

VI. Valuing Companies with “intangible” assets

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

What are the cashflows from existing assets?

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

What is the value added by growth assets?

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

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

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

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

Lesson 1: Accounting rules are cluttered with inconsistencies...

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

Exhibit 11.1: Converting R&D expenses to R&D assets - Amgen

Step 1: Determining an amortizable life for R & D expenses. ①

How long will it take, on an expected basis, for research to pay off at Amgen? Given the length of the approval process for new drugs by the Food and Drugs Administration, we will assume that this amortizable life is 10 years.

Step 2: Capitalize historical R&D expense

Year	R&D Expense	Unamortized portion	Amortization this year
Current	3030.00	1.00	3030.00
-1	3266.00	0.90	2939.40
-2	3366.00	0.80	2692.80
-3	2314.00	0.70	1619.80
-4	2028.00	0.60	1216.80
-5	1655.00	0.50	827.50
-6	1117.00	0.40	446.80
-7	864.00	0.30	259.20
-8	845.00	0.20	169.00
-9	823.00	0.10	82.30
-10	663.00	0.00	0.00
		\$13283.60	\$1,694.10

④
Current year's R&D expense = Cap ex = \$3,030 million
R&D amortization = Depreciation = \$ 1,694 million
Unamortized R&D = Capital invested (R&D) = \$13,284 million

Step 3: Restate earnings, book value and return numbers

	Unadjusted	Adjusted for R&D	Comments
Net Income	\$4,196	$4,196 + 3030 - 1694 = \$ 5,532$	Add current year's R&D and subtract R&D amortization
Book value of equity	\$17,869	$17,869 + 13,284 = \$ 31,153$	Add unamortized R&D from prior years
Return on Equity	$\frac{4196}{17869} = 23.48\%$	$\frac{5532}{31153} = 17.75\%$	Return on equity drops when book equity is augmented by R&D, even though net income rises.
Pre-tax Operating Income	\$5,594	$5,594 + 3030 - 1694 = \$ 6,930$	Add current year's R&D and subtract R&D amortization
Book value of invested capital	\$21,985	$21,985 + 13,284 = \$ 35,269$	Add unamortized R&D from prior years
Pre-tax Return on Capital	$\frac{5594}{21985} = 25.44\%$	$\frac{6930}{35269} = 19.65\%$	Return on capital drops when capital is augmented by R&D, even though operating income rises.

Cap Ex = Acc net Cap Ex(255) +
Acquisitions (3975) + R&D (2216)

Current Cashflow to Firm

EBIT(1-t) = :7336(1-.28) = 6058
 - Nt CpX = 6443
 - Chg WC 37
 = FCFF - 423
 Reinvestment Rate = 6480/6058
 = 106.98%
 Return on capital = 16.71%

10. Amgen: Status Quo

Reinvestment Rate
60%

Expected Growth
in EBIT (1-t)
.60*.16=.096
9.6%

Return on Capital
16%

Stable Growth

g = 4%; Beta = 1.10;
Debt Ratio = 20%; Tax rate = 35%
Cost of capital = 8.08%
ROC = 10.00%;
Reinvestment Rate = 4/10 = 40%

First 5 years

Growth decreases
gradually to 4%

Terminal Value₁₀ = 7300 / (.0808 - .04) = 179,099

Op. Assets 94214
 + Cash: 1283
 - Debt 8272
 = Equity 87226
 - Options 479
 Value/Share \$ 74.33

Year	1	2	3	4	5	6	7	8	9	10
EBIT	\$9,221	\$10,106	\$11,076	\$12,140	\$13,305	\$14,433	\$15,496	\$16,463	\$17,306	\$17,998
EBIT (1-t)	\$6,639	\$7,276	\$7,975	\$8,741	\$9,580	\$10,392	\$11,157	\$11,853	\$12,460	\$12,958
- 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

Term Yr
18718
12167
4867
7300

Cost of Capital (WACC) = 11.7% (0.90) + 3.66% (0.10) = 10.90%

Debt ratio increases to 20%
Beta decreases to 1.10

On May 1, 2007,
Amgen was trading
at \$ 55/share

Cost of Equity
11.70%

Cost of Debt
(4.78% + .85%)(1-.35)
= 3.66%

Weights
E = 90% D = 10%

Riskfree Rate:
Riskfree rate = 4.78%

+

Beta
1.73

x

Risk Premium
4%

Unlevered Beta for
Sectors: 1.59

D/E = 11.06%

Lesson 2: And fixing those inconsistencies can alter your view of a company and affect its value

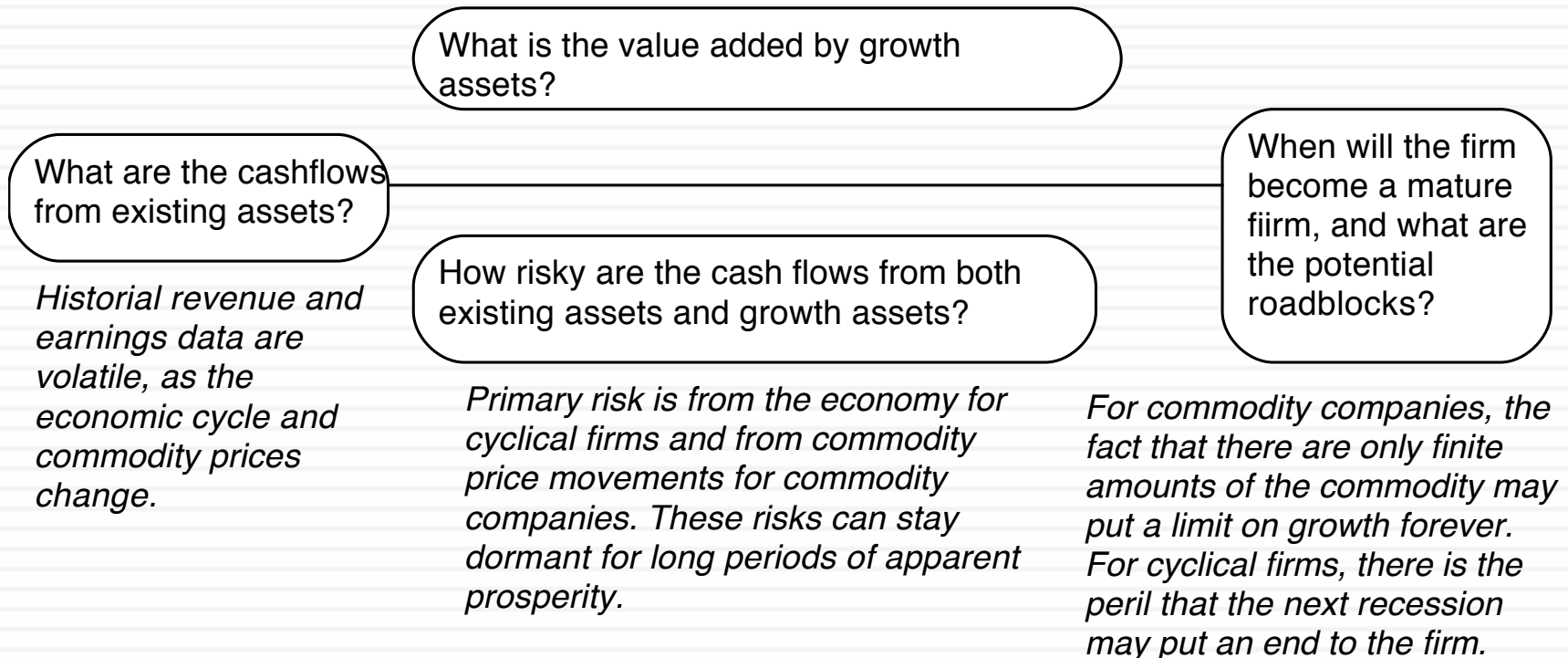
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	No R&D adjustment	R&D adjustment
EBIT	\$5,071	\$7,336
Invested Capital	\$25,277	\$33,173
ROIC	14.58%	18.26%
Reinvestment Rate	115.68%	106.98%
Value of firm	\$58,617	\$95,497
Value of equity	\$50,346	\$87,226
Value/share	\$42.73	\$74.33

VII. Valuing cyclical and commodity companies

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



Valuing a Cyclical Company - Toyota in Early 2009

Year	Revenues	Operating Income	EBITDA	Operating Margin
FY1 1992	¥10,163,380	¥218,511	¥218,511	2.15%
FY1 1993	¥10,210,750	¥181,897	¥181,897	1.78%
FY1 1994	¥9,362,732	¥136,226	¥136,226	1.45%
FY1 1995	¥8,120,975	¥255,719	¥255,719	3.15%
FY1 1996	¥10,718,740	¥348,069	¥348,069	3.25%
FY1 1997	¥12,243,830	¥665,110	¥665,110	5.43%
FY1 1998	¥11,678,400	¥779,800	¥1,382,950	6.68%
FY1 1999	¥12,749,010	¥774,947	¥1,415,997	6.08%
FY1 2000	¥12,879,560	¥775,982	¥1,430,982	6.02%
FY1 2001	¥13,424,420	¥870,131	¥1,542,631	6.48%
FY1 2002	¥15,106,300	¥1,123,475	¥1,822,975	7.44%
FY1 2003	¥16,054,290	¥1,363,680	¥2,101,780	8.49%
FY1 2004	¥17,294,760	¥1,666,894	¥2,454,994	9.64%
FY1 2005	¥18,551,530	¥1,672,187	¥2,447,987	9.01%
FY1 2006	¥21,036,910	¥1,878,342	¥2,769,742	8.93%
FY1 2007	¥23,948,090	¥2,238,683	¥3,185,683	9.35%
FY1 2008	¥26,289,240	¥2,270,375	¥3,312,775	8.64%
FY 2009 (Estim)	¥22,661,325	¥267,904	¥1,310,304	1.18%
		¥1,306,867		7.33%

Normalized Earnings ①

As a cyclical company, Toyota's earnings have been volatile and 2009 earnings reflect the troubled global economy. We will assume that when economic growth returns, the operating margin for Toyota will revert back to the historical average.

Normalized Operating Income = Revenues in 2009 * Average Operating Margin (98--09)
 $= 22661 * .0733 = 1660.7$ billion yen

In early 2009, Toyota Motors had the highest market share in the sector. However, the global economic recession in 2008-09 had pulled earnings down.

Normalized Return on capital and Reinvestment ②

Once earnings bounce back to normal, we assume that Toyota will be able to earn a return on capital equal to its cost of capital (5.09%). This is a sector, where earning excess returns has proved to be difficult even for the best of firms.

To sustain a 1.5% growth rate, the reinvestment rate has to be:

Reinvestment rate = $1.5\% / 5.09\%$
 $= 29.46\%$

Operating Assets	19,640
+ Cash	2,288
+ Non-operating assets	6,845
- Debt	11,862
- Minority Interests	583
Value of Equity	
/ No of shares	/3,448
Value per share	¥4735

$$\text{Value of operating assets} = \frac{1660.7 (1.015) (1 - .407) (1 - .2946)}{(.0509 - .015)} = 19,640 \text{ billion}$$

Normalized Cost of capital ③

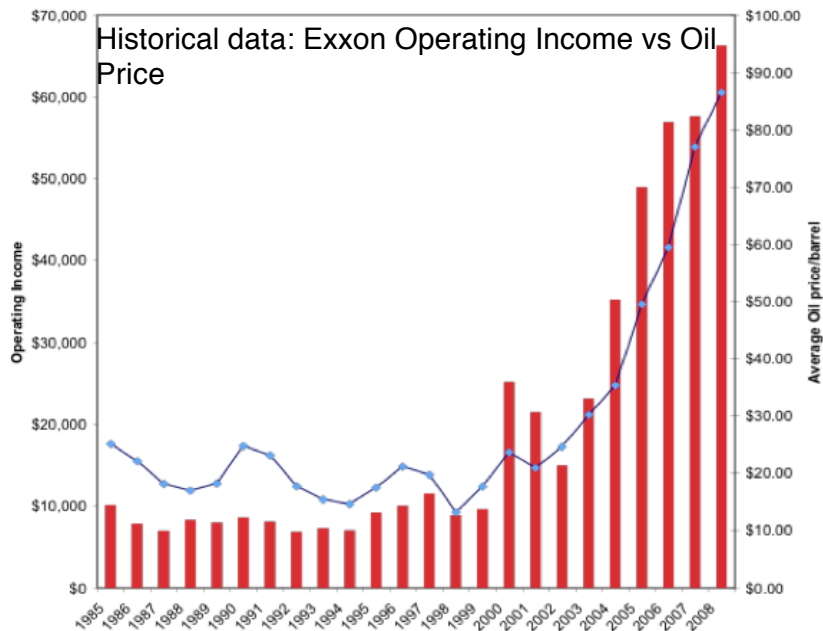
The cost of capital is computed using the average beta of automobile companies (1.10), and Toyota's cost of debt (3.25%) and debt ratio (52.9% debt ratio). We use the Japanese marginal tax rate of 40.7% for computing both the after-tax cost of debt and the after-tax operating income

Cost of capital = $8.65\% (.471) + 3.25\% (1 - .407) (.529) = 5.09\%$

Stable Growth ④

Once earnings are normalized, we assume that Toyota, as the largest market-share company, will be able to maintain only stable growth (1.5% in Yen terms)

Valuing a commodity company - Exxon in Early 2009



Regressing Exxon's operating income against the oil price per barrel from 1985-2008:

$$\text{Operating Income} = -6,395 + 911.32 (\text{Average Oil Price}) \quad R^2 = 90.2\%$$

(2.95) (14.59)

Exxon Mobil's operating income increases about \$9.11 billion for every \$ 10 increase in the price per barrel of oil and 90% of the variation in Exxon's earnings over time comes from movements in oil prices.

Estimate normalized income based on current oil price ①

At the time of the valuation, the oil price was \$ 45 a barrel. Exxon's operating income based on this price is

$$\text{Normalized Operating Income} = -6,395 + 911.32 (\$45) = \$34,614$$

Estimate return on capital and reinvestment rate based on normalized income ②

This operating income translates into a return on capital of approximately 21% and a reinvestment rate of 9.52%, based upon a 2% growth rate.

$$\text{Reinvestment Rate} = g / \text{ROC} = 2 / 21\% = 9.52\%$$

$$\text{Value of operating assets} = \frac{34,614(1 - .38)(1 - .0952)}{(.0818 - .02)} = \$320,472 \text{ million}$$

Exxon's cost of capital ④

Exxon has been a predominantly equity funded company, and is expected to remain so, with a debt ratio of only 2.85%. Its cost of equity is 8.35% (based on a beta of 0.90) and its pre-tax cost of debt is 3.75% (given AAA rating). The marginal tax rate is 38%.

$$\text{Cost of capital} = 8.35\% (0.9715) + 3.75\% (1 - .38) (.0285) = 8.18\%.$$

Expected growth in operating income ③

Since Exxon Mobile is the largest oil company in the world, we will assume an expected growth of only 2% in perpetuity.

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

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

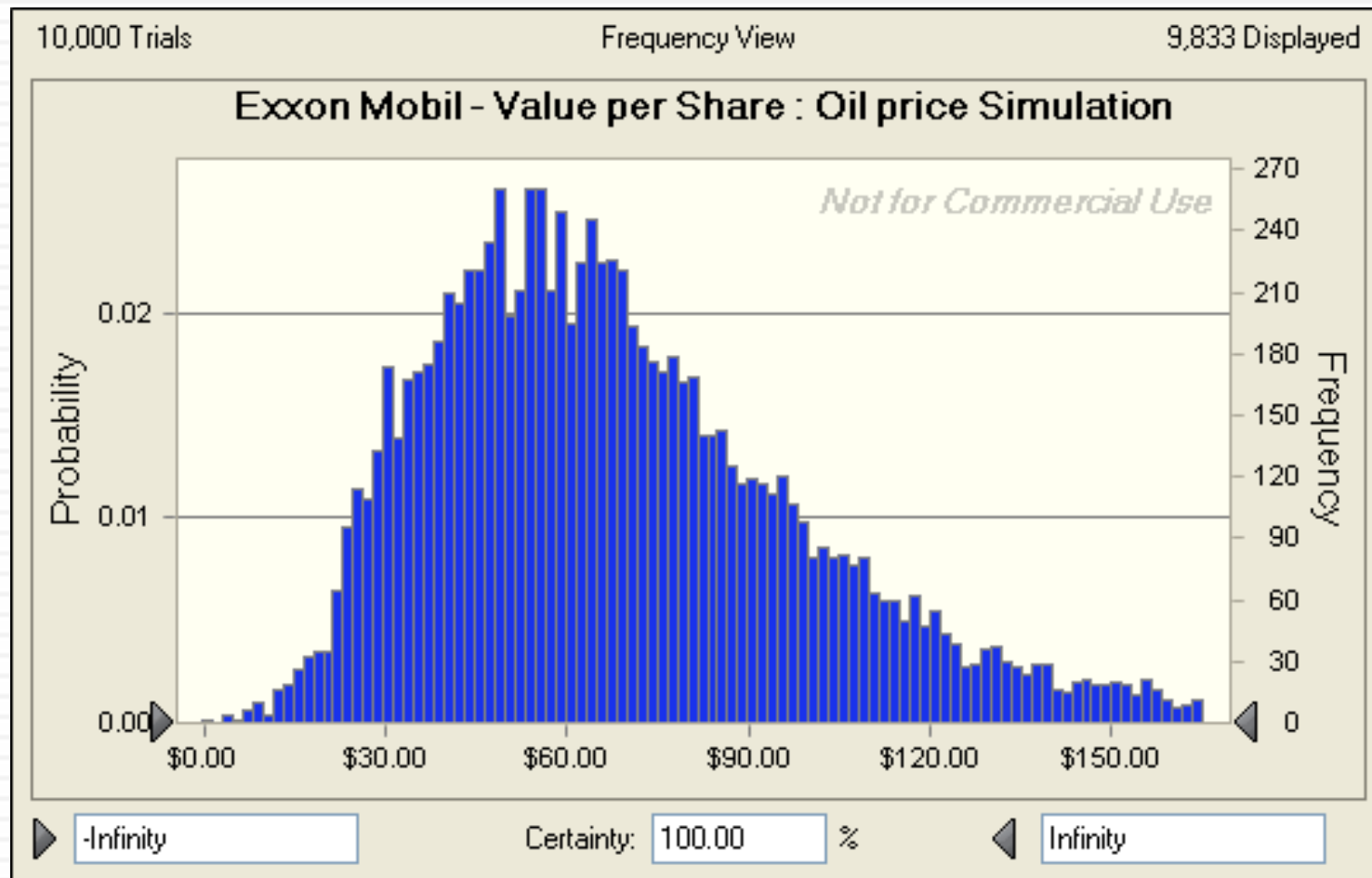
Lesson 2: Use probabilistic tools to assess value as a function of macro variables...

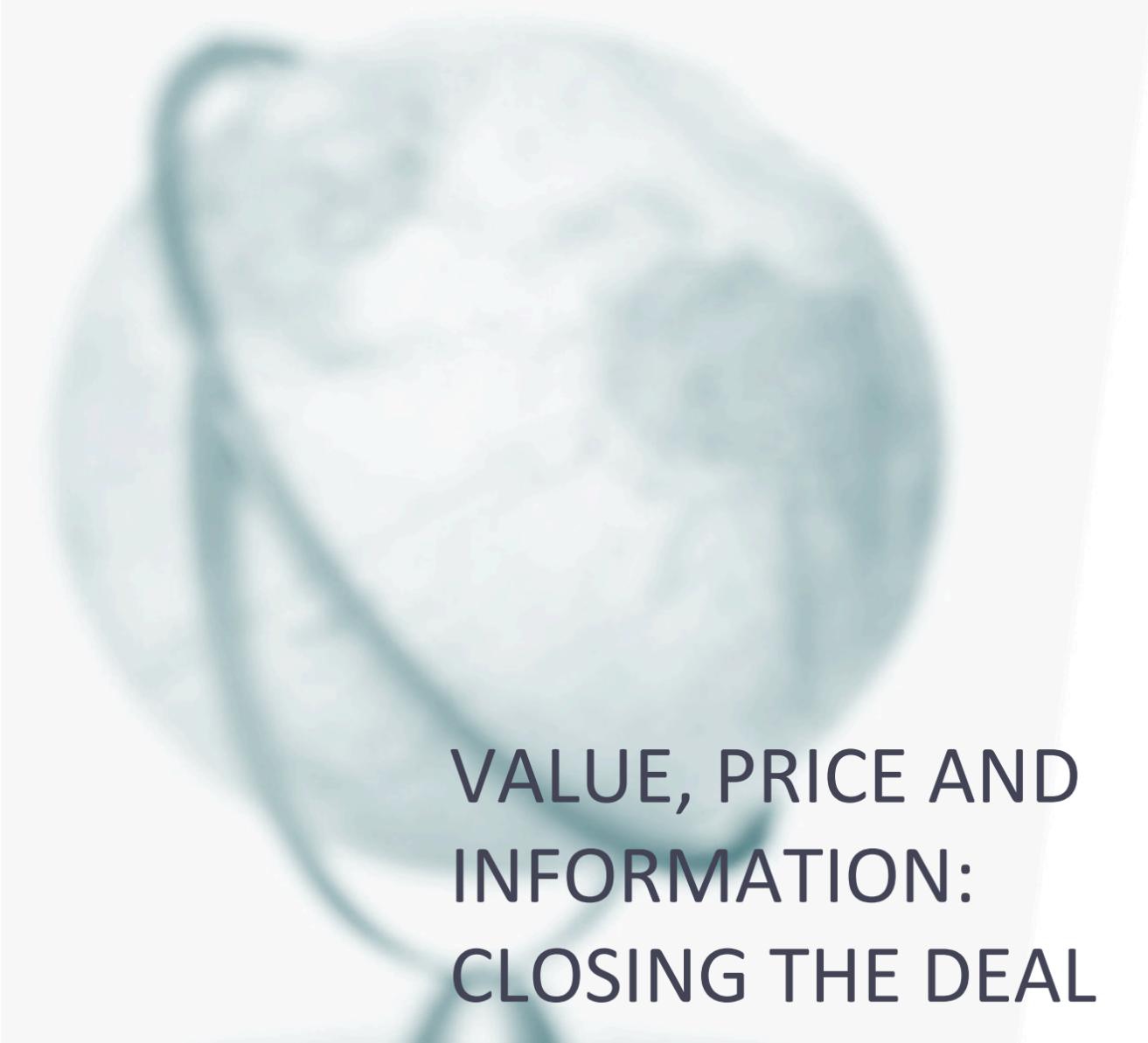
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- If there is a key macro variable affecting the value of your company that you are uncertain about (and who is not), why not quantify the uncertainty in a distribution (rather than a single price) and use that distribution in your valuation.
- That 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)

Exxon Mobil Valuation: Simulation

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VALUE, PRICE AND
INFORMATION:
CLOSING THE DEAL

Value versus Price

Are you valuing or pricing?

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Tools for intrinsic analysis

- Discounted Cashflow Valuation (DCF)
- Intrinsic multiples
- Book value based approaches
- Excess Return Models

Tools for "the gap"

- Behavioral finance
- Price catalysts

Tools for pricing

- Multiples and comparables
- Charting and technical indicators
- Pseudo DCF

Value of cashflows,
adjusted for time
and risk

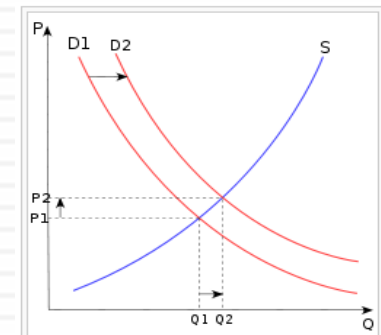
INTRINSIC
VALUE

Value

THE GAP
Is there one?
Will it close?

Price

PRICE



Drivers of intrinsic value

- Cashflows from existing assets
- Growth in cash flows
- Quality of Growth

Drivers of "the gap"

- Information
- Liquidity
- Corporate governance

Drivers of price

- Market moods & momentum
- Surface stories about fundamentals

Three views of “the gap”

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	View of the gap	Investment Strategies
The Efficient Marketer	The gaps between price and value, if they do occur, are random.	Index funds
The “value” extremist	You view pricers as dilettantes who will move on from fad to fad. Eventually, the price will converge on value.	Buy and hold stocks where value > price
The pricing extremist	Value is only in the heads of the “eggheads”. Even if it exists (and it is questionable), price may never converge on value.	(1) Look for mispriced securities. (2) Get ahead of shifts in demand/momentum.

The “pricers” dilemma..

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- No anchor: If you do not believe in intrinsic value and make no attempt to estimate it, you have no moorings when you invest. You will therefore be pushed back and forth as the price moves from high to low. In other words, everything becomes relative and you can lose perspective.
- Reactive: Without a core measure of value, your investment strategy will often be reactive rather than proactive.
- Crowds are fickle and tough to get a read on: The key to being successful as a pricer is to be able to read the crowd mood and to detect shifts in that mood early in the process. By their nature, crowds are tough to read and almost impossible to model systematically.

The valuer's dilemma and ways of dealing with it...

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- Uncertainty about the magnitude of the gap:
 - Margin of safety: Many value investors swear by the notion of the “margin of safety” as protection against risk/uncertainty.
 - Collect more information: Collecting more information about the company is viewed as one way to make your investment less risky.
 - Ask what if questions: Doing scenario analysis or what if analysis gives you a sense of whether you should invest.
 - Confront uncertainty: Face up to the uncertainty, bring it into the analysis and deal with the consequences.
- Uncertainty about gap closing: This is tougher and you can reduce your exposure to it by
 - Lengthening your time horizon
 - Providing or looking for a catalyst that will cause the gap to close.

Option 1: Margin of Safety

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- The margin of safety (MOS) is a buffer that you build into your investment decisions to protect yourself from investment mistakes. Thus, if your margin of safety is 30%, you will buy a stock only if the price is more than 30% below its “intrinsic” value.
- While value investors use the “margin of safety” as a shield against risk, keep in mind that:
 - MOS comes into play at the end of the investment process, not at the beginning.
 - MOS does not substitute for risk assessment and intrinsic valuation, but augments them.
 - The MOS cannot and should not be a fixed number, but should be reflective of the uncertainty in the assessment of intrinsic value.
 - Being too conservative can be damaging to your long term investment prospects. Too high a MOS can hurt you as an investor.

Option 2: Collect more information/ Do your homework

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- There is a widely held view among value investors that they are not as exposed to risk as the rest of the market, because they do their homework, poring over financial statements or using ratios to screen for risky stocks. Put simply, they are assuming that the more they know about an investment, the less risky it becomes.
- That may be true from some peripheral risks and a few firm specific risks, but it definitely is not for the macro risks. You cannot make a cyclical company less cyclical by studying it more or take the nationalization risk out of Venezuelan company by doing more research.

Implication 1: The need for diversification does not decrease just because you are a value investor who picks stocks with much research and care.

Implication 2: There is a law of diminishing returns to information. At a point, additional information will only serve to distract you.

Option 3: Build What-if analyses

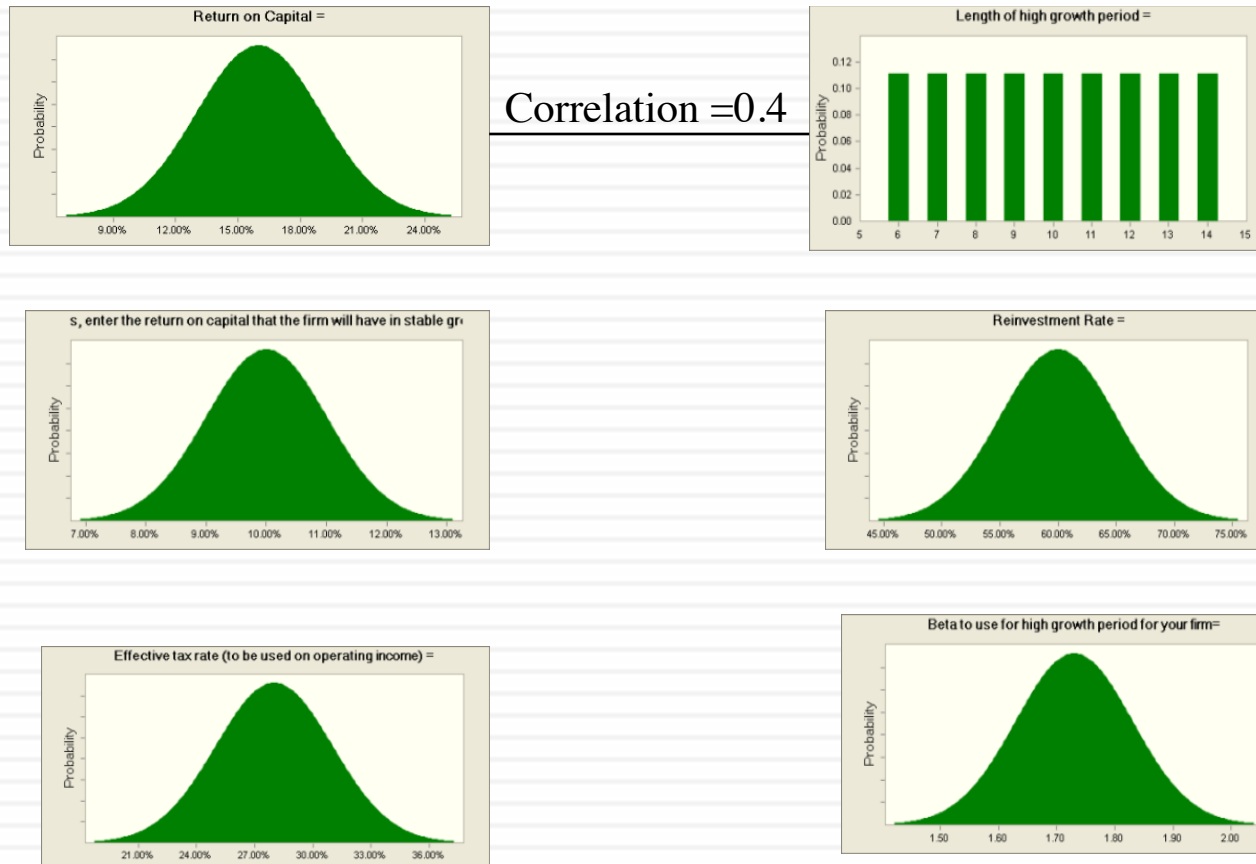
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- A valuation is a function of the inputs you feed into the valuation. To the degree that you are pessimistic or optimistic on any of the inputs, your valuation will reflect it.
- There are three ways in which you can do what-if analyses
 - Best-case, Worst-case analyses, where you set all the inputs at their most optimistic and most pessimistic levels
 - Plausible scenarios: Here, you define what you feel are the most plausible scenarios (allowing for the interaction across variables) and value the company under these scenarios
 - Sensitivity to specific inputs: Change specific and key inputs to see the effect on value, or look at the impact of a large event (FDA approval for a drug company, loss in a lawsuit for a tobacco company) on value.
- *Proposition 1: As a general rule, what-if analyses will yield large ranges for value, with the actual price somewhere within the range.*

Option 4: Confront uncertainty

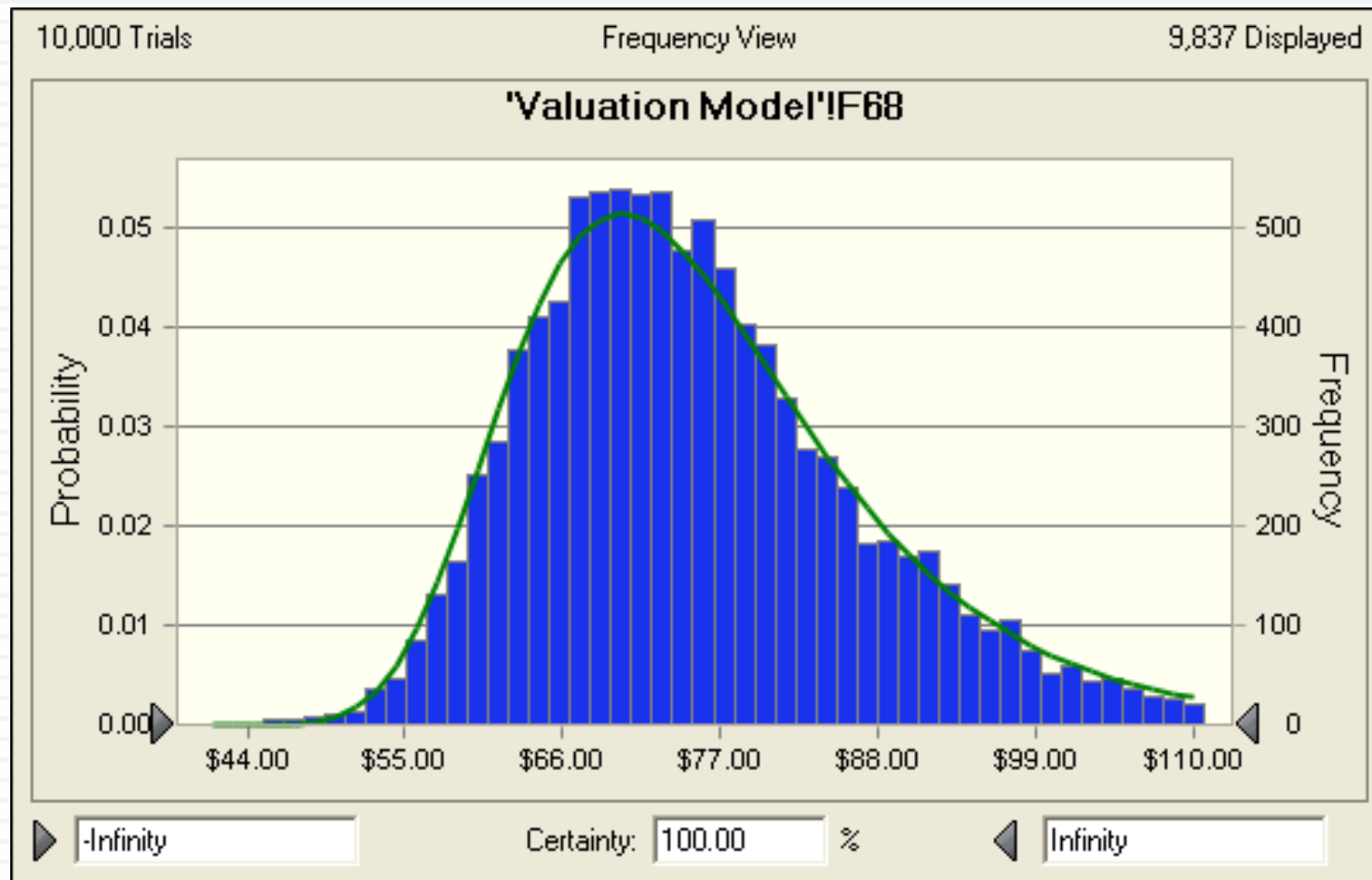
Simulations – The Amgen valuation

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The Simulated Values of Amgen: What do I do with this output?

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Strategies for managing the risk in the “closing” of the gap

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- The “karmic” approach: In this one, you buy (sell short) under (over) valued companies and sit back and wait for the gap to close. You are implicitly assuming that given time, the market will see the error of its ways and fix that error.
- The catalyst approach: For the gap to close, the price has to converge on value. For that convergence to occur, there usually has to be a catalyst.
 - If you are an activist investor, you may be the catalyst yourself. In fact, your act of buying the stock may be a sufficient signal for the market to reassess the price.
 - If you are not, you have to look for other catalysts. Here are some to watch for: a new CEO or management team, a “blockbuster” new product or an acquisition bid where the firm is targeted.

A closing thought...

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Aswath Damodaran

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