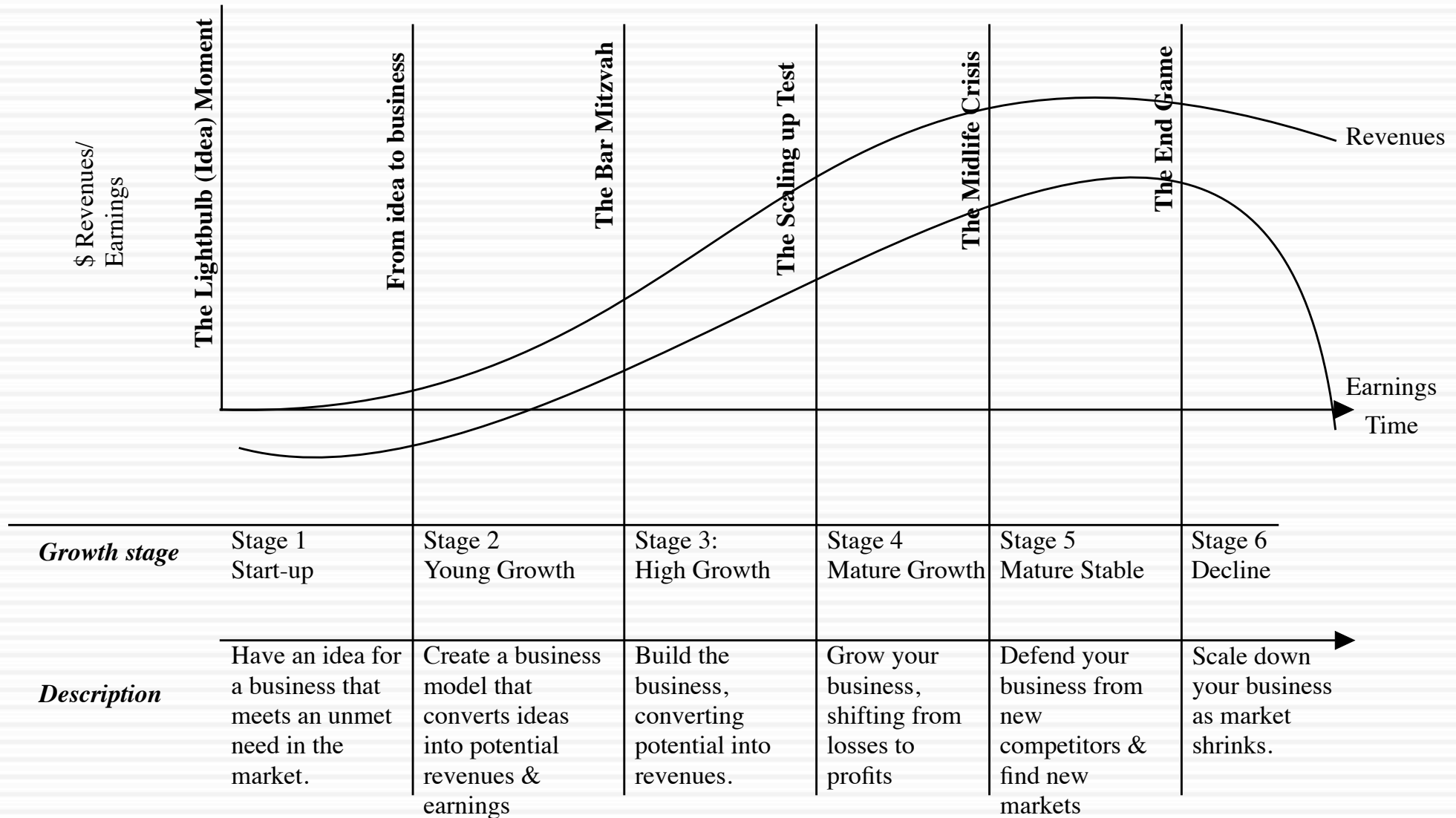




# THE CORPORATE LIFE CYCLE: GROWING UP IS HARD TO DO!

Aswath Damodaran

# The Life Cycle





# ACCOUNTING VERSUS FINANCE ACROSS THE LIFE CYCLE



# Accounting and Financial Balance Sheets

*Accounting Balance Sheet*

Assets		Liabilities	
Long Lived Real Assets	Fixed Assets	Current Liabilities	Short-term liabilities of the firm
Short-lived Assets	Current Assets	Debt	Debt obligations of firm
Investments in securities & assets of other firms	Financial Investments	Other Liabilities	Other long-term obligations
Assets which are not physical, like patents & trademarks	Intangible Assets	Equity	Equity investment in firm

*A Financial Balance Sheet*

Assets		Liabilities	
Existing Investments Generate cashflows today	Investments already made	Debt	Borrowed money
Expected Value that will be created by future investments	Investments yet to be made	Equity	Owner's funds

*Variant 1: You estimate the values of assets*

*Variant 2: You let the market estimate it for your*



# An Early Stage Comparison - Twitter

## Accounting Balance Sheet

Cash	\$550	Debt (leases)	\$21
PP&E	\$ 62	Preferred stock	\$835
Intangible assets	\$6	Equity	\$202
Goodwill	\$ 47		

## Intrinsic Value Balance Sheet (post-IPO)

Cash	\$ 1,616	Debt	\$ 214
Assets in place	\$ 73	Equity	\$11,106
Growth assets	\$ 9,631		

## Market Price Balance Sheet (post-IPO)

Cash	\$ 1,816	Debt	\$ 214
Assets in place	\$ 73	Equity	\$28,119
Growth assets	\$ 26,444		

# A More Mature Company: Ferrari

<i>Accounting Balance Sheet</i>			
Cash	164	Debt	623
Other current asset	3,131	Minority Interest	13
PP&E	591	Other liabilities	1,894
Financial Inv	216	<b>Equity</b>	<b>2,474</b>
Goodwill	781		
Other Intangibles	278		
Total Assets	5,004		

<i>Intrinsic Value Balance Sheet</i>			
Cash	164	Debt	623
Assets in Place	5,489	Minority Interest	13
Growth Assets	658	<b>Equity</b>	<b>6,311</b>

<i>Market Price Balance Sheet</i>			
Cash	164	Debt	623
Assets in Place	5,489	Minority Interest	13
Growth Assets	5,347	<b>Equity</b>	<b>11,000</b>

# Infosys: Balance Sheet in March 2018

Particulars	Note	As at March 31,		As at April 1,
		2017	2016	2015
ASSETS				
Non-current assets				
Property, plant and equipment	2.4	9,751	8,637	7,685
Capital work-in-progress		1,365	960	776
Goodwill	2.5	3,652	3,764	3,091
Other intangible assets	2.5	776	985	638
Investment in associate	2.25	71	103	93
Financial assets				
Investments	2.6	6,382	1,714	1,305
Loans	2.7	29	25	31
Other financial assets	2.8	309	286	173
Deferred tax assets (net)	2.17	540	536	536
Income tax assets (net)	2.17	5,716	5,230	4,089
Other non-current assets	2.11	1,059	1,357	698
Total non-current assets		29,650	23,597	19,115
Current assets				
Financial assets				
Investments	2.6	9,970	75	874
Trade receivables	2.9	12,322	11,330	9,713
Cash and cash equivalents	2.10	22,625	32,697	30,367
Loans	2.7	272	303	222
Other financial assets	2.8	5,980	5,190	4,527
Other current assets	2.11	2,536	2,158	1,541
Total current assets		53,705	51,753	47,244
Total assets		83,355	75,350	66,359
EQUITY AND LIABILITIES				
Equity				
Equity share capital	2.13	1,144	1,144	572
Other equity		67,838	60,600	54,198
Total equity attributable to equity holders of the Company		68,982	61,744	54,770
Non-controlling interests		—	—	—
Total equity		68,982	61,744	54,770
Liabilities				
Non-current liabilities				
Financial liabilities				
Other financial liabilities	2.14	70	69	—
Deferred tax liabilities (net)	2.17	207	252	159
Other non-current liabilities	2.15	83	46	47
Total non-current liabilities		360	367	206
Current liabilities				
Financial liabilities				
Trade payables		367	386	140
Other financial liabilities	2.14	6,349	6,302	5,983
Other current liabilities	2.15	3,007	2,629	1,964
Provisions	2.16	405	512	478
Income tax liabilities (net)	2.17	3,885	3,410	2,818
Total current liabilities		14,013	13,239	11,383
Total equity and liabilities		83,355	75,350	66,359

# Infosys: Financial Balance Sheet

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	Value		Value
Assets in Place	₹ 167,961	Debt	₹ -
Growth Assets	₹ 47,751	Equity	₹ 244,893
Cash & Non-operating Assets	₹ 29,181		

# The Bottom Line

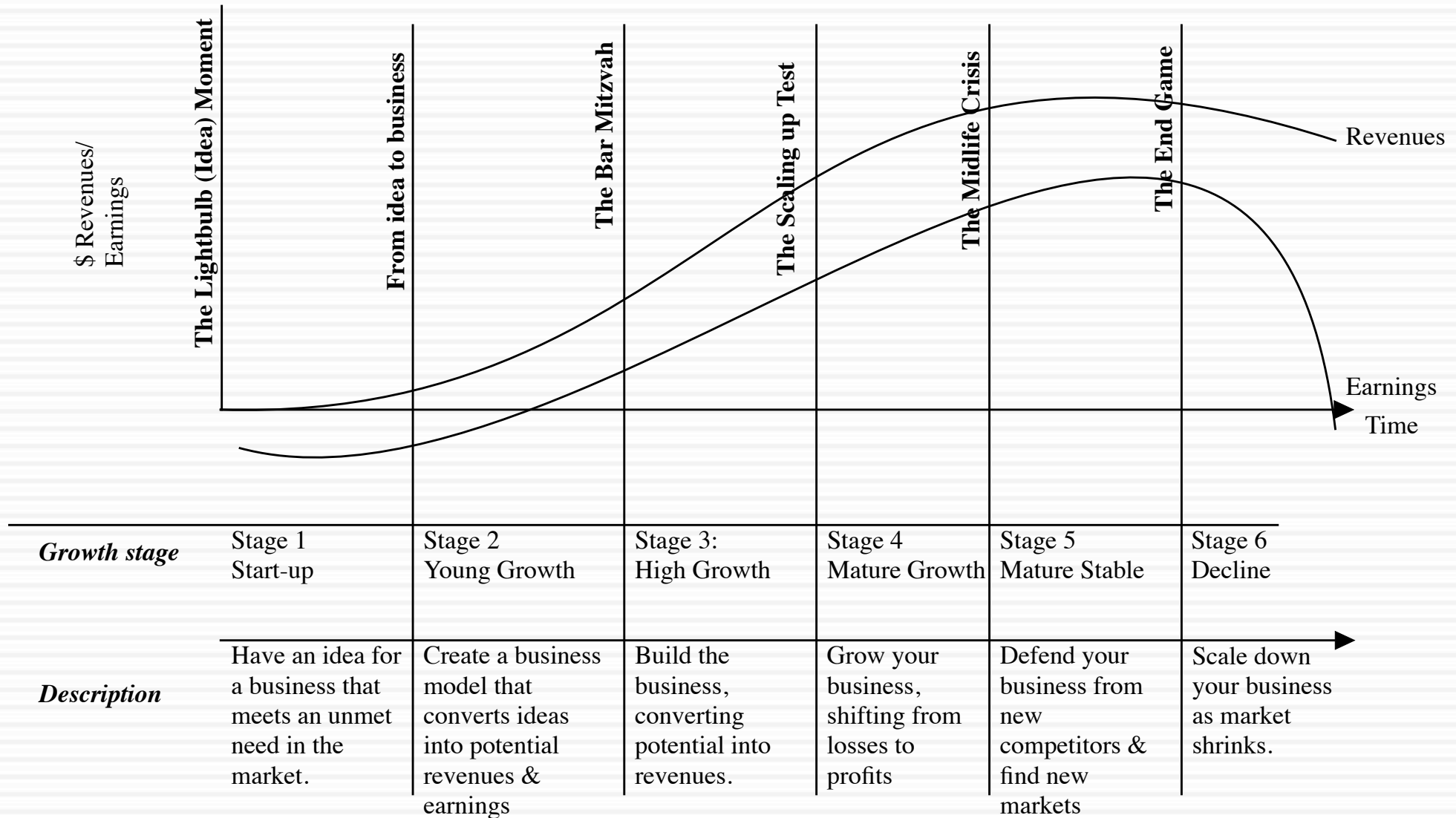
- Accounting statements get less and less useful if you are looking earlier in the life cycle, since accountants have neither a history to record nor an operating business to describe.
- As companies age, balance sheets mean more but they also become more cluttered, since they carry the legacy of “accounting” fixes and choices. Meaningless assets start to populate the balance sheet and meaningless liabilities are often created to offset them.
- Balance sheet based valuation, which is what most accounting valuation is (and is at the core of much of value investing) is useless with young companies. It is most useful in mature companies without accounting clutter.
- For companies where accounting miscategorizes expenses, balance sheets get even more meaningless.
- Fair value accounting is destined for failure everywhere, because accountants cannot be imaginative and/or creative, but it will fail most spectacularly with young companies.



# CORPORATE LIFE CYCLE: THE DETERMINANTS

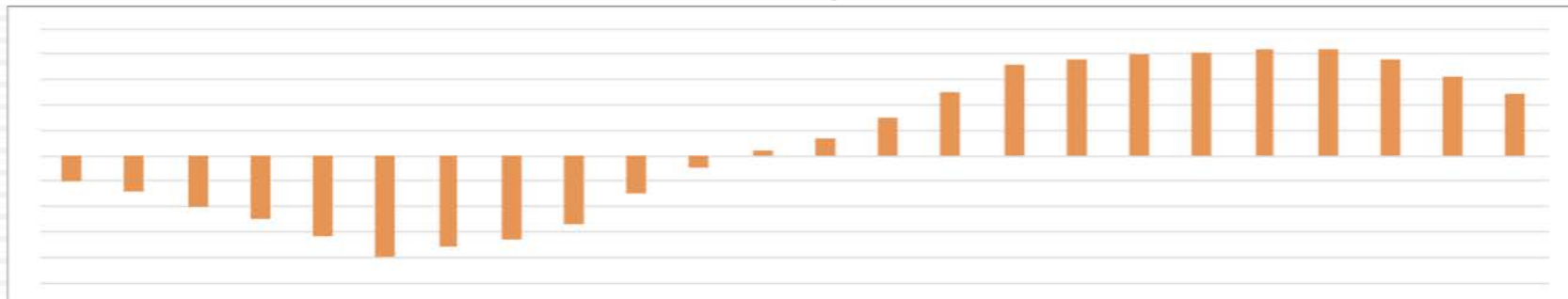
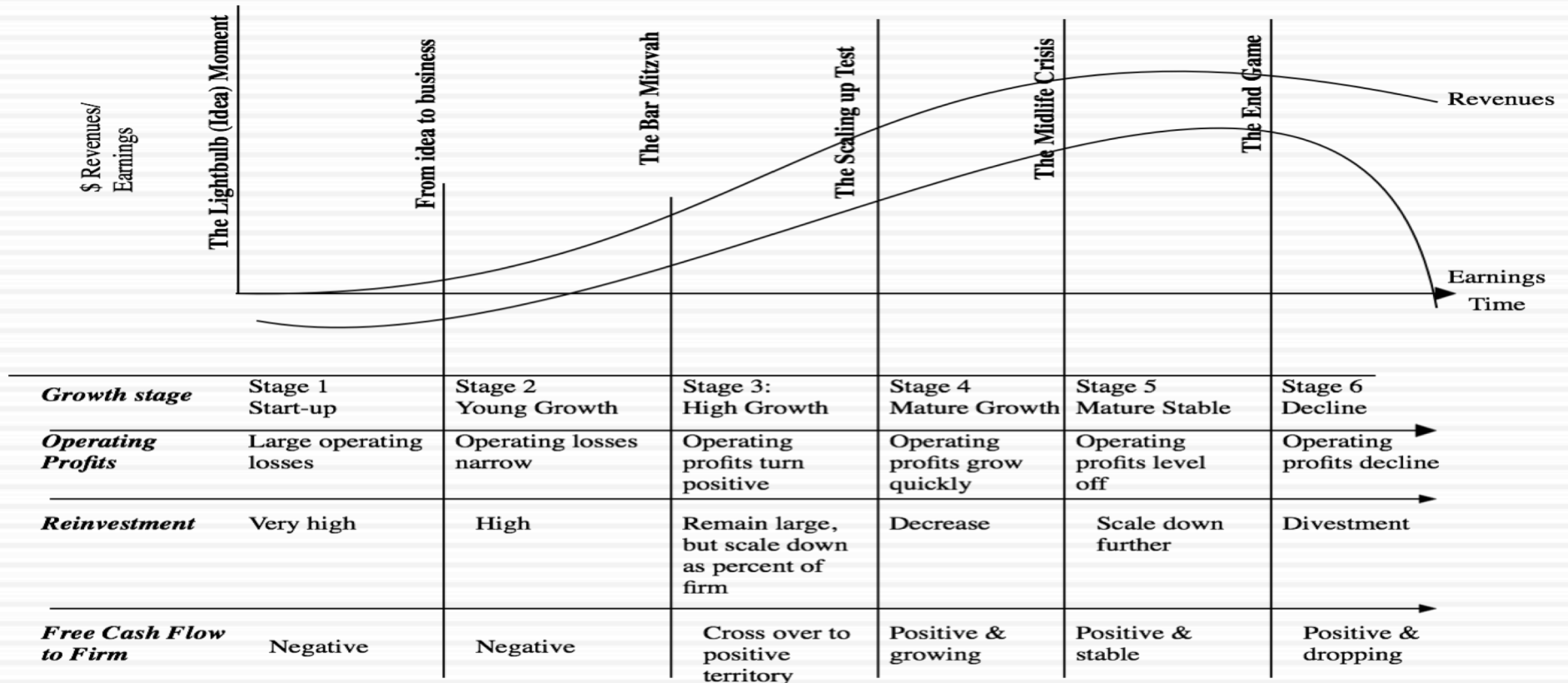


# Revisiting the Life Cycle





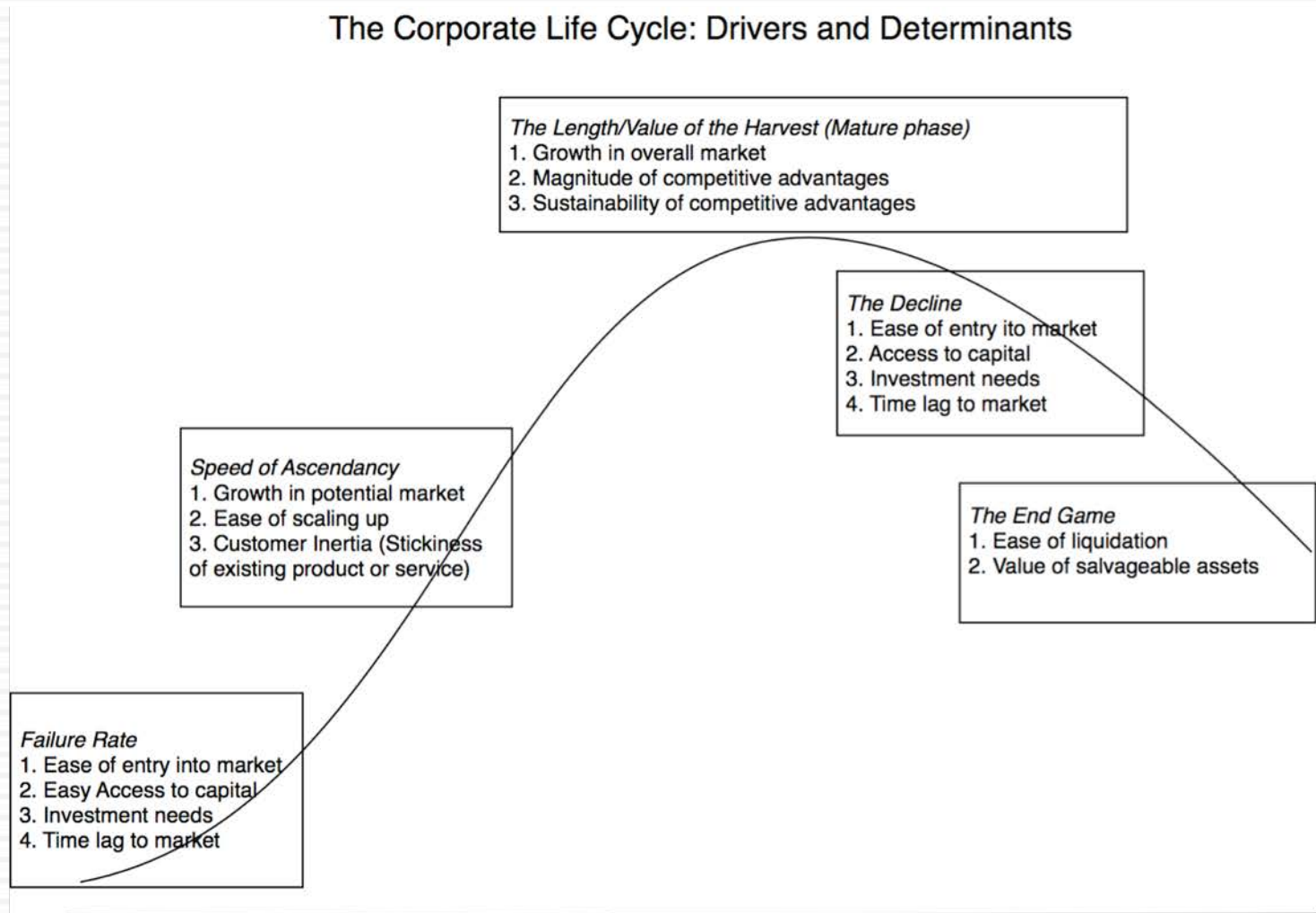
# The Life Cycle in earnings and cash flows



# Would you rather be young or old?

- As a business, where in the life cycle would you most like to be?
  - a. A Start up
  - b. A Young, Growth Company
  - c. An Established Growth Company
  - d. A Mature Growth Company
  - e. A Mature Company
  - f. A Declining Company
- Assuming you are a business, where in the life cycle are you currently?
  - a. A Start up
  - b. A Young, Growth Company
  - c. An Established Growth Company
  - d. A Mature Growth Company
  - e. A Mature Company
  - f. A Declining Company

# The determinants of the life cycle



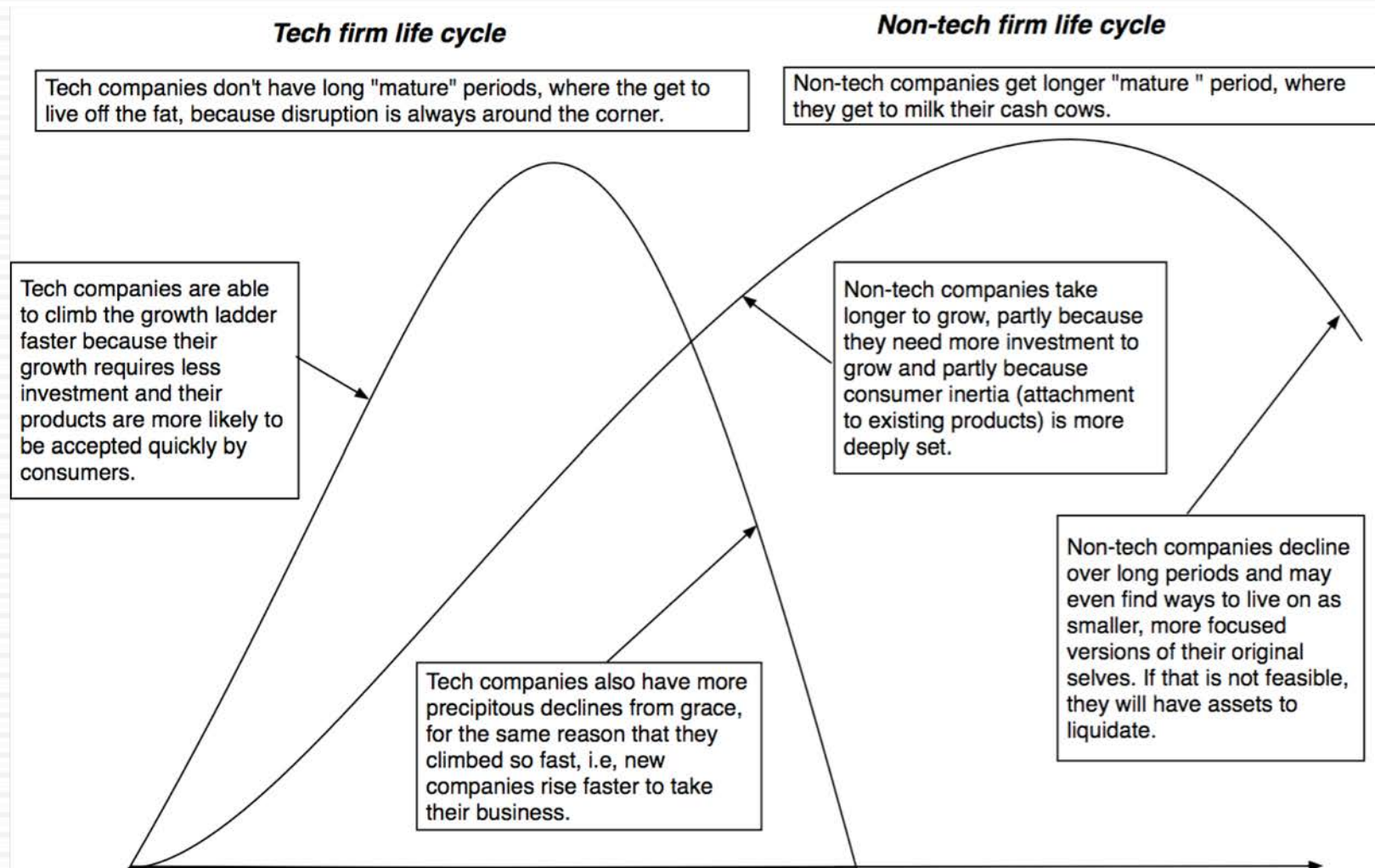
# Tech versus Non-tech companies

- Drawing the line between tech and non tech companies is getting more and more difficult. The solution may be to think of technology on a continuum.
- There are two reasons the classifications matter:
  - ▣ Equity research analysts and portfolio managers still work in sector silos, with tunnel vision of anything that happens outside these silos. Where a company like Amazon is placed can make a difference in how it is analyzed.
  - ▣ Pricing is often done relative to the sector that investors decide to put a company into.

# The defining characteristics of the tech business..

1. Scaling up is easy: Tech companies often operate in businesses where entry is not restricted, the up front investment is minimal and scaling up is easy.
2. Holding on is tough: Once tech companies reach the mature phase, they don't get to have long harvest periods. Their competitive advantages are fleeting and quickly deplete.
3. Decline is rapid: The same forces that allow technology companies to grow, i.e., unrestricted entry, ease of scaling up and customer switching, also make them vulnerable to new entrants seeking to take their business away from them.
4. And there is little left in the end game: Unlike other businesses, which accumulate physical assets as they grow and thus have a liquidation potential, with technology companies, there is little of substance to fall back, once earnings power is exhausted.

# Tech versus Non-tech life cycles



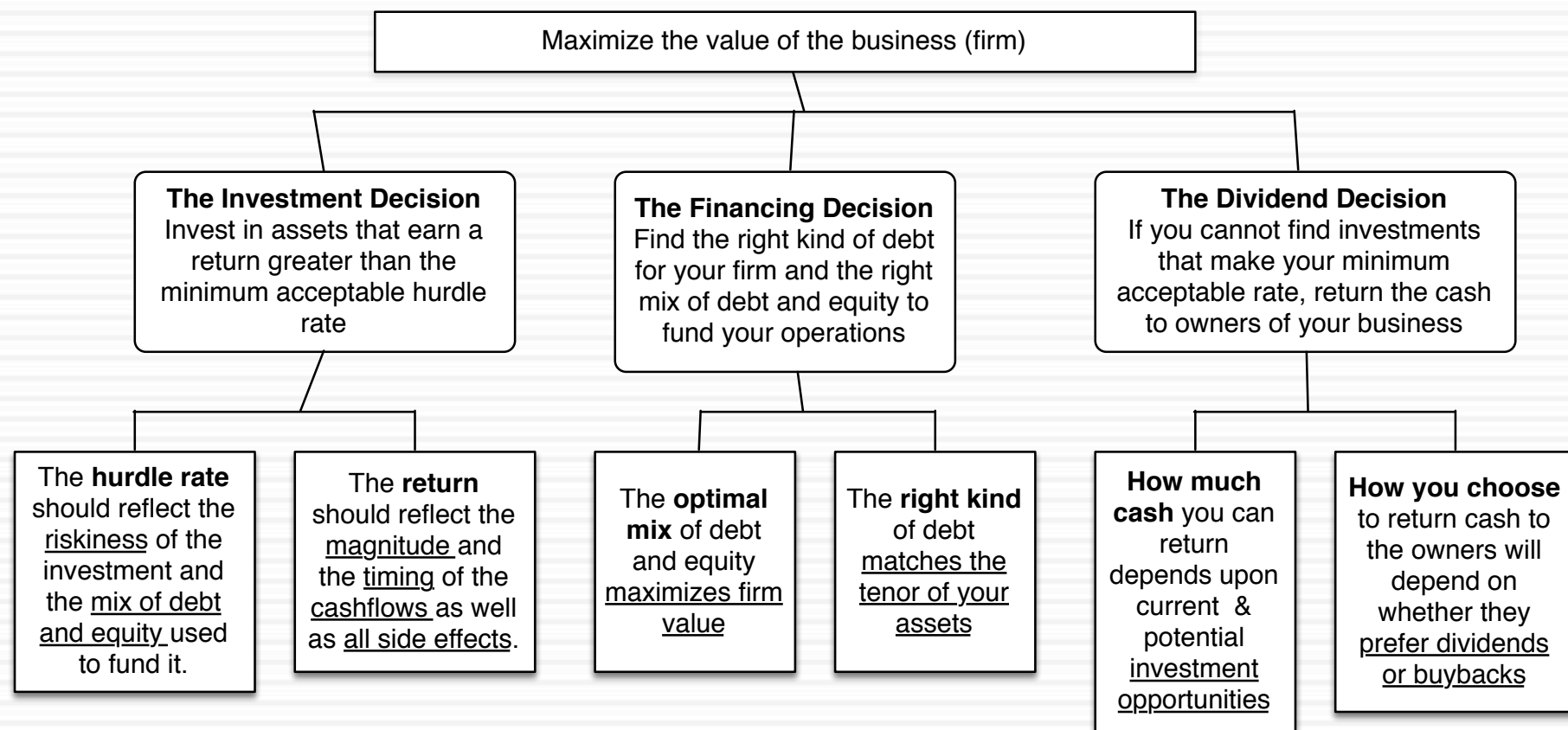


# CORPORATE FINANCE ACROSS THE LIFE CYCLE



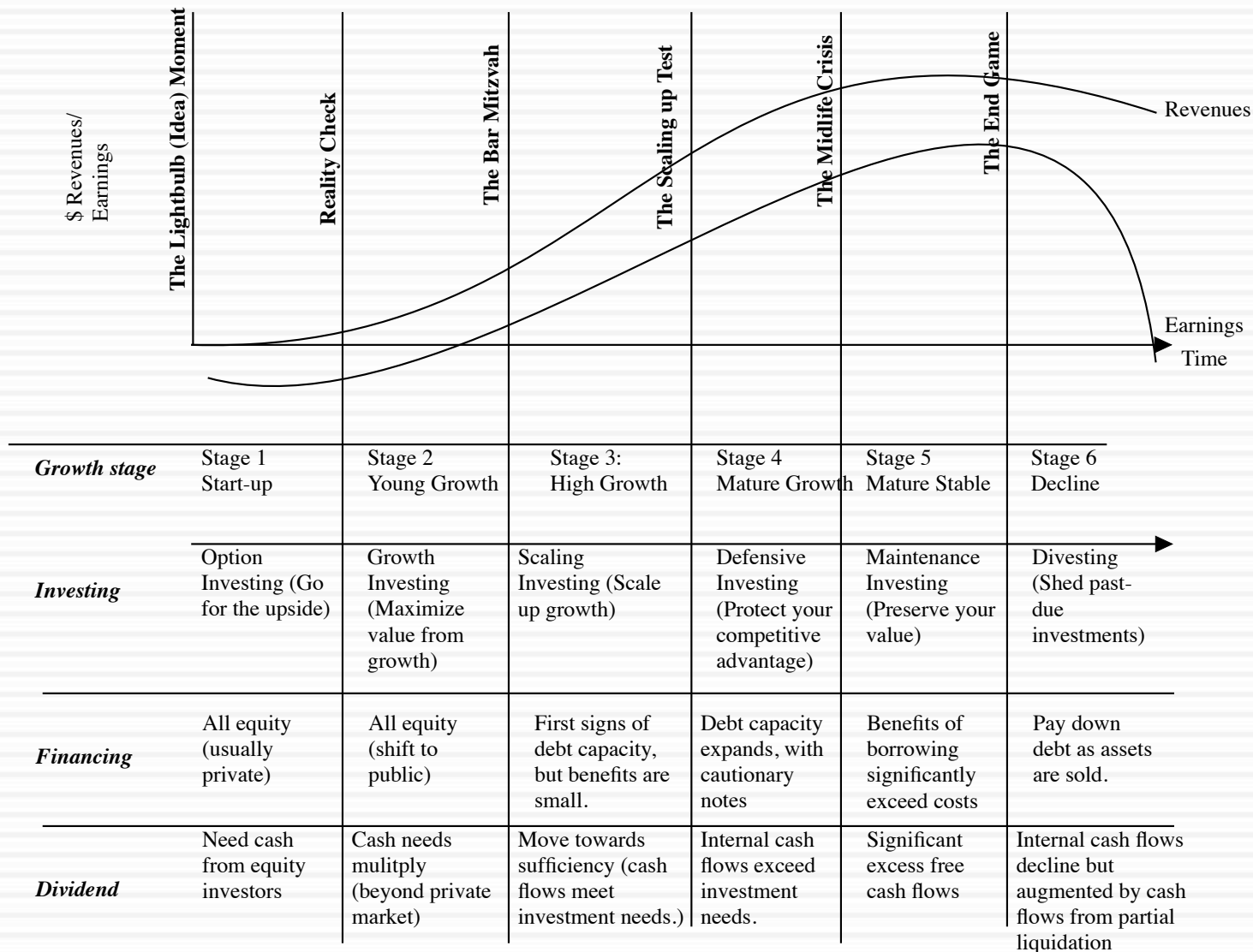


# The Big Picture

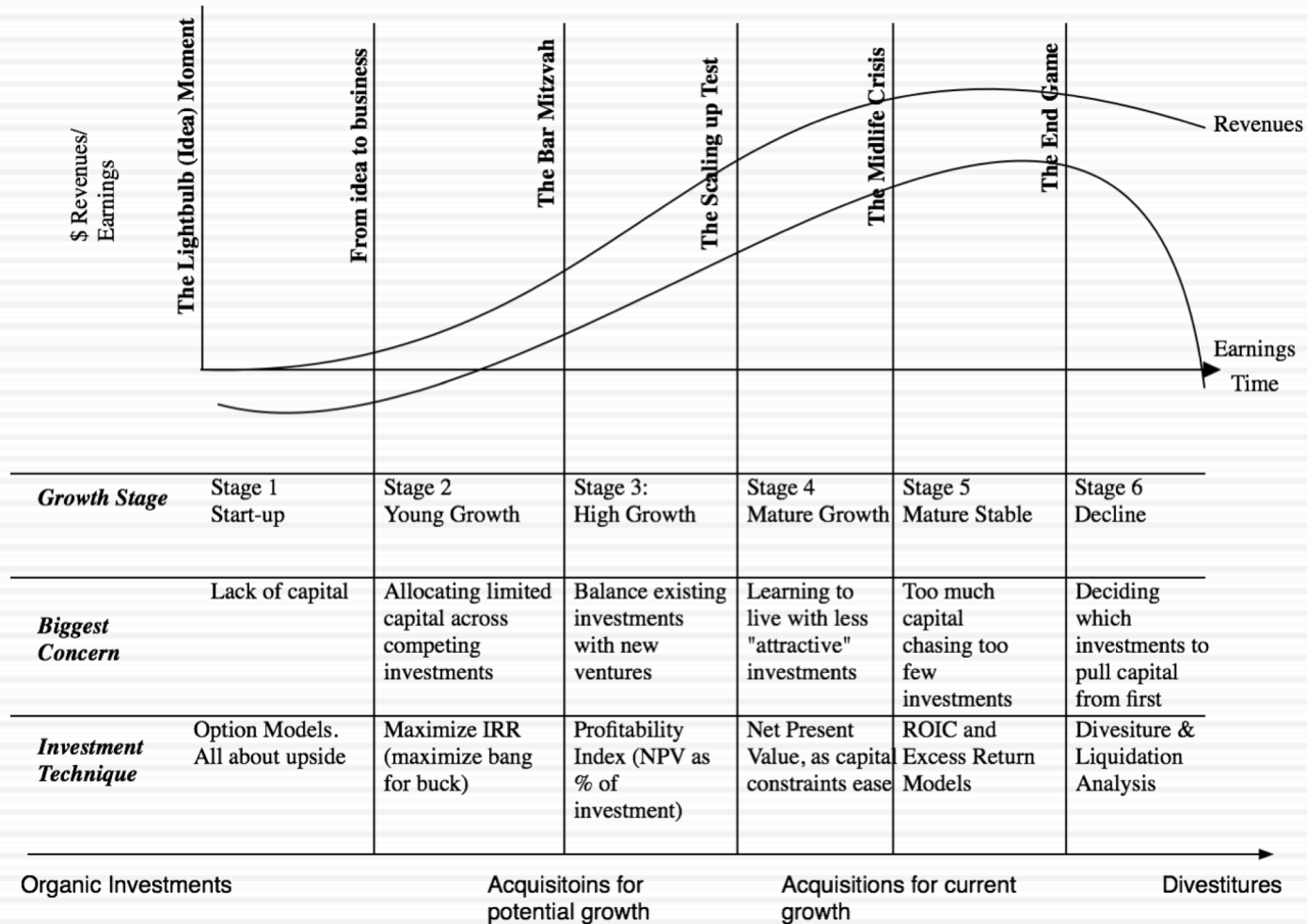


# The Emphasis Shifts

The Corporate Life Cycle

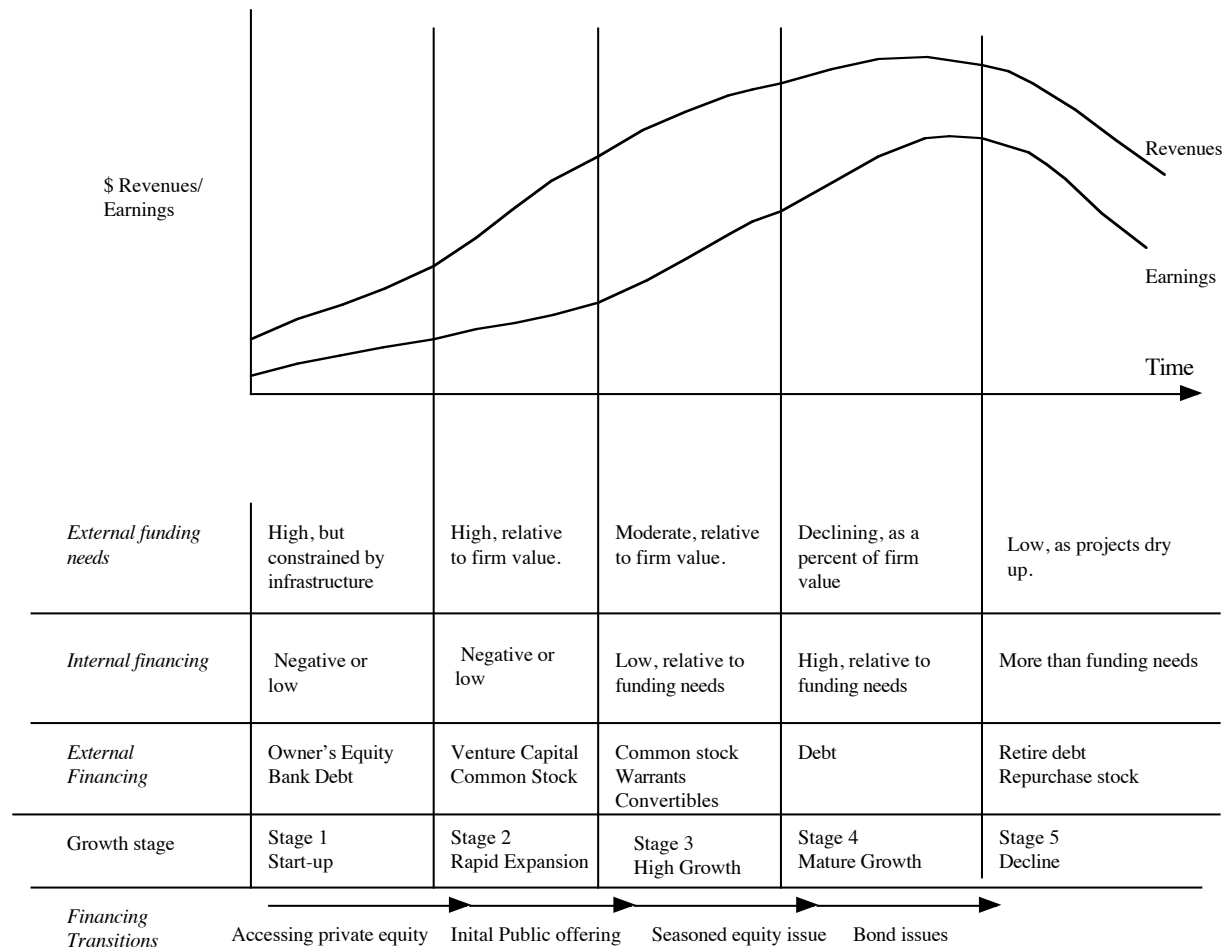


# Too many projects to too few..



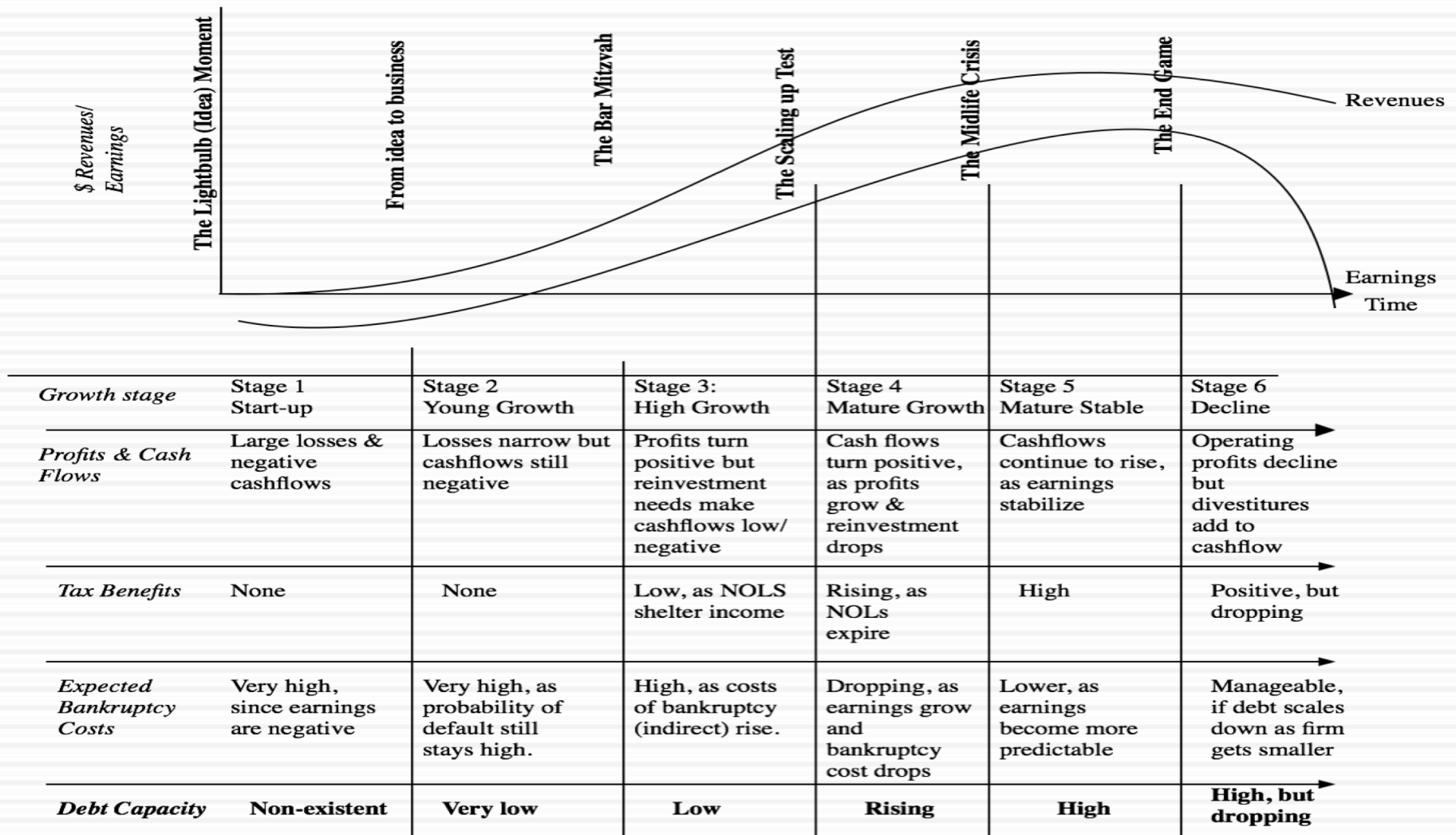
# Financing, from start to finish..

*Financing Choices across the life cycle*

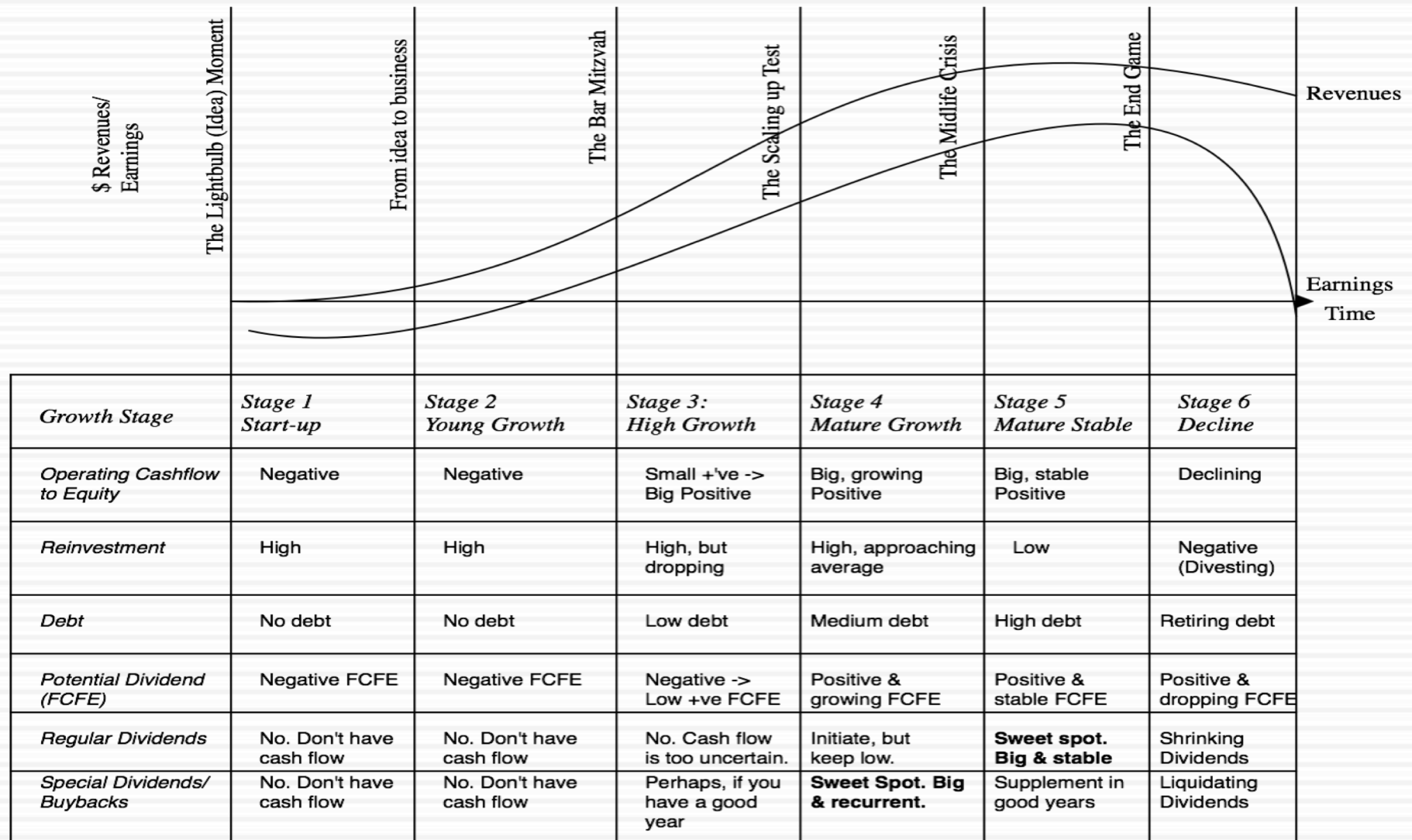


# And with it, debt capacity

*Debt Capacity across Life Cycle*



# Dividends, from seed to harvest..



# The Bottom Line

- Early in the life of a business, it is the creative part of the business (R&D, New Product development) that will drive the business, since value is created primarily from making great investments.
- As a business ages, you will see power shift towards the “finance” portion of the business, as projects start to get less attractive and financial engineering (changing debt mixes, debt types) will start to be potentially more value creating.
- As the business enters its declining phase, it will be decisions about how much to return to owners and in what form that will become the core discussion.
- By observing what a company is focusing its energies on, you can usually get a sense of where it thinks it is in the life cycle.
- Companies that don't “act their age” will destroy value, in one way or the other.

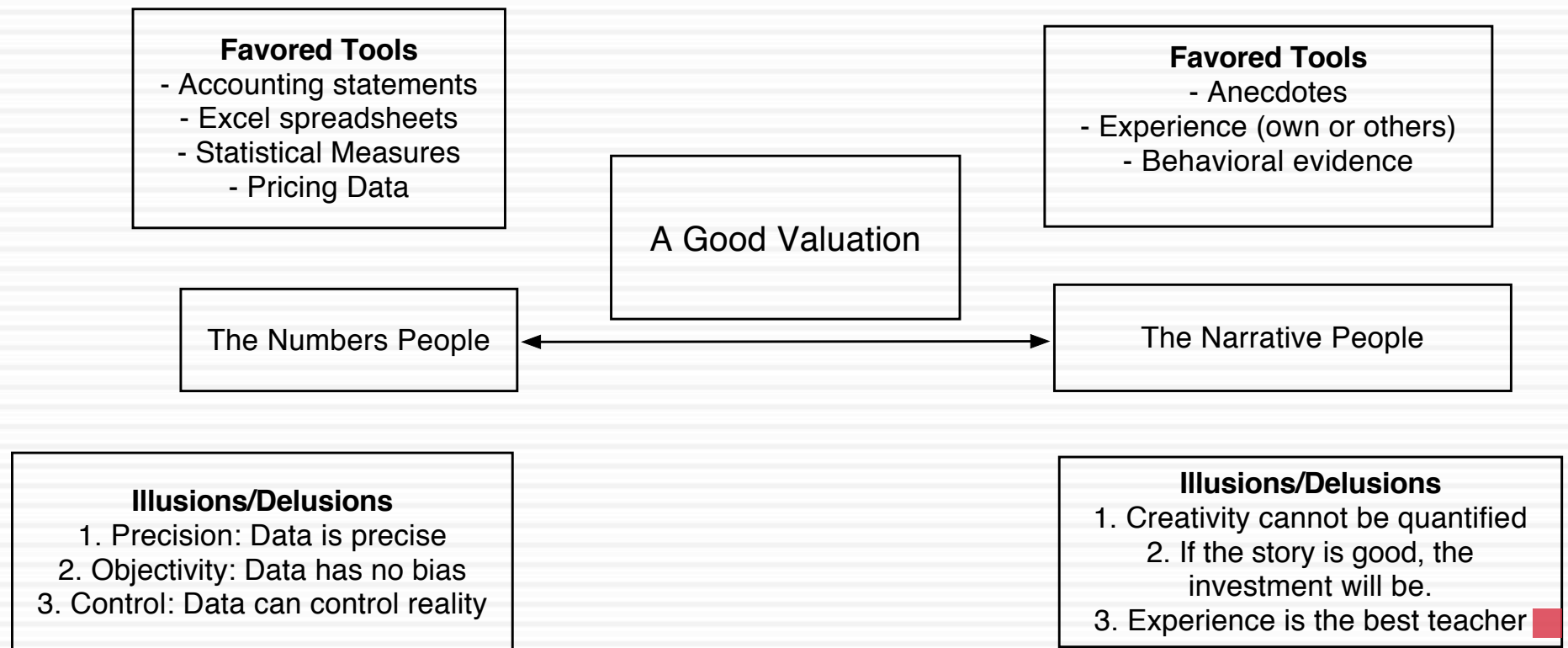




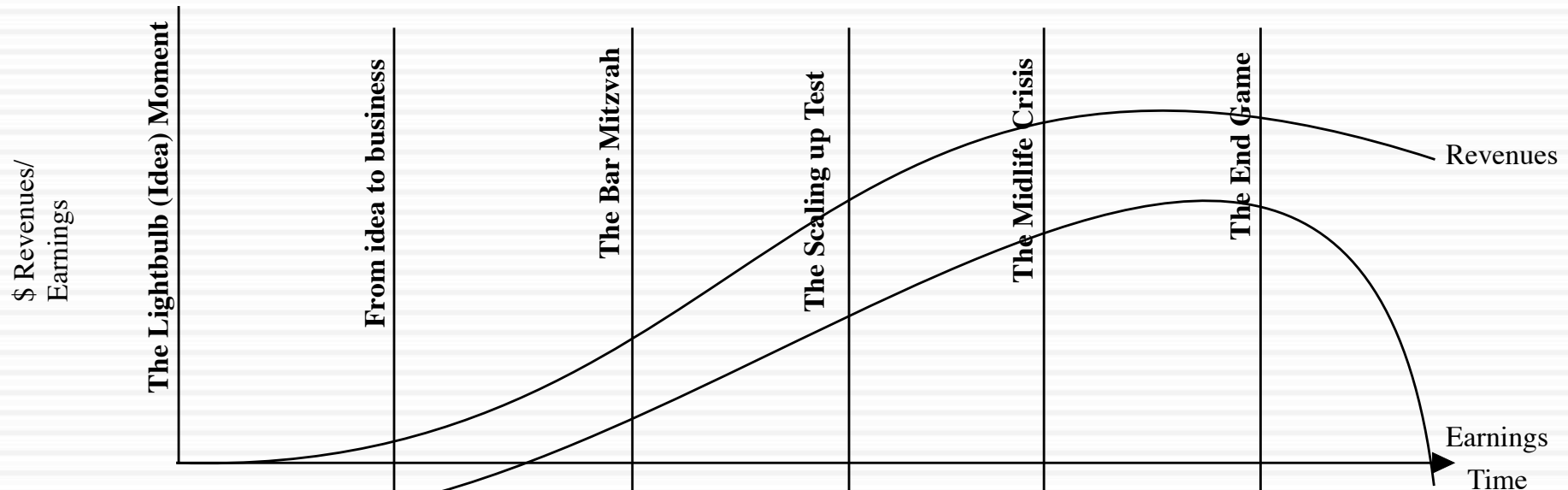
## FROM NARRATIVE TO NUMBERS

All story to mostly numbers..

# Valuation as a bridge



# Narrative versus Numbers



**Growth stage**

Stage 1  
Start-up

Stage 2  
Young Growth

Stage 3:  
High Growth

Stage 4  
Mature Growth

Stage 5  
Mature Stable

Stage 6  
Decline

**All Narrative**

**Narrative  
drivers**

How big is the  
narrative?

How plausible is  
the narrative?

How profitable  
is the narrative?

How scalable  
is the  
narrative?

How  
sustainable is  
the narrative?

Is there a  
happy ending?

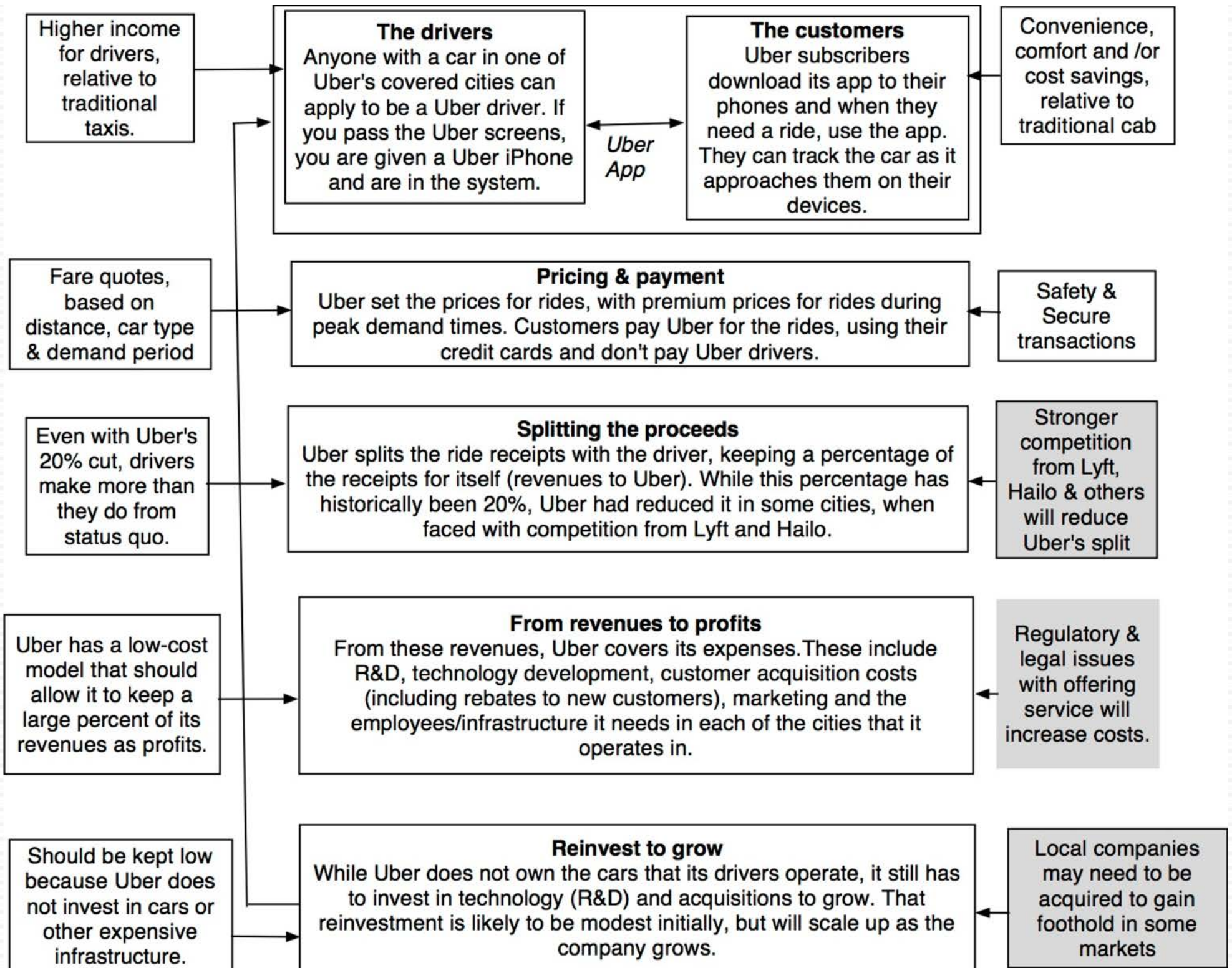
**All Numbers**

# Narrative to Numbers for companies

- With a young company, narrative is central, divergent and volatile.
  - ▣ It is central because it is the only thing that you are offering investors, since you have no history.
  - ▣ It is divergent because you can still offer widely different narratives, since it is early in the game.
  - ▣ It is volatile, because the real world will deliver surprises that will require you to adjust your narrative.
- As companies age, their narratives get narrower as their histories, size and culture start to become binding. The numbers often drive the narrative, rather than the other way around.

# Step 1: 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.





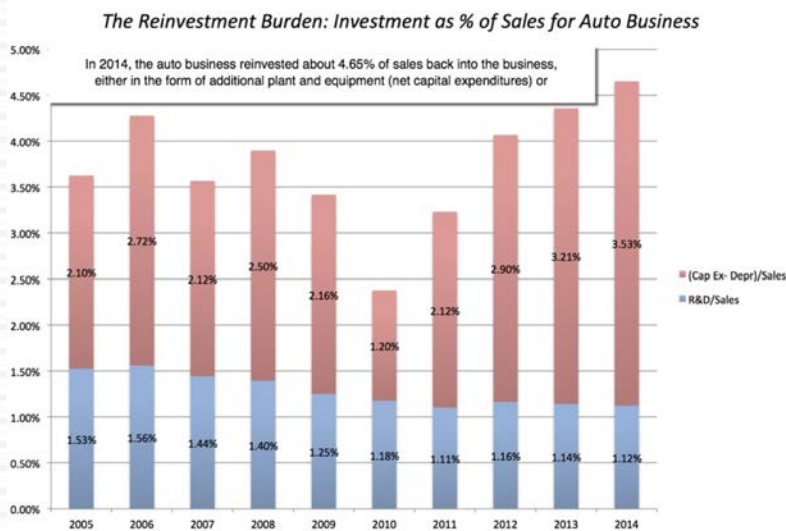
# The Auto Business

## Anemic Revenue Growth

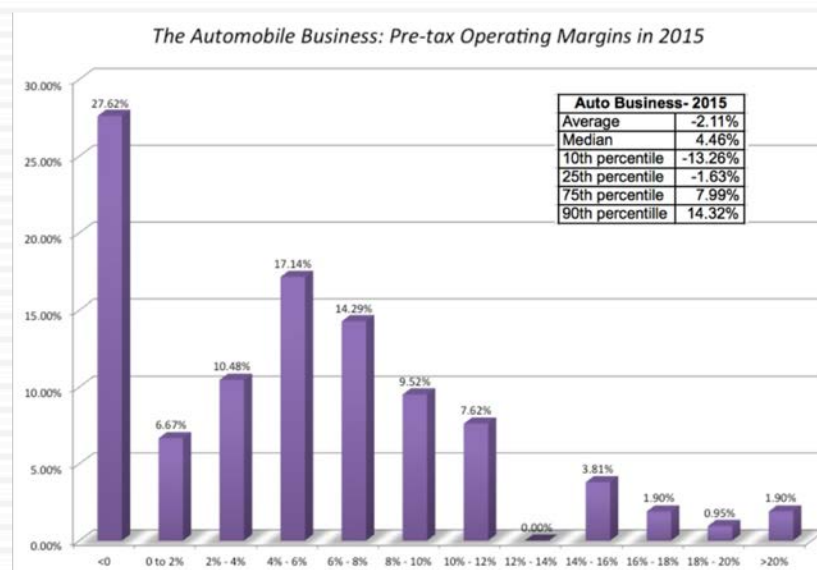
Year	Revenues (\$)	% Growth Rate
2005	1,274,716.6	
2006	1,421,804.2	11.54%
2007	1,854,576.4	30.44%
2008	1,818,533.0	-1.94%
2009	1,572,890.1	-13.51%
2010	1,816,269.4	15.47%
2011	1,962,630.4	8.06%
2012	2,110,572.2	7.54%
2013	2,158,603.0	2.28%
2014	2,086,124.8	-3.36%

Compounded annual revenue growth of 5.63% between 2005 and 2014.

## + Increasing Reinvestment



## + Poor Operating Margins

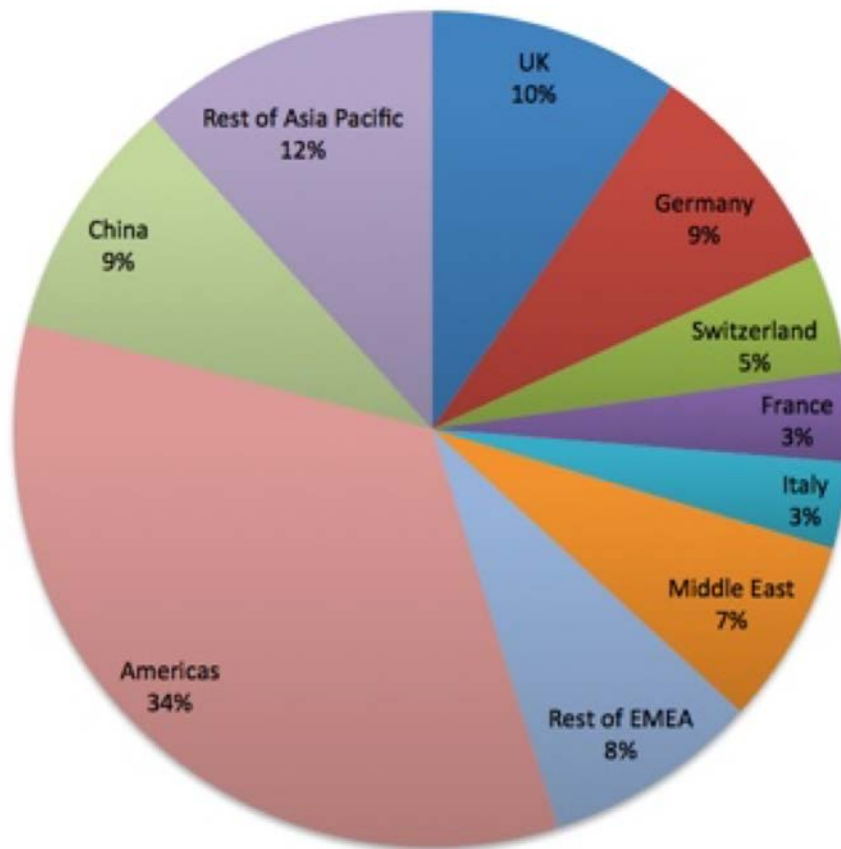


**= Bad Business**

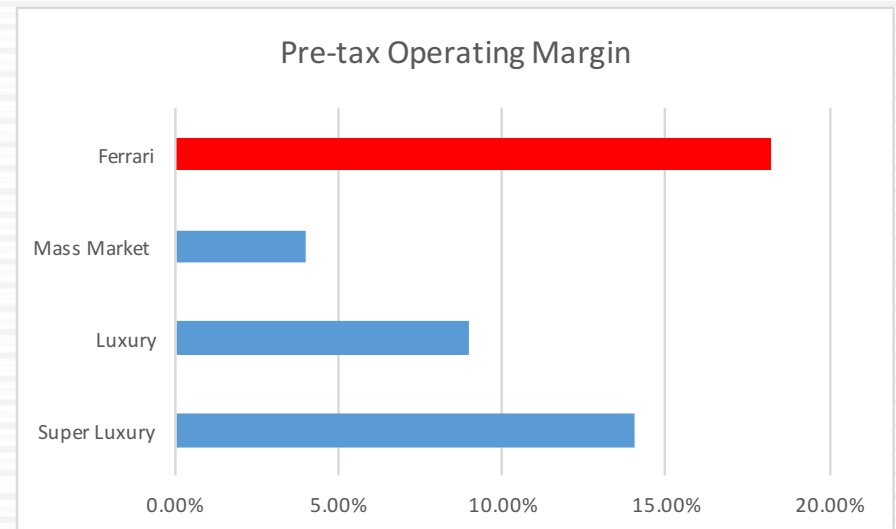


# But super luxury cars look better..

*Ferrari: Geographical Sales (2014)*



Pre-tax Operating Margin



## Step 2: 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

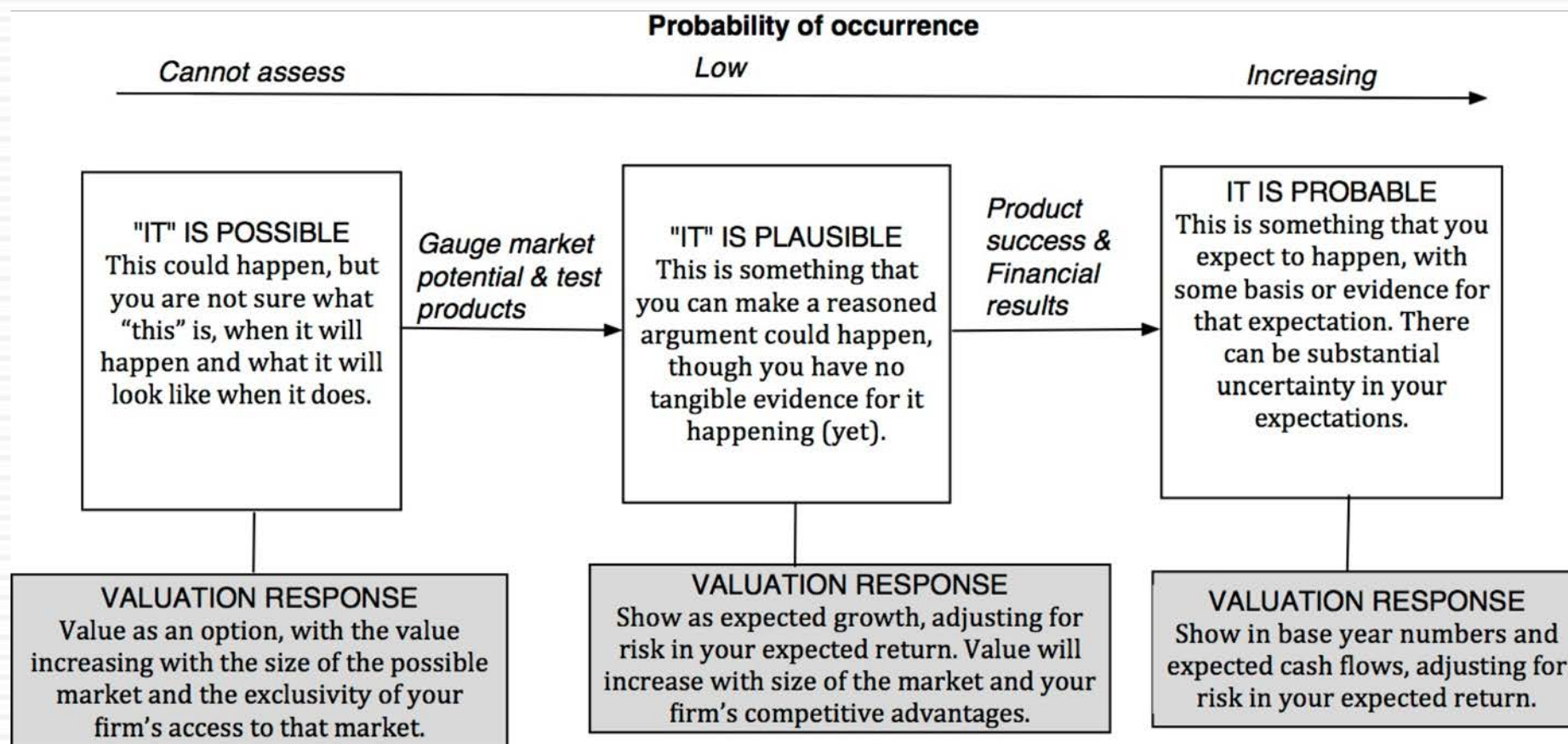
1. An urban car service business: I saw Uber primarily as a force in urban areas and only in the car service business.
2. Which would expand the business moderately (about 40% over ten years) by bringing in new users.
3. With local networking benefits: If Uber becomes large enough in any city, it will 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

- After the IPO, Ferrari will continue to be run by the same managers who run it today and will continue to be controlled by the Agnelli family and Ferrari (just as it is now).
- In my base narrative, I expect the company to stick to the status quo and
  - ▣ Stay super exclusive (Ferrari's sales have been flat over much of the last decade) and global.
  - ▣ Charge exceptionally high prices
  - ▣ Spend little or nothing on advertising
  - ▣ Be only lightly affected by economic ups and downs (since these are the super rich)

# Step 3: Check the narrative against history, economic first principles & common sense

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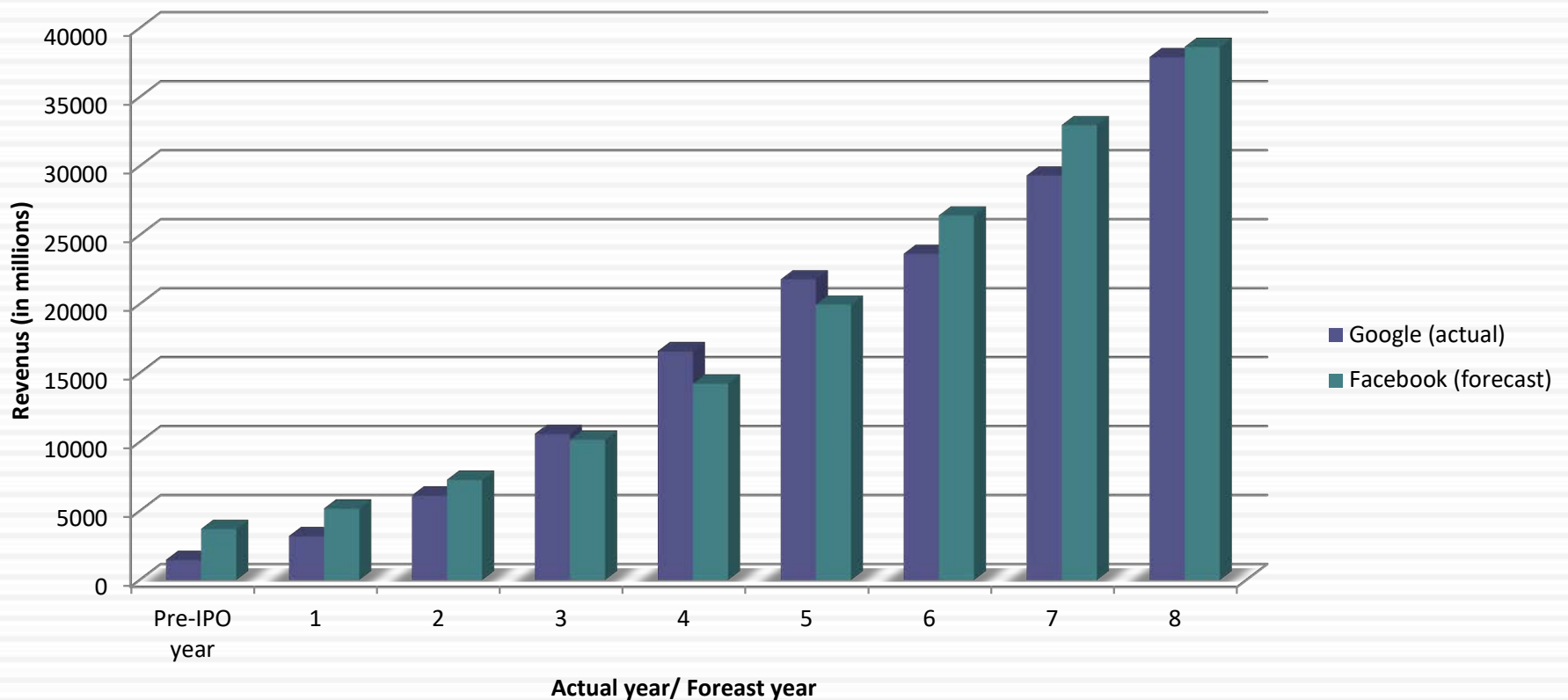


# Test 1: The “Big Market” Delusion

Company	Market Capitalization	Enterprise Value	Current Revenues	Breakeven Revenues (2023)	% from Online Ads (2012)	Imputed Online Ad Revenue (2023)	Cost of capital	Target margin
Google	\$291,586.00	\$240,579.00	\$56,594.00	\$168,336.00	87.07%	\$146,570.16	10%	22.49%
Facebook	\$119,769.00	\$111,684.00	\$6,118.00	\$90,959.00	84.08%	\$76,478.33	10%	29.99%
Yahoo!	\$34,688.00	\$29,955.00	\$4,823.00	\$17,695.00	100%	\$17,695.00	10%	25.00%
Linkedin	\$27,044.00	\$26,171.00	\$1,244.00	\$32,110.00	80.41%	\$25,819.65	10%	25.00%
Twitter (Est)	\$12,000.00	\$11,000.00	\$448.00	\$7,846.00	90.00%	\$7,061.40	10%	25.00%
Pandora	\$4,833.00	\$4,774.00	\$528.00	\$3,085.00	87.84%	\$2,709.86	10%	25.00%
Yelp	\$4,422.00	\$4,325.00	\$179.00	\$2,825.00	94.31%	\$2,664.26	10%	25.00%
Zillow	\$3,192.00	\$3,060.00	\$152.00	\$1,984.00	25.83%	\$512.47	10%	25.00%
AOL	\$2,586.00	\$2,208.00	\$2,211.00	\$10,055.00	64.72%	\$6,507.60	10%	9.32%
Retailmenot	\$1,718.00	\$1,644.00	\$169.00	\$1,605.00	100%	\$1,605.00	10%	25.00%
OpenTable	\$1,597.00	\$1,505.00	\$173.77	\$1,361.38	74.22%	\$1,010.42	10%	25.00%
<b>US based</b>	<b>\$503,435.00</b>	<b>\$436,905.00</b>	<b>\$72,639.77</b>	<b>\$337,861.38</b>	<b>\$8.88</b>	<b>\$288,634.13</b>		
Baidu	\$53,589.00	\$49,961.00	\$4,182.00	\$15,526.00	99.73%	\$15,484.08	10%	25.00%
Sohu.com	\$3,166.00	\$2,540.00	\$1,231.00	\$1,338.00	36.33%	\$486.10	10%	21.45%
Naver	\$17,843.00	\$17,595.00	\$133.00	\$11,227.00	62.94%	\$7,066.27	10%	25.00%
Yandex	\$12,654.00	\$11,872.00	\$1,065.00	\$7,684.00	98%	\$7,505.73	10%	25.00%
<b>Global</b>	<b>\$590,687.00</b>	<b>\$518,873.00</b>	<b>\$79,250.77</b>	<b>\$373,636.38</b>	<b>\$11.85</b>	<b>\$319,176.31</b>		

# Test 2: Measure up against past winners

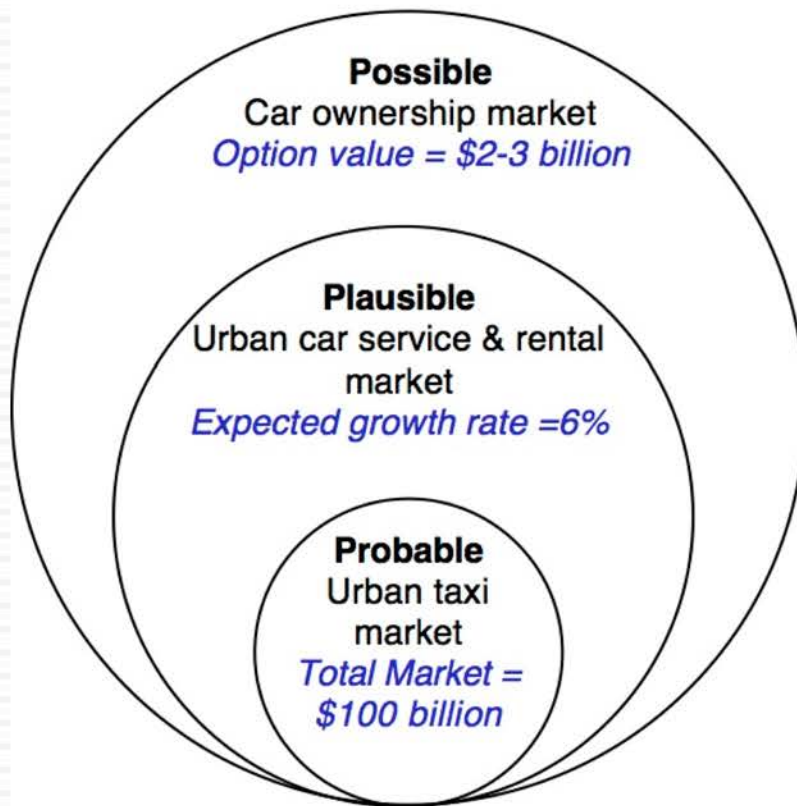
**Google's actual revenues versus Facebook Revenue Forecasts (at IPO)**



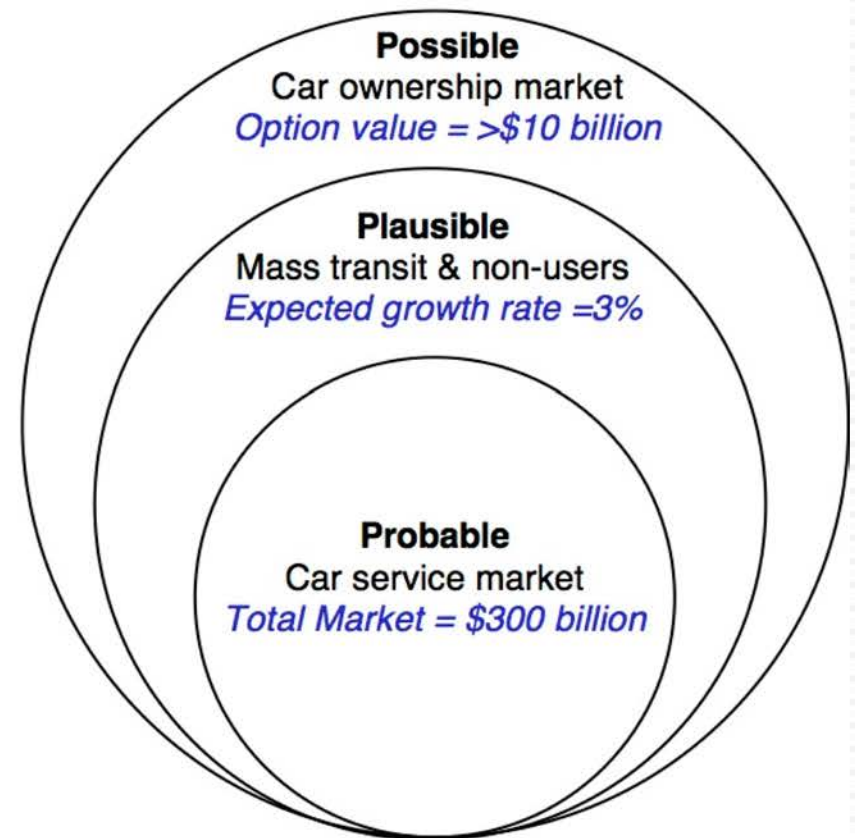


# Uber: Possible, Plausible and Probable

Uber (My valuation))



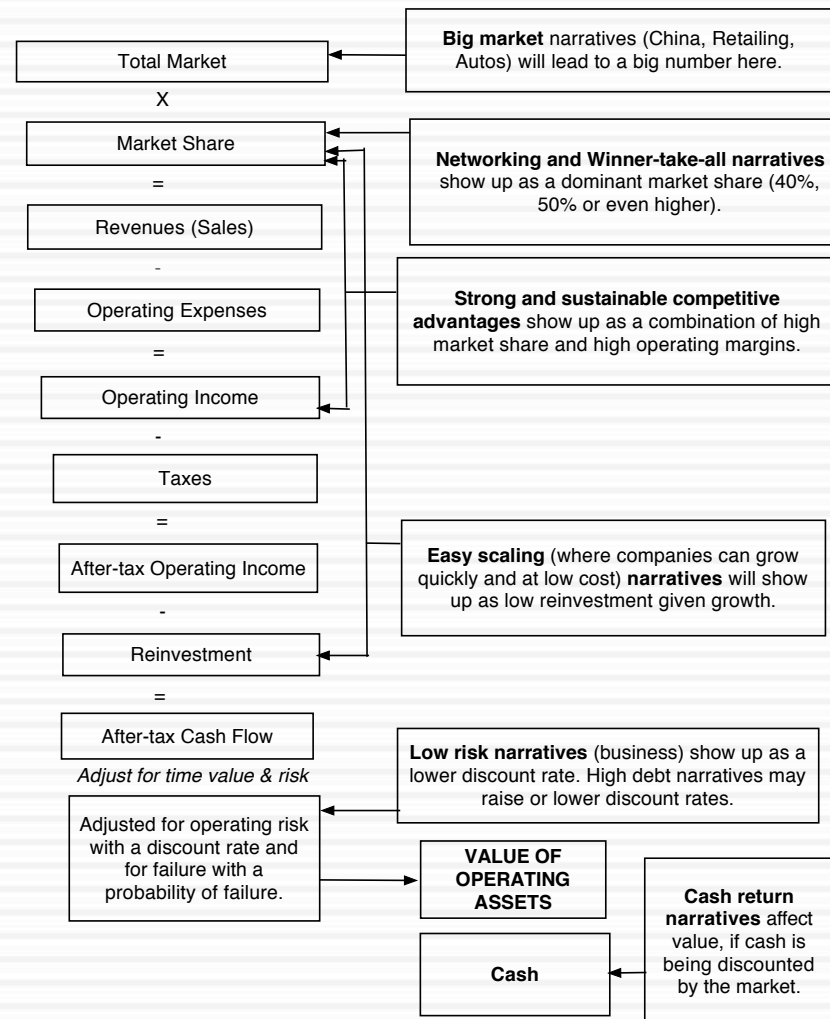
Uber (Bill Gurley)



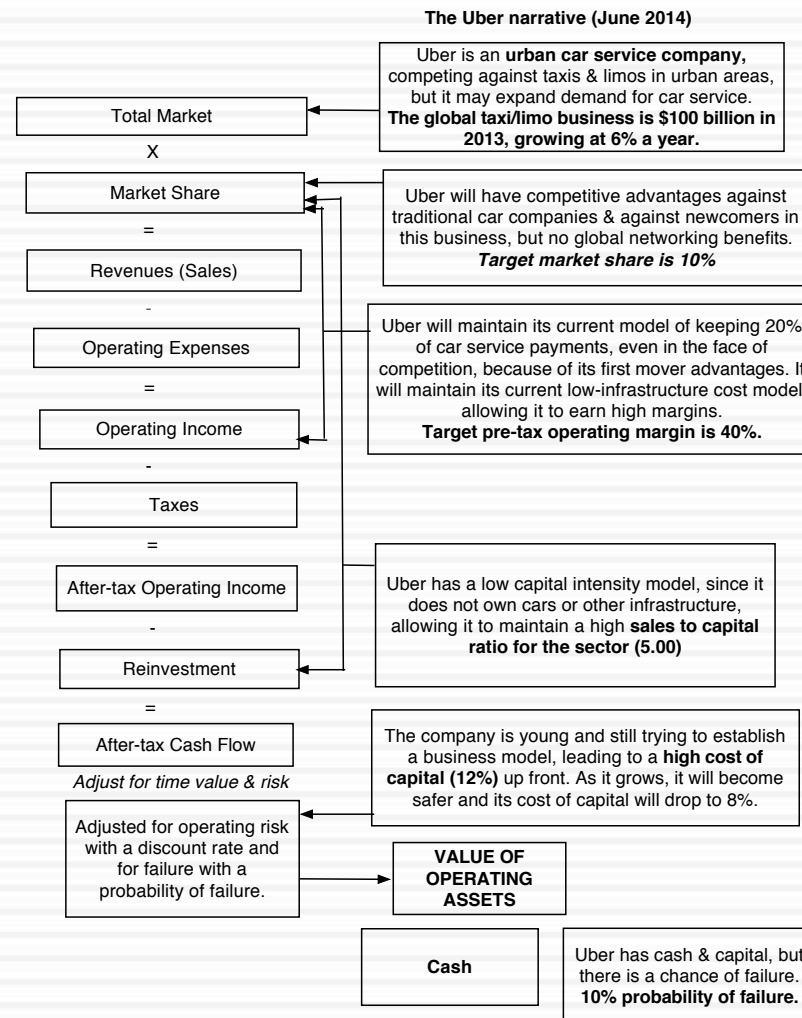
# Ferrari: Probable, Plausible and Impossible

- It is probable: Ferrari will continue on its current path of staying an exclusive car maker that sells cars without any conventional advertising/selling at very high prices to a global market.
- It is plausible: Ferrari will try to go for a higher growth model, introducing perhaps a lower-cost Ferrari, increasing advertising/selling expenses and settling for lower margins.
- It is impossible: Ferrari will go for sharply higher revenue growth, without cutting prices or increasing selling expenses.

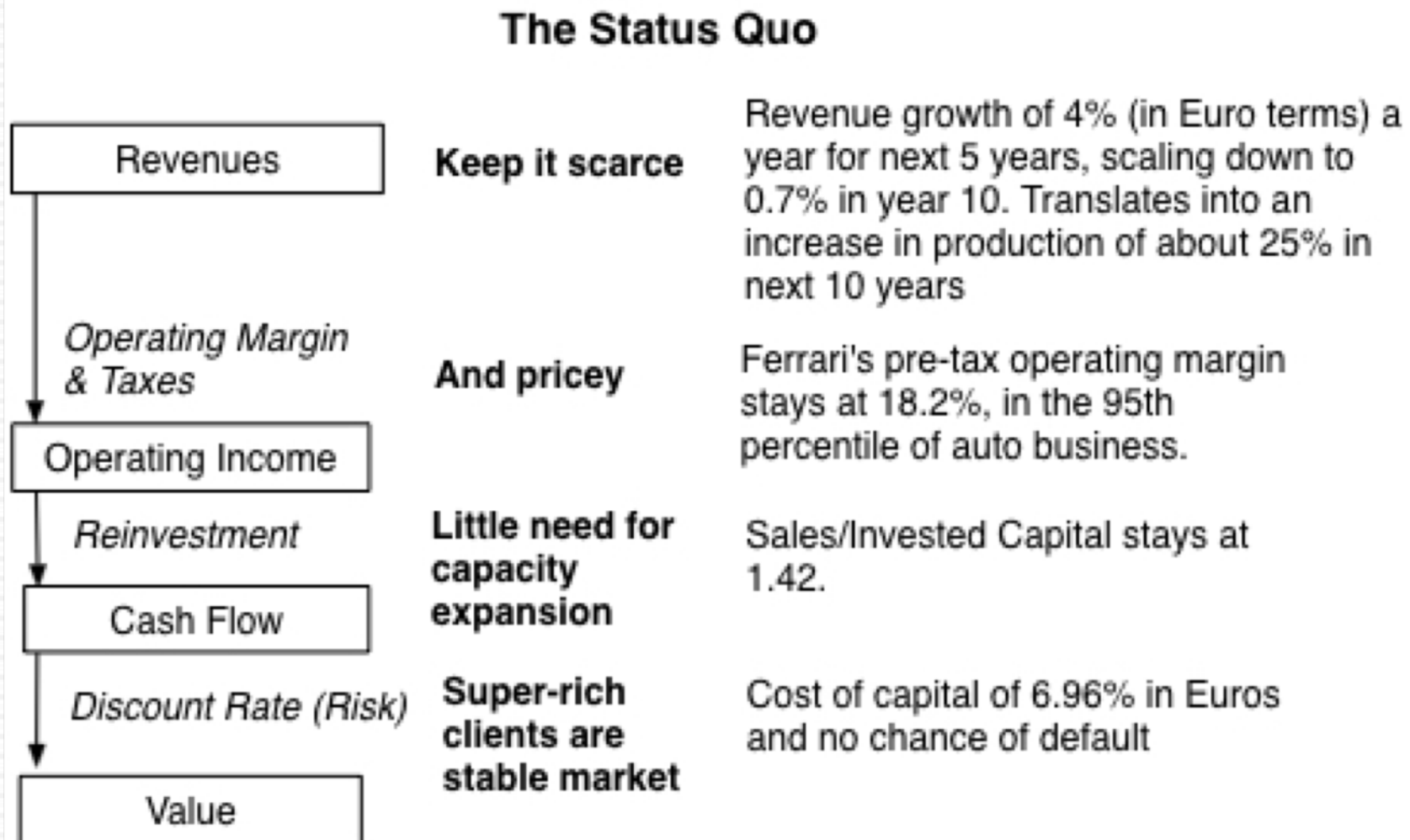
# Step 4: Connect your narrative to key drivers of value



# With Uber



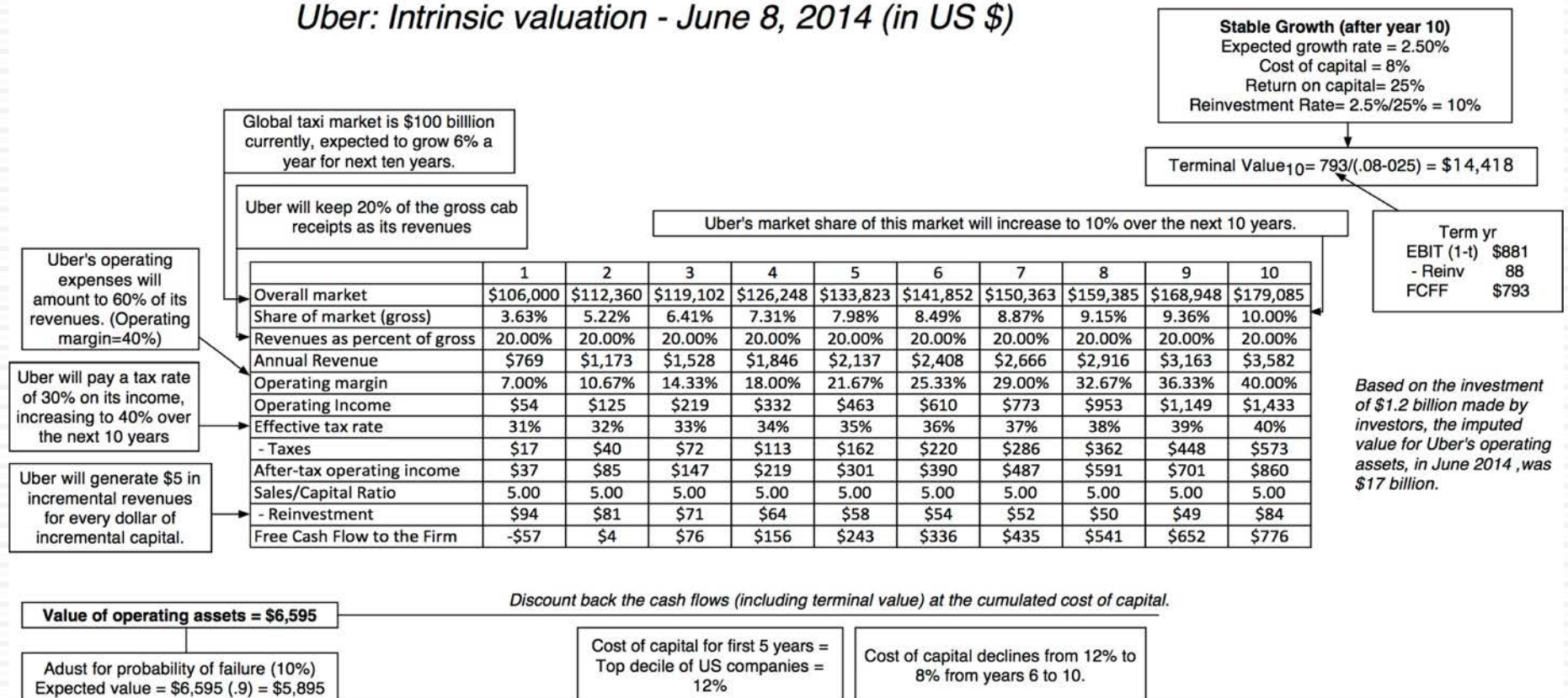
# With Ferrari



# Step 4: Value the company (Uber)

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



# And Ferrari

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

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

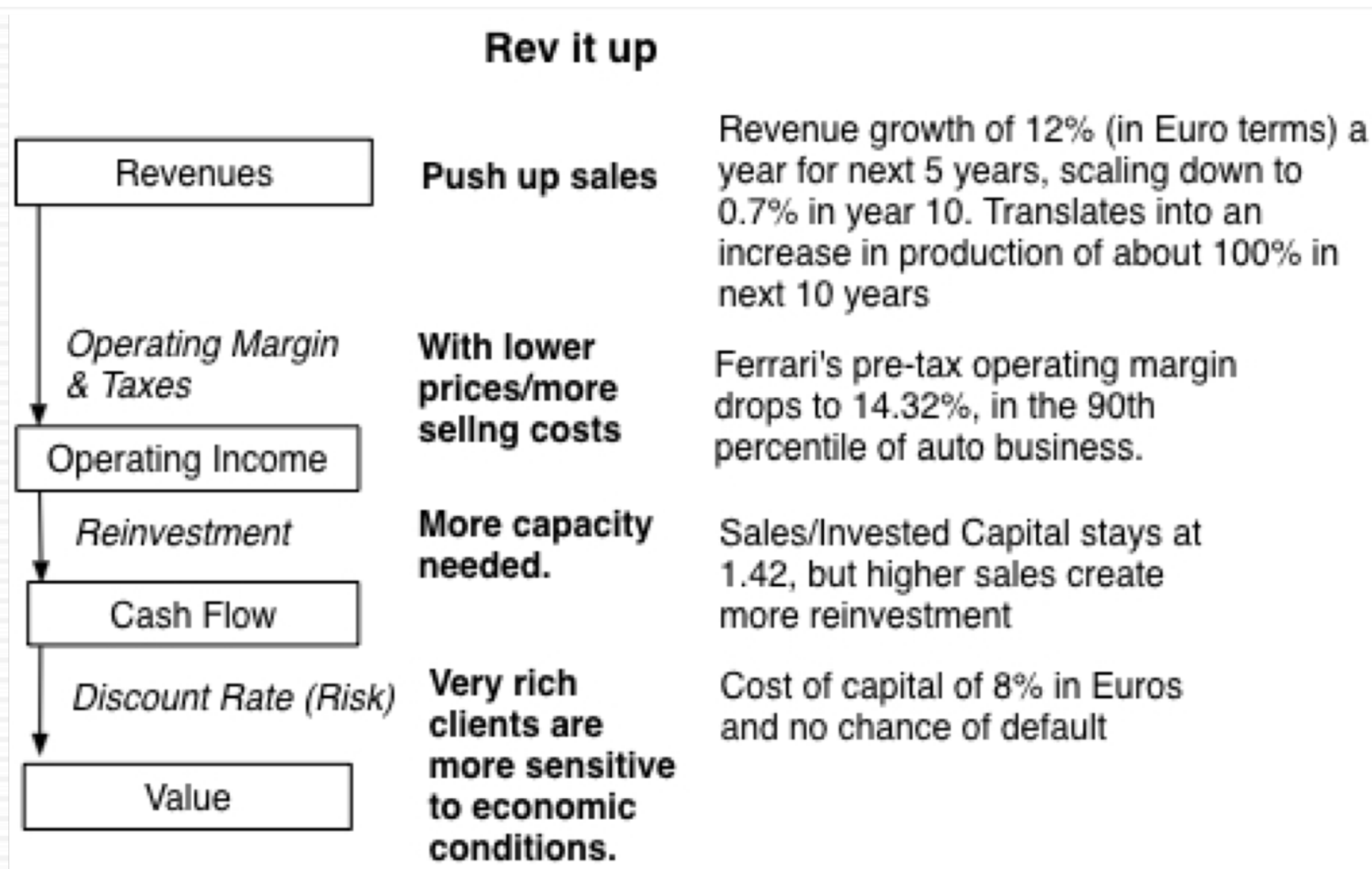
# Valuing Bill Gurley's Uber narrative

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

# Different narratives, Different Numbers

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

# Ferrari: A Rev it up Narrative



# And valuation..

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

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

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

# The Bottom Line

- To be a successful investor in early-stage businesses, you need to be a good judge of narrative. Not only do you need to be able to find good stories to invest in, but you also have to be able to separate impossible stories (fairy tales) from plausible stories, and then providing support (financial or management) to make the plausible into the probable.
- To be a successful in mature businesses, you need to be able to use the numbers that the business has already produced to decide on a narrative that is right for it, and then invest in companies where (you believe) the market has a mistaken narrative.

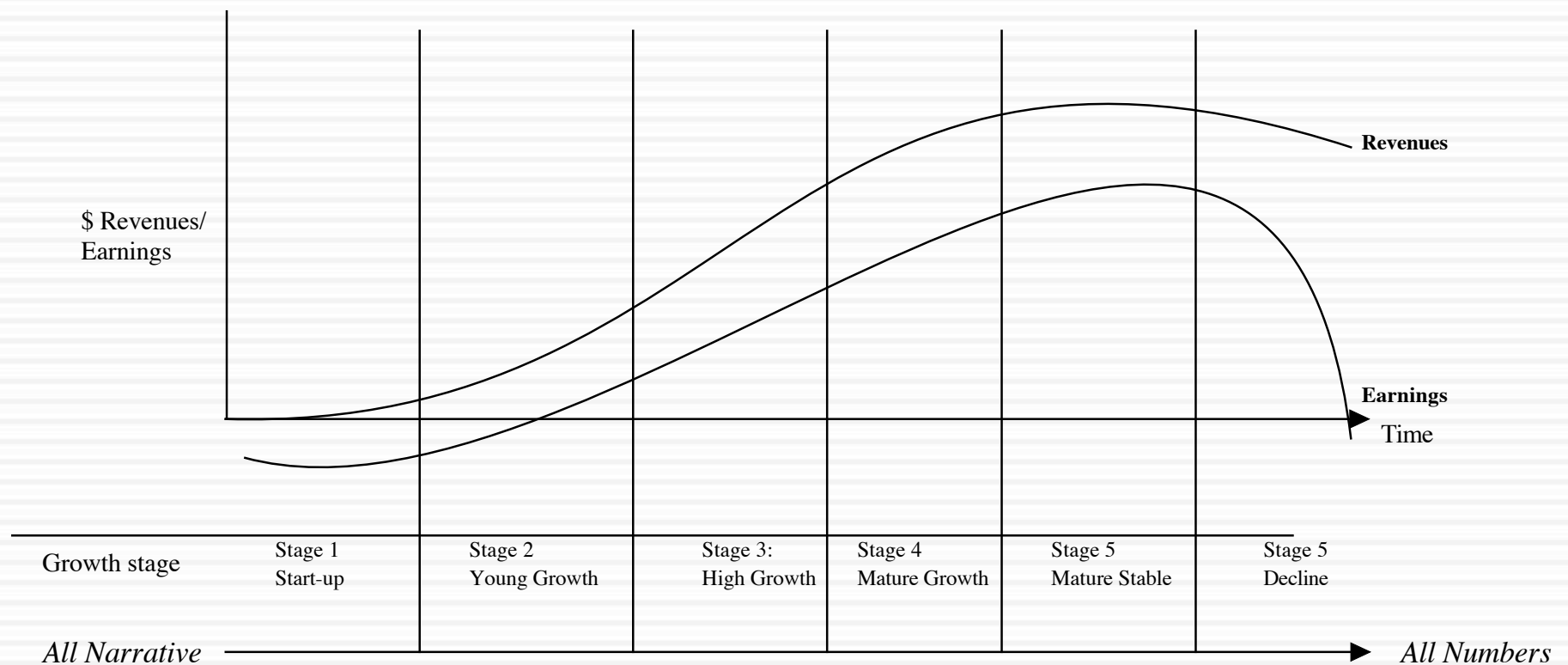




## The Manager's job

Story Tellers, Business Builders and Managers

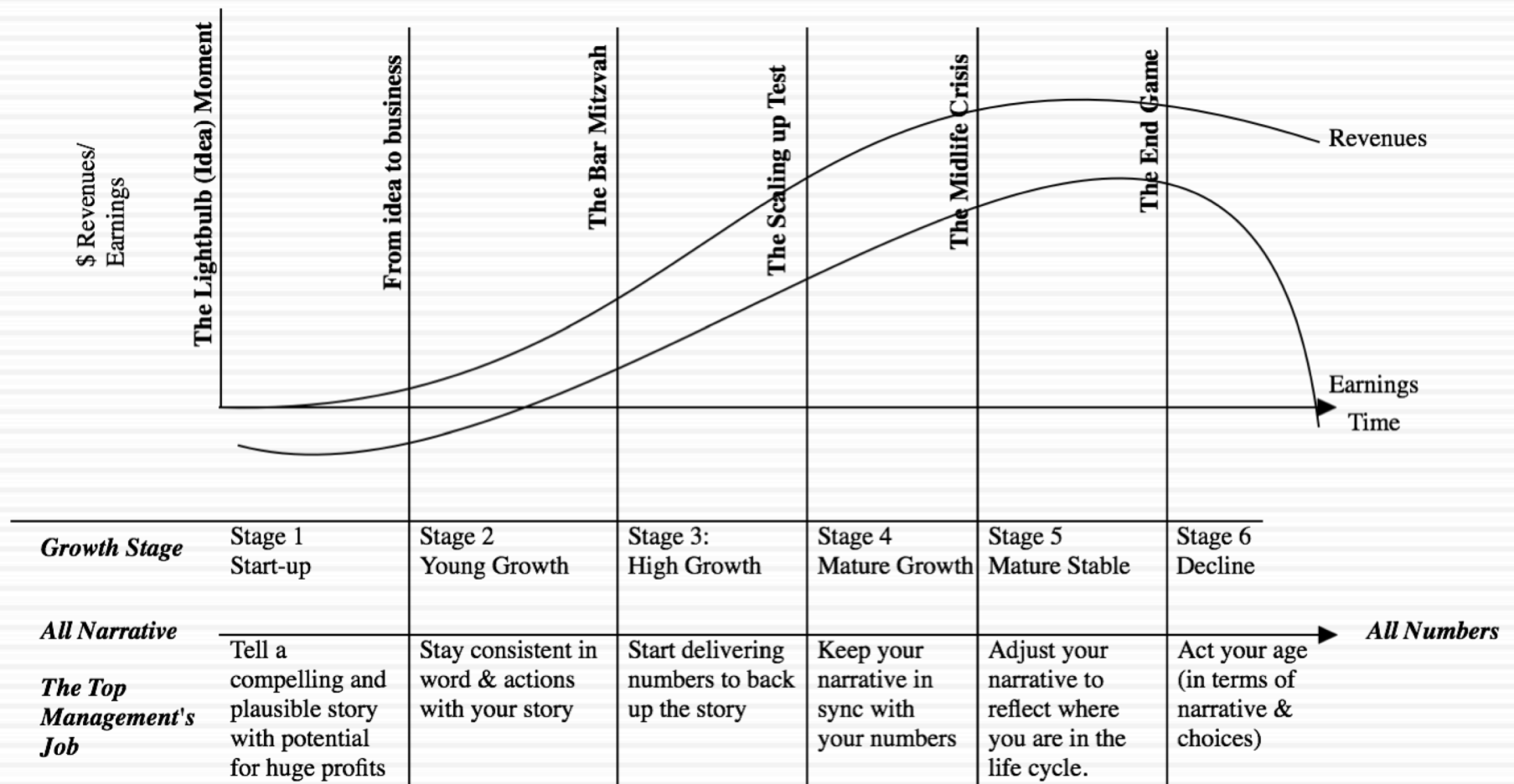
# A Company's Life Cycle & Narrative/Numbers



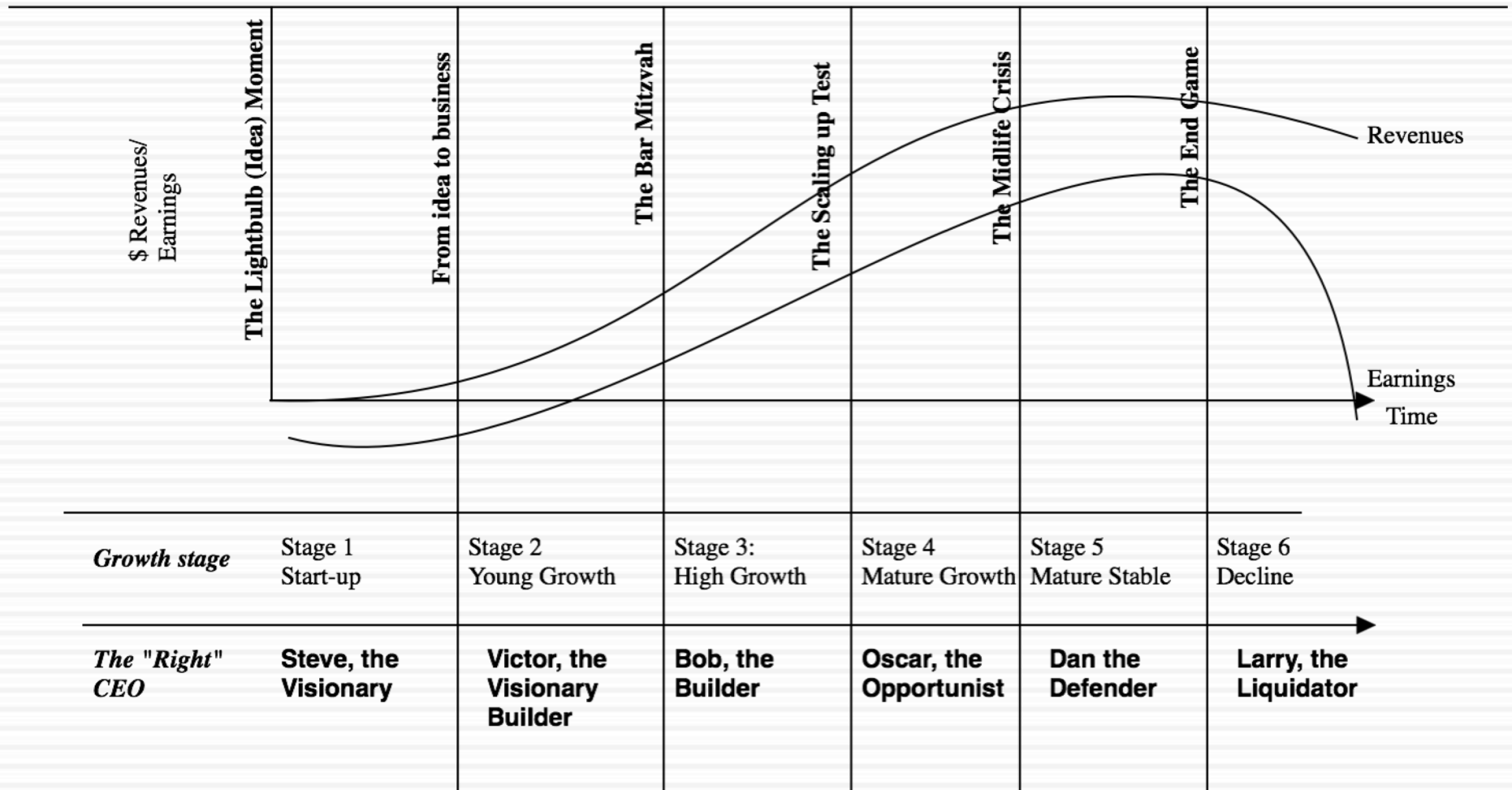
# As companies age, the emphasis shifts..

- Early in a company's life, when all you have are ideas and no clear business plan, it is all about the narrative. Not surprisingly, the most successful managers/investors at this stage are people who are stronger on narrative.
- As companies age, the emphasis shifts to numbers, partly because more of the value is determined by the narrative that has actually unfolded and partly because there are more numbers to focus on. The most successful managers/investors become people who are stronger on numbers.

# And the focus changes..



# The Right CEO for your company? It depends..



# As emphasis shifts, managers and investors can resist, adapt or move on

- As young start-ups succeed and start moving into the growth, the managers who were instrumental in their success have three choices:
  - ▣ Adapt and adjust their focus to include numbers, without giving up their narrative.
  - ▣ Stay completely focused on narrative and ignore numbers.
  - ▣ Hand over control of the operating details of the company to a numbers person while handling the narrative part.
- With investors, the transition is made easier by the existence of public markets. As companies go public, these investors can cash out and go back to their preferred habitat. Investors who stray far from their strengths will pay a price.



# UNCERTAINTY: A FEATURE, NOT A BUG

There are no facts, just opinions

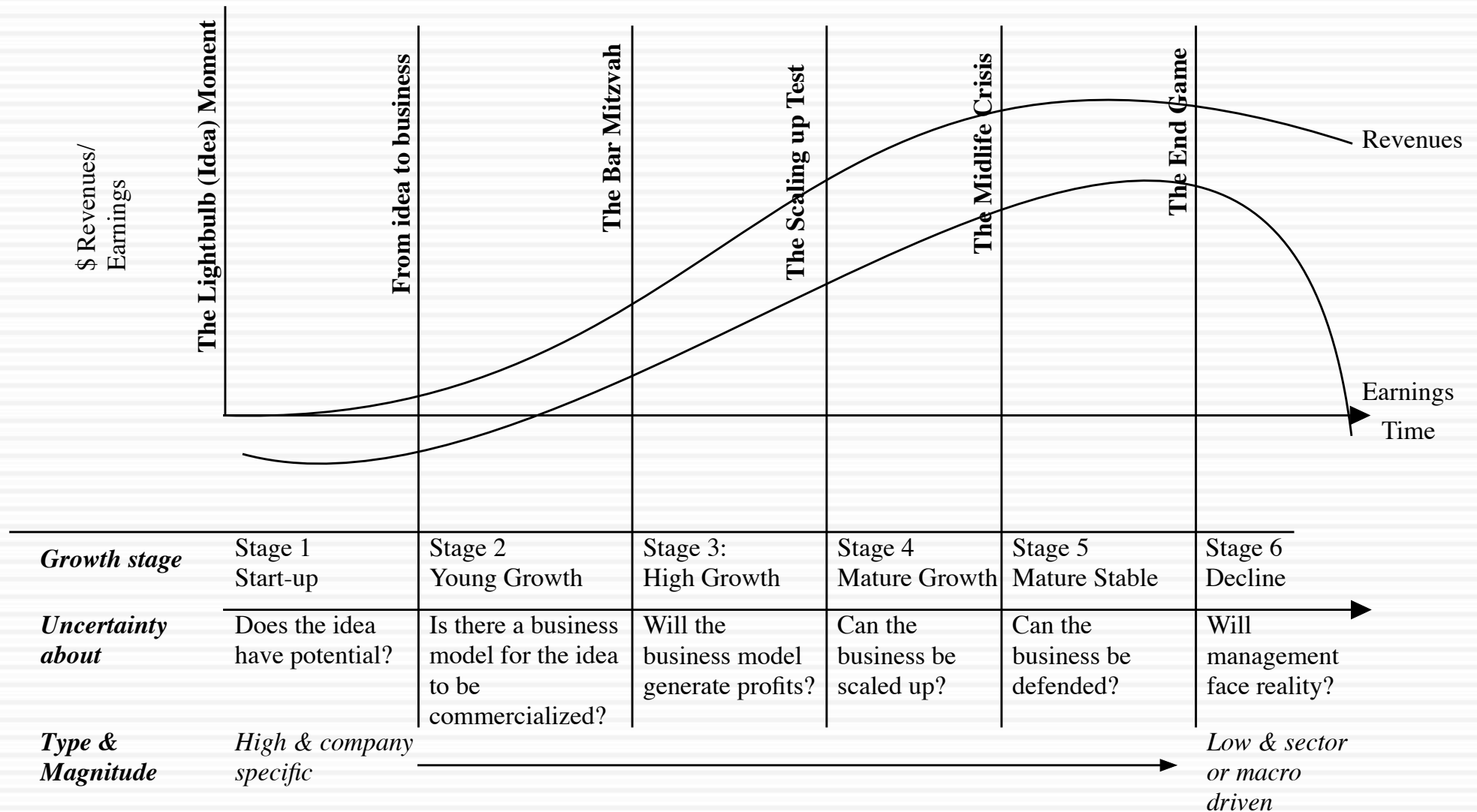


# Uncertainty in valuation

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- Estimation versus Economic uncertainty
  - ▣ Estimation uncertainty reflects the possibility that you could have the “wrong model” or estimated inputs incorrectly within this model.
  - ▣ Economic uncertainty comes the fact that markets and economies can change over time and that even the best models will fail to capture these unexpected changes.
- Micro uncertainty versus Macro uncertainty
  - ▣ Micro uncertainty refers to uncertainty about the potential market for a firm’s products, the competition it will face and the quality of its management team.
  - ▣ Macro uncertainty reflects the reality that your firm’s fortunes can be affected by changes in the macro economic environment.
- Discrete versus continuous uncertainty
  - ▣ Discrete risk: Risks that lie dormant for periods but show up at points in time. (Examples: A drug working its way through the FDA pipeline may fail at some stage of the approval process or a company in Venezuela may be nationalized)
  - ▣ Continuous risk: Risks changes in interest rates or economic growth occur continuously and affect value as they happen.

# The Evolution of Uncertainty



### 3M: A Pre-crisis valuation

#### Current Cashflow to Firm

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

**Reinvestment Rate**  
 30%

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

**Return on Capital**  
 25%

#### Stable Growth

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

First 5 years

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

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

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

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

Value/Share \$ 83.55

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

**Cost of Equity**  
**8.32%**

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

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

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

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

+

**Beta**  
 1.15

x

**Risk Premium**  
 4%

Unlevered Beta for Sectors: 1.09

$D/E = 8.8\%$

# Tata Motors: April 2010

**Current Cashflow to Firm**

EBIT(1-t) : Rs 20,116  
- Nt CpX Rs 31,590  
- Chg WC Rs 2,732  
= FCFF - Rs 14,205  
Reinv Rate =  $(31590+2732)/20116 = 170.61\%$ ; Tax rate = 21.00%  
Return on capital = 17.16%

Average reinvestment rate  
from 2005-09: 179.59%;  
without acquisitions: 70%

Reinvestment Rate  
70%

Expected Growth  
from new inv.  
 $.70 \times .1716 = 0.1201$

Return on Capital  
17.16%

Stable Growth  
 $g = 5\%$ ; Beta = 1.00  
Country Premium = 3%  
Cost of capital = 10.39%  
Tax rate = 33.99%  
ROC = 10.39%;  
Reinvestment Rate =  $g/ROC = 5/10.39 = 48.11\%$

Op. Assets Rs210,813  
+ Cash: 11418  
+ Other NO 140576  
- Debt 109198  
= Equity 253,628

Value/Share Rs 614

Rs Cashflows											
Year	1	2	3	4	5	6	7	8	9	10	
EBIT (1-t)	22533	25240	28272	31668	35472	39236	42848	46192	49150	51607	
- Reinvestment	15773	17668	19790	22168	24830	25242	25138	24482	23264	21503	
FCFF	6760	7572	8482	9500	10642	13994	17711	21710	25886	30104	
											Terminal Value <sub>5</sub> = $23493 / (.1039 - .05) = \text{Rs } 435,686$
											45278 21785 23493
Discount at Cost of Capital (WACC) = $14.00\% (.747) + 8.09\% (0.253) = 12.50\%$											

**Cost of Equity**  
14.00%

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

**Weights**  
E = 74.7% D = 25.3%

Growth declines to 5%  
and cost of capital  
moves to stable period  
level.

On April 1, 2010  
Tata Motors price = Rs 781

**Riskfree Rate:**  
Rs Riskfree Rate = 5%

+ **Beta** 1.20 X **Mature market premium** 4.5% + **Lambda** 0.80 X **Country Equity Risk Premium** 4.50%

Unlevered Beta for Sectors: 1.04      Firm's D/E Ratio: 33%

Country Default Spread 3%      Rel Equity Mkt Vol 1.50

# Infosys: March 2018 (in Rupees)

## Cash flows from existing assets

	LTM	2011-2017	Industry (US data)
Revenue growth =	3.28%	14.22%	15.31%
Pre-tax operating margin =	24.29%	26.16%	8.35%
Sales to capital ratio =	1.81	2.50	3.69
Return on invested capital =	31.57%	47.80%	27.96%

## The Payoff from growth

Revenues will grow 10% a year for next 5 years, tapering down to 5.38% growth in year 10

Operating margin (per-tax) will continue to decline from 24.29% to 23%

Sales/Invested Capital will stay at ten-year average of 1.81

## Maturity and Closure

Stable Growth  
g = 5.38%;  
Cost of capital = 9.88%  
ROC = 15%;  
Reinvestment Rate = g/ROC = 5.83%/15.00% = 35.87%

## Rupee Cashflows

Terminal Value =  $169,632 / (.0988 - .0538) = 3,769,597$

	Base year	1	2	3	4	5	6	7	8	9	10	Terminal year
Revenue growth rate		10.00%	10.00%	10.00%	10.00%	10.00%	9.08%	8.15%	7.23%	6.30%	5.38%	5.38%
Revenues	₹ 683,119	₹ 751,431	₹ 826,574	₹ 909,231	₹ 1,000,155	₹ 1,100,170	₹ 1,200,021	₹ 1,297,847	₹ 1,391,656	₹ 1,479,386	₹ 1,558,976	₹ 1,642,849
EBIT (Operating) margin	24.29%	24.16%	24.03%	23.90%	23.78%	23.65%	23.52%	23.39%	23.26%	23.13%	23.00%	23.00%
EBIT (Operating income)	₹ 165,945	₹ 181,568	₹ 198,657	₹ 217,348	₹ 237,790	₹ 260,148	₹ 282,208	₹ 303,536	₹ 323,678	₹ 342,170	₹ 358,565	₹ 377,855
Tax rate	28.00%	28.00%	28.00%	28.00%	28.00%	28.00%	28.40%	28.80%	29.20%	29.60%	30.00%	30.00%
EBIT(1-t)	₹ 119,480	₹ 130,729	₹ 143,033	₹ 156,491	₹ 171,209	₹ 187,306	₹ 202,061	₹ 216,118	₹ 229,164	₹ 240,888	₹ 250,995	₹ 264,499
- Reinvestment	₹ 37,842	₹ 41,626	₹ 45,789	₹ 50,368	₹ 55,404	₹ 55,313	₹ 54,191	₹ 51,966	₹ 48,599	₹ 44,090	₹ 44,090	₹ 94,867
FCFF		₹ 92,887	₹ 101,407	₹ 110,702	₹ 120,841	₹ 131,902	₹ 146,747	₹ 161,927	₹ 177,198	₹ 192,289	₹ 206,905	₹ 169,632
Cost of capital		11.02%	11.02%	11.02%	11.02%	11.02%	10.80%	10.57%	10.34%	10.11%	9.88%	
Cumulated discount factor		0.9007	0.8113	0.7307	0.6581	0.5928	0.5350	0.4839	0.4386	0.3983	0.3625	
PV(FCFF)		₹ 83,664	₹ 82,268	₹ 80,890	₹ 79,531	₹ 78,190	₹ 78,514	₹ 78,356	₹ 77,712	₹ 76,588	₹ 74,999	

Discount at Rs Cost of Capital (WACC) = 11.02% (.100) = 11.02%

## The Risk in the Cash flows

On March 27, 2018, Infosys was trading at Rs 1150/ share

Cost of Equity  
11.02%

Cost of Debt  
NO DEBT

Weights  
E = 100% D = 0%

Riskfree Rate:  
Rupee Risk free Rate =  
7.33% - 1.95% = 5.38%

Beta = 1.03

Firm's D/E  
Ratio: 0%

Business	Revenues	EV/Sales	Estimated Value	Value Weight	Unlevered Beta
Computer Software	₹ 2,101	6.3640	₹ 13,371	13.51%	1.1114
Computer Services	₹ 66,383	1.2899	₹ 85,630	86.49%	1.0136
Company	₹ 68,484		₹ 99,001		1.0268

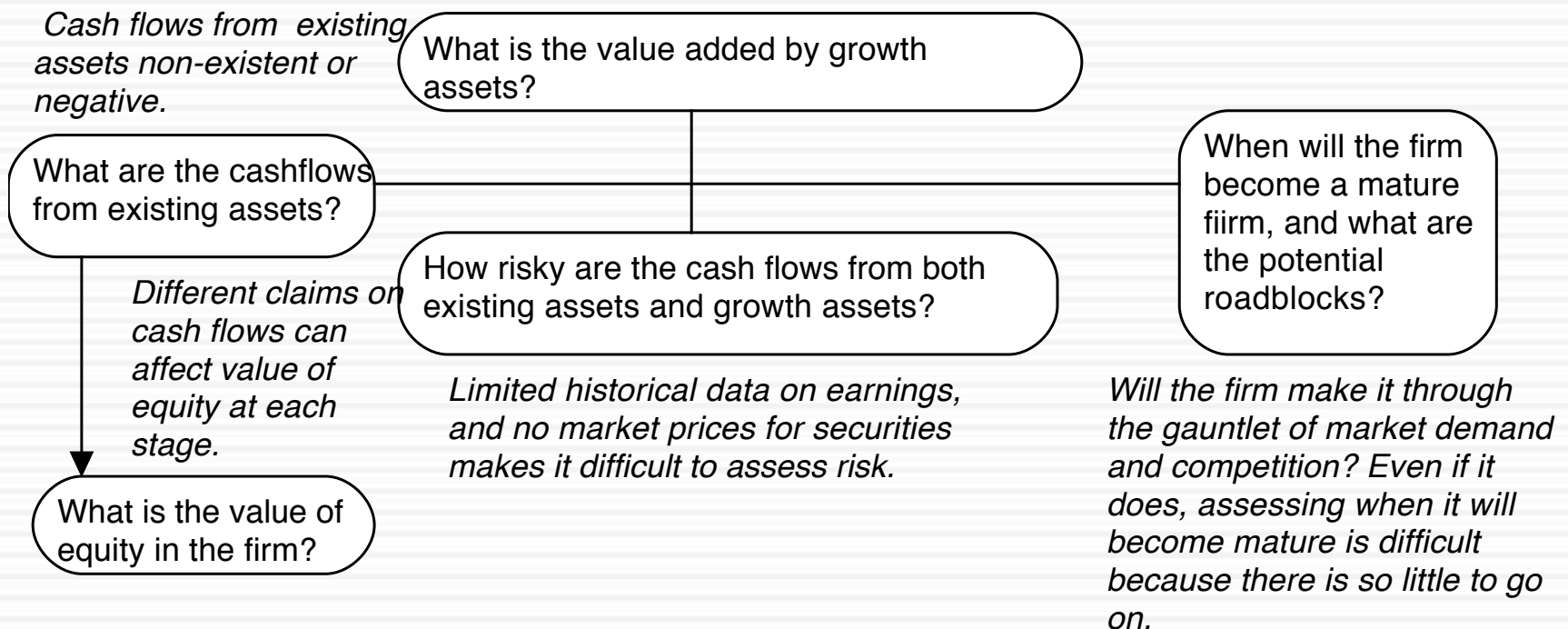
## ERP = 5.50%

Region	Revenues	ERP	Weight	Weighted ERP
North America	₹ 42,408	5.08%	62.01%	3.1499%
Europe	₹ 15,302	6.01%	22.37%	1.3437%
Rest of the World	₹ 8,504	6.21%	12.43%	0.7721%
India	₹ 2,180	7.27%	3.19%	0.2317%
Total	₹ 68,394		100.00%	5.4974%

# So, what's different about a young start up?

Figure 3: 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.*



# The Dark Side will beckon.. Don't be tempted..

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- With young start up companies, you will be told that it is “too difficult” or even “impossible” to value these companies, because there is so little history and so much uncertainty in the future.
- Instead, you will be asked to come over to the “dark side”, where
  - ▣ You will see value metrics that you have never seen before
  - ▣ You will hear “macro” stories, justifying value
  - ▣ You will be asked to play the momentum game
- While all of this behavior is understandable, none of it makes the uncertainty go away. You have a choice. You can either hide from uncertainty or face up to it.



# Twitter: Setting the table in October 2013

	Last 10K	Trailing 12 month
Revenues	\$316.93	\$534.46
Operating Income	(\$77.06)	(\$134.91)
Adjusted Operating Income		\$7.66
Invested Capital		\$955.00
Adjusted Operating Margin		1.44%
Sales/ Invested Capital		\$0.56

# Twitter: Priming the Pump for Valuation

## 1. Make small revenues into big revenues

	2011		2012		2013	
	%	\$	%	\$	%	\$
Google	32.09%	\$27.74	31.46%	\$32.73	33.24%	\$38.83
Facebook	3.65%	\$3.15	4.11%	\$4.28	5.04%	\$5.89
Yahoo!	3.95%	\$3.41	3.37%	\$3.51	3.10%	\$3.62
Microsoft	1.27%	\$1.10	1.63%	\$1.70	1.78%	\$2.08
IAC	1.15%	\$0.99	1.39%	\$1.45	1.47%	\$1.72
AOL	1.17%	\$1.01	1.02%	\$1.06	0.95%	\$1.11
Amazon	0.48%	\$0.41	0.59%	\$0.61	0.71%	\$0.83
Pandora	0.28%	\$0.24	0.36%	\$0.37	0.50%	\$0.58
Twitter	0.16%	\$0.14	0.28%	\$0.29	0.50%	\$0.58
Linkedin	0.18%	\$0.16	0.25%	\$0.26	0.32%	\$0.37
Millennial Media	0.05%	\$0.04	0.07%	\$0.07	0.10%	\$0.12
Other	55.59%	\$48.05	55.47%	\$57.71	52.29%	\$61.09
Total Market	100%	\$86.43	100.00%	\$104.04	100.00%	\$116.82

		Annual growth rate in Global Advertising Spending				
		2.00%	2.50%	3.00%	3.50%	4.00%
Online advertising share of market	20%	\$124.78	\$131.03	\$137.56	\$144.39	\$151.52
	25%	\$155.97	\$163.79	\$171.95	\$180.49	\$189.40
	30%	\$187.16	\$196.54	\$206.34	\$216.58	\$227.28
	35%	\$218.36	\$229.30	\$240.74	\$252.68	\$265.16
	40%	\$249.55	\$262.06	\$275.13	\$288.78	\$303.04

*My estimate for 2023: Overall online advertising market will be close to \$200 billion and Twitter will have about 5.7% (\$11.5 billion)*

Aswath Damodaran

## 2. Make losses into profits

Company	Operating Margin
Google Inc. (NasdaqGS:GOOG)	22.82%
Facebook, Inc. (NasdaqGS:FB)	29.99%
Yahoo! Inc. (NasdaqGS:YHOO)	13.79%
Netfix	3.16%
Groupon	2.53%
LinkedIn Corporation (NYSE:LNKD)	5.18%
Pandora Media, Inc. (NYSE:P)	-9.13%
Yelp, Inc. (NYSE:YELP)	-6.19%
OpenTable, Inc. (NasdaqGS:OPEN)	24.90%
RetailMeNot	45.40%
Travelzoo Inc. (NasdaqGS:TZOO)	15.66%
Zillow, Inc. (NasdaqGS:Z)	-66.60%
Trulia, Inc. (NYSE:TRLA)	-6.79%
Aggregate	20.40%

*My estimate for Twitter: Operating margin of 25% in year 10*

## 3. Reinvest for growth

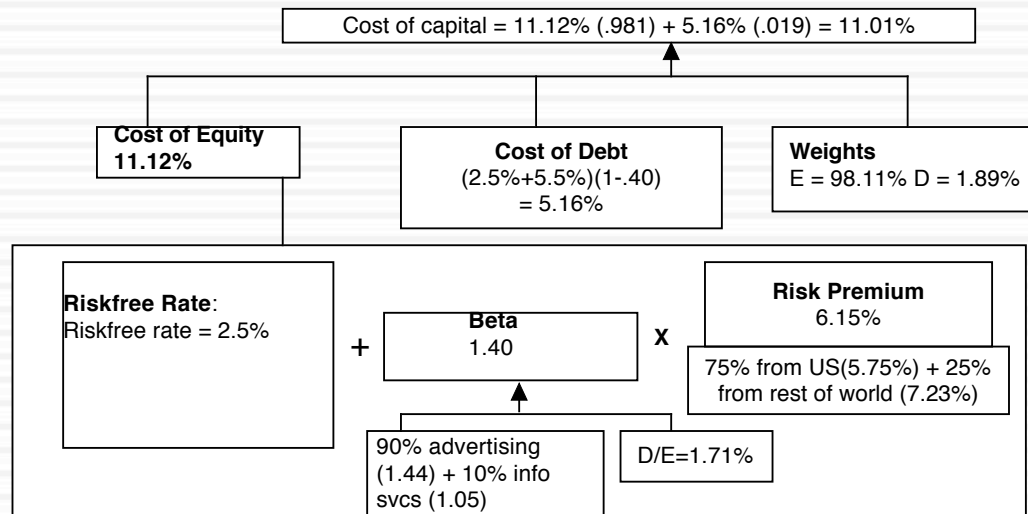
	Sales/ Invested Capital
Twitter (2013)	1.10
Advertising Companies	1.40
Social Media Companies	1.05

*My estimate for Twitter: Sales/Capital will be 1.50 for next 10 years*

# Sweating the small stuff: Risk and Required Return

## *Risk in the discount rate*

### *My estimate for Twitter*



0%

*Survival Risk*

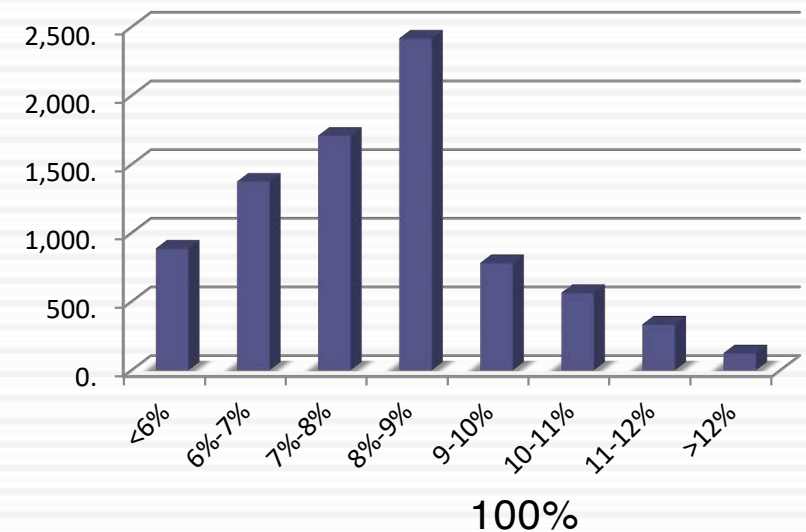
Probability that the firm will not make it as a going concern

*Certain to make it as going concern*

*Certain to fail*

*My assumption for Twitter*

### *Cost of Capital: US - Nov '13*



### Starting numbers

	Last 10K	Trailing 12 month
Revenues	\$316.93	\$534.46
Operating income	-\$77.06	-\$134.91
Adjusted Operating Income		\$7.67
Invested Capital		\$955.00
Adjusted Operatng Margin		1.44%
Sales/ Invested Capital		0.56
Interest expenses	\$2.49	\$5.30

Revenue growth of 51.5% a year for 5 years, tapering down to 2.5% in year 10

Pre-tax operating margin increases to 25% over the next 10 years

Sales to capital ratio of **1.50** for incremental sales

**Stable Growth**  
 $g = 2.5\%$ ;  $\text{Beta} = 1.00$ ;  
 Cost of capital = 8%  
 $\text{ROC} = 12\%$ ;  
 Reinvestment Rate =  $2.5\%/12\% = 20.83\%$

Terminal Value<sub>10</sub> =  $1466 / (.08 - .025) = \$26,657$

		1	2	3	4	5	6	7	8	9	10	
Operating assets	\$9,705	Revenues	\$ 810	\$1,227	\$1,858	\$2,816	\$4,266	\$6,044	\$7,973	\$9,734	\$10,932	\$11,205
+ Cash	321	Operating Income	\$ 31	\$ 75	\$ 158	\$ 306	\$ 564	\$ 941	\$1,430	\$1,975	\$ 2,475	\$ 2,801
+ IPO Proceeds	1295	Operating Income after tax	\$ 31	\$ 75	\$ 158	\$ 294	\$ 395	\$ 649	\$ 969	\$1,317	\$ 1,624	\$ 1,807
- Debt	214	- Reinvestment	\$ 183	\$ 278	\$ 421	\$ 638	\$ 967	\$1,186	\$1,285	\$1,175	\$ 798	\$ 182
Value of equity	11,106	FCFF	\$(153)	\$(203)	\$(263)	\$(344)	\$(572)	\$(537)	\$(316)	\$ 143	\$ 826	\$ 1,625
- Options	713											
Value in stock	10,394											
/ # of shares	582.46											
Value/share	\$17.84											

Cost of capital = 11.12% (.981) + 5.16% (.019) = 11.01%

Cost of 8% from

**Terminal year (11)**  
 EBIT (1-t) \$ 1,852  
 - Reinvestment \$ 386  
 FCFF \$ 1,466

Cost of capital =  $11.12\% (.981) + 5.16\% (.019) = 11.01\%$

Cost of capital decreases to 8% from years 6-10

Cost of Equity  
11.12%

**Cost of Debt**  
 $(2.5\% + 5.5\%)(1 - .40)$   
 $= 5.16\%$

**Weights**  
 $E = 98.1\%$   $D = 1.9\%$

**Riskfree Rate:**  
 Riskfree rate = 2.5%

**Beta**  
1.40

**Risk Premium**  
6.15%

75% from US (5.75%) + 25% from rest of world (7.23%)

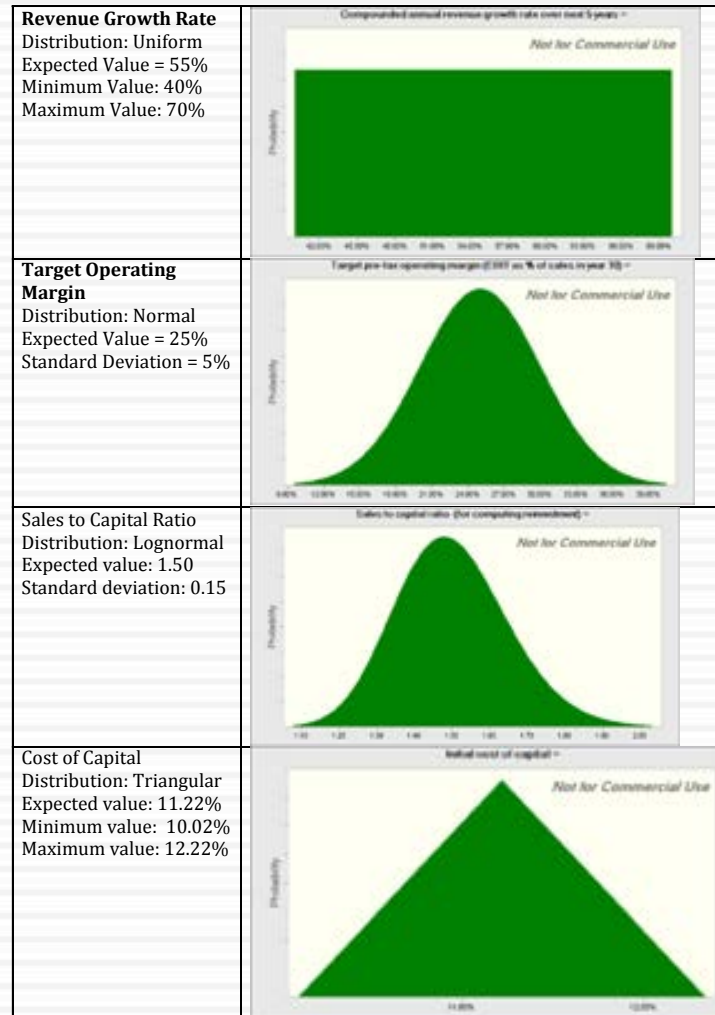
90% advertising (1.44) + 10% info svcs (1.05)

D/E = 1.71%

# The Bottom Line

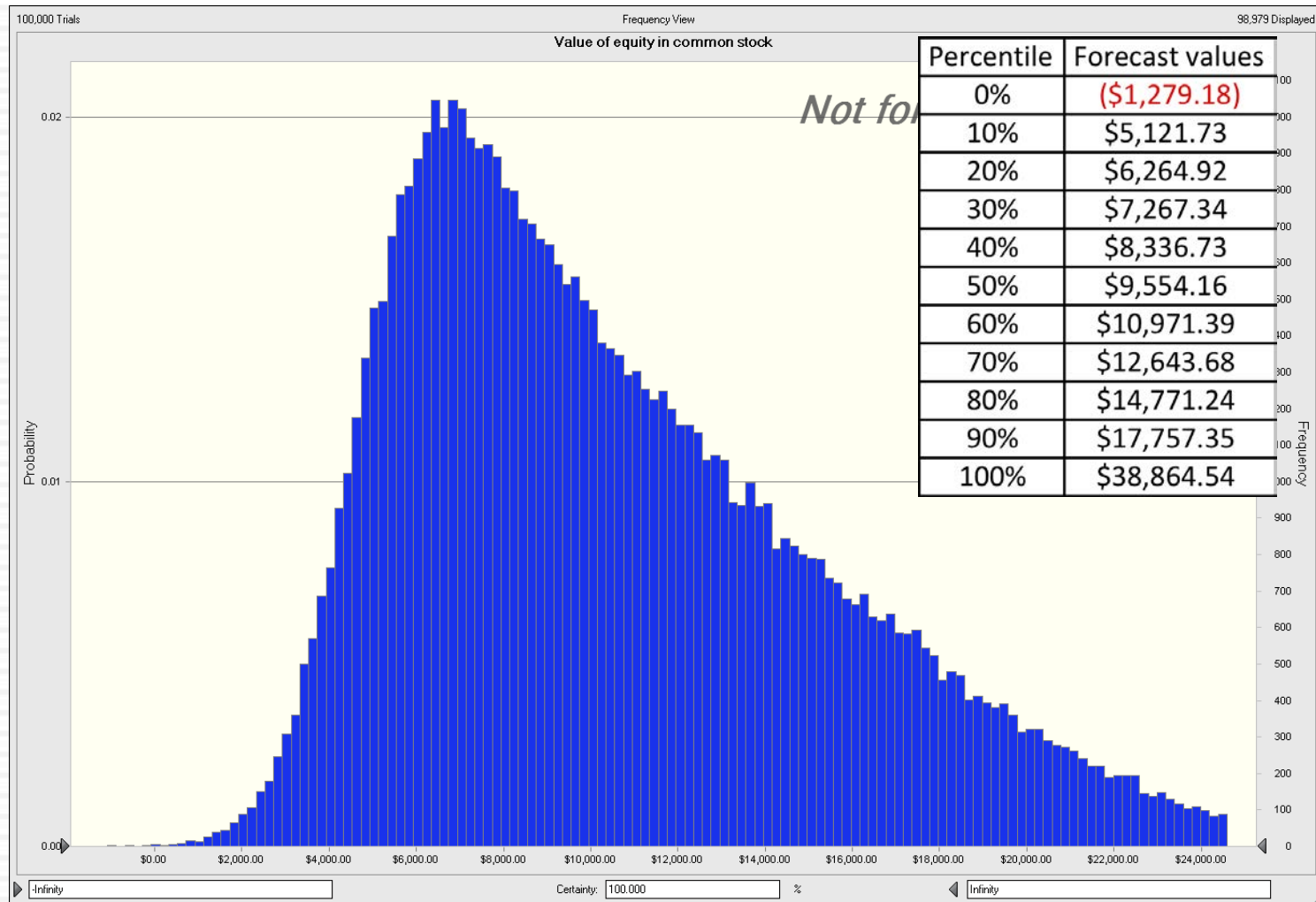
- Early in a company's life, it is a fact of life that everything is uncertain. Consulting with experts, collecting more data or building bigger models will not make the uncertainty go away.
- As you move from mature companies to young companies, you have to be willing to move from
  - ▣ Rule-based valuation to principle-based valuation
  - ▣ Being reliant on historical data to market-based best judgments
  - ▣ Wanting the right answer to being okay with being wrong (sometimes horribly so).
  - ▣ Point estimate valuations to valuation distributions

# To illustrate: Revisiting the Twitter valuation...



# With the consequences for equity value...

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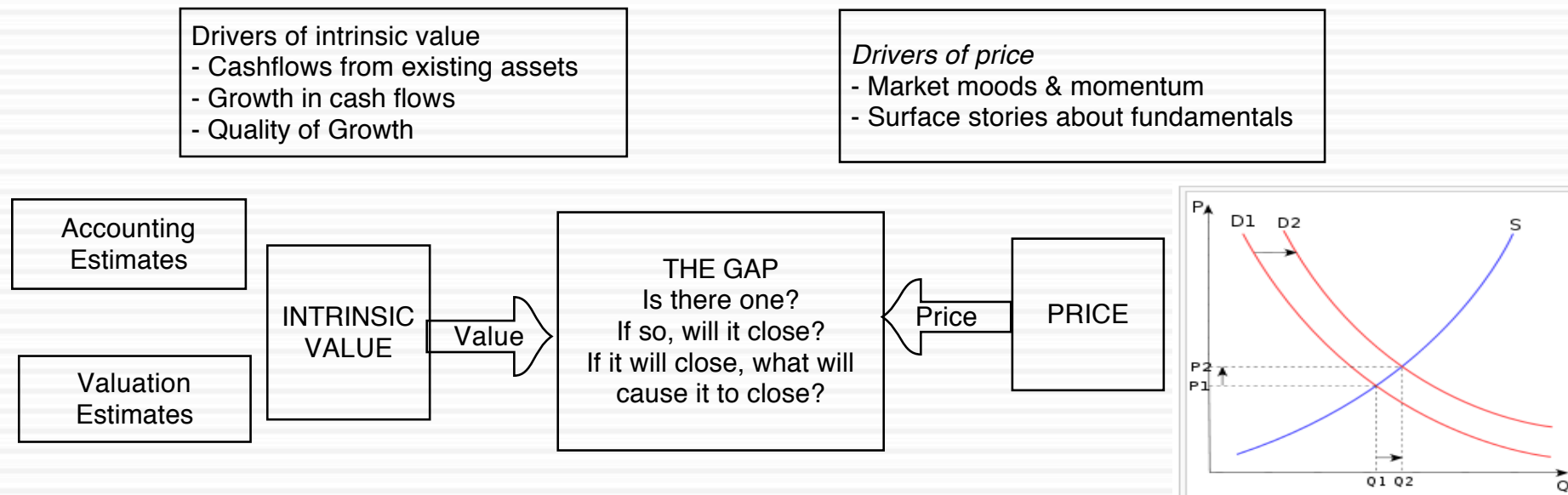


# PRICE VERSUS VALUE



# Price versus Value: The Set up

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# The determinants of price

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## **Mood and Momentum**

Price is determined in large part by mood and momentum, which, in turn, are driven by behavioral factors (panic, fear, greed).

## **Liquidity & Trading Ease**

While the value of an asset may not change much from period to period, liquidity and ease of trading can, and as it does, so will the price.

The Market Price

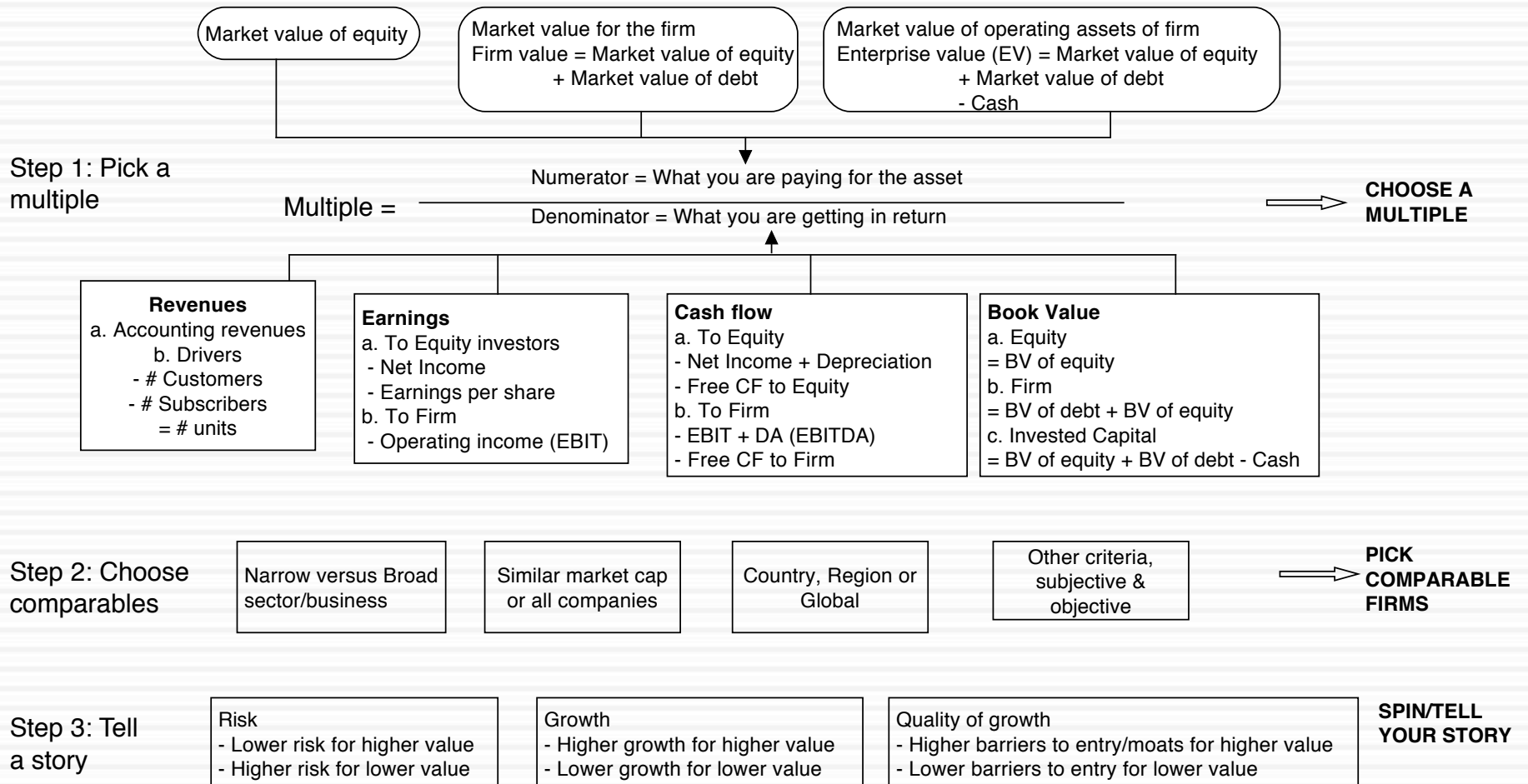
## **Incremental information**

Since you make money on price changes, not price levels, the focus is on incremental information (news stories, rumors, gossip) and how it measures up, relative to expectations

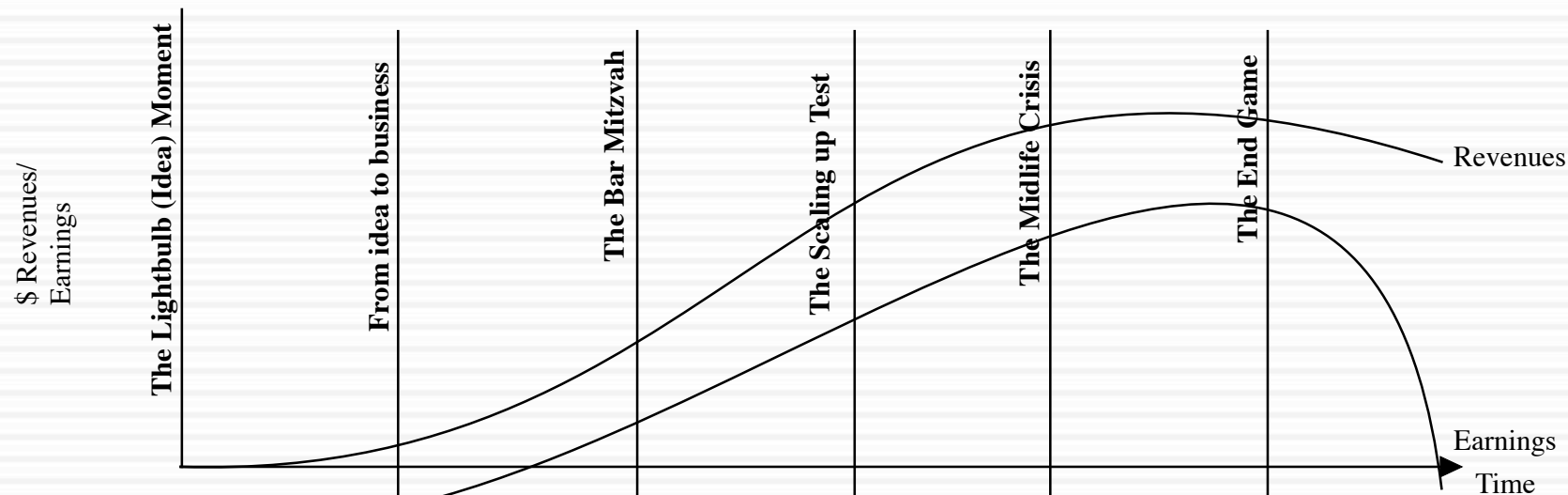
## **Group Think**


To the extent that pricing is about gauging what other investors will do, the price can be determined by the "herd".

# Multiples and Comparable Transactions



# The Pricing Game



<i>Growth stage</i>	Stage 1 Start-up	Stage 2 Young Growth	Stage 3: High Growth	Stage 4 Mature Growth	Stage 5 Mature Stable	Stage 6 Decline	
<i>Mostly Pricing</i>							<i>Mostly Value</i>
<i>Pricing Measures</i>	Market size, Cash on hand, Access to capital	Number of users, User intensity	User Engagement, Revenues	Revenue Growth Rate, Earnings	Earnings growth, Return on capital	Asset Liquidity, Cash flows	
<i>Pricing Metrics</i>	EV/Market Potential, Cash Burn Ratio	EV/User, EV/ User Intensity	EV/Sales	PEG (PE to growth rate)	PE, EV to EBITDA	Price to Book, EV/Invested Capital	

# Pricing Twitter: Start with the “comparables”

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<i>Company</i>	<i>Market Cap</i>	<i>Enterprise value</i>	<i>Revenues</i>	<i>EBITDA</i>	<i>Net Income</i>	<i>Number of users (millions)</i>	<i>EV/User</i>	<i>EV/Revenue</i>	<i>EV/EBITDA</i>	<i>PE</i>
Facebook	\$173,540.00	\$160,090.00	\$7,870.00	\$3,930.00	\$1,490.00	1230.00	\$130.15	20.34	40.74	116.47
Linkedin	\$23,530.00	\$19,980.00	\$1,530.00	\$182.00	\$27.00	277.00	\$72.13	13.06	109.78	871.48
Pandora	\$7,320.00	\$7,150.00	\$655.00	-\$18.00	-\$29.00	73.40	\$97.41	10.92	NA	NA
Groupon	\$6,690.00	\$5,880.00	\$2,440.00	\$125.00	-\$95.00	43.00	\$136.74	2.41	47.04	NA
Netflix	\$25,900.00	\$25,380.00	\$4,370.00	\$277.00	\$112.00	44.00	\$576.82	5.81	91.62	231.25
Yelp	\$6,200.00	\$5,790.00	\$233.00	\$2.40	-\$10.00	120.00	\$48.25	24.85	2412.50	NA
Open Table	\$1,720.00	\$1,500.00	\$190.00	\$63.00	\$33.00	14.00	\$107.14	7.89	23.81	52.12
Zynga	\$4,200.00	\$2,930.00	\$873.00	\$74.00	-\$37.00	27.00	\$108.52	3.36	39.59	NA
Zillow	\$3,070.00	\$2,860.00	\$197.00	-\$13.00	-\$12.45	34.50	\$82.90	14.52	NA	NA
Trulia	\$1,140.00	\$1,120.00	\$144.00	-\$6.00	-\$18.00	54.40	\$20.59	7.78	NA	NA
Tripadvisor	\$13,510.00	\$12,860.00	\$945.00	\$311.00	\$205.00	260.00	\$49.46	13.61	41.35	65.90
						<b>Average</b>	\$130.01	11.32	350.80	267.44
						<b>Median</b>	\$97.41	10.92	44.20	116.47

# Read the tea leaves: See what the market cares about

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	<i>Market Cap</i>	<i>Enterprise value</i>	<i>Revenues</i>	<i>EBITDA</i>	<i>Net Income</i>	<i>Number of users (millions)</i>
<i>Market Cap</i>	1.					
<i>Enterprise value</i>	0.9998	1.				
<i>Revenues</i>	0.8933	0.8966	1.			
<i>EBITDA</i>	0.9709	0.9701	0.8869	1.		
<i>Net Income</i>	0.8978	0.8971	0.8466	0.9716	1.	
<i>Number of users (millions)</i>	0.9812	0.9789	0.8053	0.9354	0.8453	1.

*Twitter had 240 million users at the time of its IPO. What price would you attach to the company?*



# Use the “market metric” and “market price”

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- The most important variable, in late 2013, in determining market value and price in this sector (social media, ill defined as that is) is the number of users that a company has.
- Looking at comparable firms, it looks like the market is paying about \$100/user in valuing social media companies, with a premium for “predictable” revenues (subscriptions) and user intensity.
- Twitter has about 240 million users and can be valued based on the \$100/user:
- Enterprise value =  $240 * 100 = \$24$  billion

# Pricing Ferrari

## *Market Pricing of Auto Companies*

<i>Size Class</i>	<i># Firms</i>	<i>Operating Margin</i>	<i>Net Margin</i>	<i>Pre-tax ROIC</i>	<i>ROE</i>	<i>EV/Sales</i>	<i>EV/Inv Cap</i>	<i>EV/EBITDA</i>	<i>PE</i>	<i>PBV</i>
Largest (>\$10 billion)	31	6.31%	5.23%	6.63%	12.24%	0.95	1.00	9.06	9.72	1.26
2	16	5.24%	5.57%	10.72%	13.33%	0.71	1.46	7.56	13.03	1.73
3	14	2.43%	3.19%	3.40%	5.39%	0.95	1.33	13.23	18.54	1.49
4	20	1.51%	-0.40%	2.02%	-0.87%	0.87	1.16	13.73	17.57	1.32
Smallest	26	2.46%	2.56%	2.74%	9.30%	0.97	1.09	8.85	2.19	1.40

	<i>Ferrari (my estimated value)</i>	<i>Auto Sector</i>	<i>Reason for difference</i>
EV/Sales	2.10	0.94	Ferrari's operating margin is 18.2% versus Industry average of 6.58%.
EV/Invested Capital	1.97	1.02	Ferrari earns a much higher return on capital (14.56%) than the sector (6.68%)
EV/EBITDA	12.57	9.05	Ferrari EBITDA/Invested capital is 15.68% versus Industry average of 14.45%.
PE	22.87	10.00	Ferrari has a debt ratio of 9.43% versus Industry average of 39.06%.
PBV	2.56	1.29	Ferrari has a slightly higher ROE and lower equity risk (because of less debt)

# Infosys: Priced against other Indian tech firms

	Trailing PE	PEG	PBV	EV/Sales	Expected Growth	ROE	Operating Margin
Infosys	15.42	1.99	3.97	3.40	8.90%	25.49%	24.29%
TCS	21.02	1.90	6.72	4.60	10.90%	33.23%	25.02%
HCL	15.22	1.34	3.82	2.99	12.30%	30.14%	20.11%
Wipro	14.72	1.83	2.63	2.47	9.12%	17.81%	16.23%
IT India (99 companies)							
25th Percentile	13.75	0.57	1.00	0.72	11.10%	0.88%	1.61%
Median	18.92	1.33	1.83	1.52	13.80%	11.45%	7.69%
75th Percentile	26.94	1.99	3.44	2.68	36.00%	21.13%	14.56%

# Controlling for Differences?

- There are clear differences in fundamentals across IT companies, especially when it comes to margins and ROE, which may explain variation in pricing multiples.
- Regressing EV/Sales against pre-tax operating margin, for instance:

$$\text{EV/ Sales} = \begin{matrix} 0.924 \\ (2.82) \end{matrix} + \begin{matrix} 12.93 \\ (8.74) \end{matrix} \text{ Operating Margin} \quad R^2 = 44.5\%$$

- Plugging in Infosys operating margin (24.29%) into the regression, we get:

$$\text{EV/ Sales} = 0.924 + 12.93 (.2429) = 3.04$$

At 3.40 times sales, Infosys looks over priced by about 10% against other Indian IT companies.

# The Bottom Line

- As companies age, it is natural for the metric on which they are priced to change from revenue proxies to revenues to earnings to book value.
- Using a metric that is designed for one stage in the life cycle to price companies in a different stage will yield results that can range from puzzling (if you don't act on them) to catastrophic.
  - Old time value investors who use PE ratios will always find young companies to be over priced, no matter what their pricing is.
  - Growth investors who use revenue multiples will find mature companies look like bargains at all times.



“Growing old is mandatory, Growing up is optional”

*Amvath Jambou*