### III. Dealing with decline and distress...

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Historial data often reflects flat or declining revenues and falling margins. Investments often earn less than the cost of capital. Growth can be negative, as firm sheds assets and shrinks. As less profitable assets are shed, the firm's remaining assets may improve in quality.

What is the value added by growth assets?

What are the cashflows from existing assets?

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 divestuture (to pay dividends or retire debt), the risk in both the firm and its equity can change. There is a real chance, especially with high financial leverage, that the firm will not make it. If it is expected to survive as a going concern, it will be as a much smaller entity.

When will the firm

become a mature

fiirm, and what are

the potential

roadblocks?

Aswath Damodaran

### a. Dealing with Decline

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

				Decli	ning	g bus	ine	ss: Re	ever	nues e	exp	ected	to c	drop k	oy 3	% a y	ear	fo ne	ext 5	5 year	S		Margins improve gradually to
	Be	ise year		1		2		3		4		5		6		7		8		9		10	median for
Revenue growth rate		2	-3	3.00%	-3	.00%	-3	.00%	-3	.00%	-3	.00%	-2	.00%	-1.	.00%	0.0	00%	1.0	00%	2.	00%	US retail
Revenues	\$	12,522	\$1	12,146	\$1	1,782	\$1	1,428	\$1	1,086	\$1	0,753	\$10	0,538	\$10	0,433	\$10	0,433	\$10	0,537	\$10	0,748	Sector
EBIT (Operating) margin		1.32%	1	.82%	2.	31%	2	.80%	3.	29%	3	.79%	4.	28%	4.	77%	5.	26%	5.	76%	6.	25%	(0.2378)
EBIT (Operating income)	\$	166	\$	221	\$	272	\$	320	\$	365	\$	407	\$	451	\$	498	\$	549	\$	607	\$	672	As stores
Tax rate		35.00%	3.	5.00%	35	.00%	35	0.00%	35	.00%	35	5.00%	36	.00%	37	.00%	38	.00%	39.	.00%	40	.00%	shut down,
EBIT(1-t)	\$	108	\$	143	\$	177	\$	208	\$	237	\$	265	\$	289	\$	314	\$	341	\$	370	\$	403	cash
- Reinvestment			\$	(188)	\$	(182)	\$	(177)	\$	(171)	\$	(166)	\$	(108)	\$	(53)	\$	-	\$	52	\$	105	released from
FCFF			\$	331	\$	359	\$	385	\$	409	\$	431	\$	396	\$	366	\$	341	\$	318	\$	298	real estate.
Cost of capital			9	0.00%	9.	00%	9	.00%	9.	00%	9	.00%	8.	80%	8.	60%	8.4	40%	8.	20%	8.	00%	The cost of
PV(FCFF)			\$	304	\$	302	\$	297	\$	290	\$	280	\$	237	\$	201	\$	173	\$	149	\$	129	capital is at
Terminal value	\$	5,710																					9%, higher
PV(Terminal value)	\$	2,479																					because of
PV (CF over next 10 years)	\$	2,362																					high cost of
Sum of PV	\$	4,841																					debt.
Probability of failure =		20.00%		Hiah	deb	ot load	l ar	nd poo	or e	arnino	ns r	out											
Proceeds if firm fails =		\$2,421		surviv	/al a	at risk	. B	ased	on k	ond r	atir	ng,											
Value of operating assets =		\$4,357	2	20% cł	nano	ce of	failı	ure ar	nd li	quida	tior	n will											
					brir	ng in 5	50%	6 of bo	ook	value													

#### Figure 14.5: A Valuation of JC Penney

### b. Dealing with the "downside" of Distress

- A DCF valuation values a firm as a going concern. If there is a significant likelihood of the firm failing before it reaches stable growth and if the assets will then be sold for a value less than the present value of the expected cashflows (a distress sale value), DCF valuations will overstate the value of the firm.
- Value of Equity= DCF value of equity (1 Probability of distress) + Distress sale value of equity (Probability of distress)
- □ There are three ways in which we can estimate the probability of distress:
  - Use the bond rating to estimate the cumulative probability of distress 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).



### Adjusting the value of LVS for distress..

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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:

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

- □ Solving for the probability of bankruptcy, we get:
  - $\Box$   $\pi_{istress}$  = Annual probability of default = 13.54%
  - **C**umulative 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</p>
  - Expected equity value/share = \$0.00
- □ Expected value per share = \$8.12 (1 .7666) + \$0.00 (.7666) = \$1.92

### IV. Emerging Market Companies

Estimation Issues - Emerging Market Companies



# Lesson 1: Country risk has to be incorporated... but with a scalpel, not a bludgeon

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



### Lesson 2: Currency should not matter

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

### Lesson 3: The "corporate governance" drag

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





![](_page_13_Figure_0.jpeg)

### Lesson 4: Watch out for cross holdings...

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

![](_page_15_Figure_0.jpeg)

8. The Tata Group – April 2010

### Tata Companies: Value Breakdown

![](_page_16_Figure_1.jpeg)

Aswath Damodaran

### Lesson 5: Truncation risk can come in many forms...

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

### V. Valuing Financial Service Companies

Existing assets are usually financial assets or loans, often marked to market. Earnings do not provide much information on underlying risk.	Defining capital expenditures and working challenge.Growth can be strongly influence regulatory limits and constraints. Both the a new investments and the returns on these can change with regulatory changes. What is the value added by growth assets?	capital is a ed by amount of investments
What are the cashflows from existing assets?		When will the firm become a mature fiirm, and what are
Preferred stock is a	How risky are the cash flows from both existing assets and growth assets?	the potential roadblocks?
What is the value of equity in the firm?	For financial service firms, debt is raw material rather than a source of capital. It is not only tough to define but if defined broadly can result in high financial leverage, magnifying the impact of small operating risk changes on equity risk.	In addition to all the normal constraints, financial service firms also have to worry about maintaining capital ratios that are acceptable ot regulators. If they do not, they can be taken over and shut down.

### **CIB Egypt in December 2015** Valuation in Egyptian Pounds

![](_page_19_Figure_1.jpeg)

![](_page_20_Figure_0.jpeg)

### Lesson 1: Financial service companies are opaque...

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

![](_page_22_Figure_0.jpeg)

### Lesson 2: For financial service companies, book value

### matters...

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

### FCFE for a bank...

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To estimate the FCFE for a bank, we redefine reinvestment as investment in regulatory capital. Since any dividends paid deplete equity capital and retained earnings increase that capital, the FCFE is:

FCFE<sub>Bank</sub>= Net Income – Increase in Regulatory Capital (Book Equity)

	Current	1	2	3	4	5	Steady state
Asset Base	312,882 €	325,398 €	338,414 €	351,950€	366,028 €	380,669 €	392,089 €
Capital ratio	10.20%	10.16%	10.12%	10.08%	10.04%	10.00%	10.00%
Regulatory Capital	31,914 €	33,060 €	34,247 €	35,477 €	36,749 €	38,067€	39,244 €
Change in regulatory capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318€	1,177 €
ROE	9.40%	9.56%	9.72%	9.88%	10.04%	10.20%	10.20%
Net Income	3,000 €	3,161 €	3,329 €	3,505 €	3,690 €	3,883€	4,003 €
- Investment in Regulatory Capital		1,146 €	1,187 €	1,229 €	1,273 €	1,318€	1,177 €
FCFE		2,014 €	2,142 €	2,276 €	2,417 €	2,565 €	2,826 €

#### Deutsche Bank: FCFE

![](_page_25_Figure_0.jpeg)

### VI. Valuing Companies with "intangible" assets

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

What is the value added by growth assets?

What are the cashflows from existing assets?

The capital expenditures associated with acquiring intangible assets (technology, himan capital) are mis-categorized as operating expenses, leading to inccorect accounting earnings and measures of capital invested. How risky are the cash flows from both existing assets and growth assets?

It ican be more difficult to borrow against intangible assets than it is against tangible assets. The risk in operations can change depending upon how stable the intangbiel asset is. When will the firm become a mature fiirm, and what are the potential roadblocks?

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

Aswath Damodaran

### Lesson 1: Accounting rules are cluttered with

inconsistencies...

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

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

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

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 exoense

			(2)	(3)
Year	R&D Expense	Unam	ortized portion	Amortization this year
Current	3030.00	1.00	3030.00	
-1	3266.00	0.90	2939.40	\$326.60
-2	3366.00	0.80	2692.80	\$336.60
-3	2314.00	0.70	1619.80	\$231.40
-4	2028.00	0.60	1216.80	\$202.80
-5	1655.00	0.50	827.50	\$165.50
-6	1117.00	0.40	446.80	\$111.70
-7	864.00	0.30	259.20	\$86.40
-8	845.00	0.20	169.00	\$84.50
-9	823.00	0.10	82.30	\$82.30
-10	663.00	0.00	0.00	\$66.30
			\$13283.60	\$1,694.10

#### Step 3: Restate earnings, book value and return numbers

			$\checkmark$ $\bigcirc$
	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 wath Dan	$\frac{5594}{21985}$ = 25.44%	$\frac{6930}{35269} = 19.65\%$	Return on capital drops when capital is augmented by R&D, even though operating income rises.

(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

E

![](_page_29_Figure_0.jpeg)

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

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

### VII. Valuing cyclical and commodity companies

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

What is the value added by growth assets?

What are the cashflows from existing assets?

Historial revenue and earnings data are volatile, as the economic cycle and commodity prices change. How risky are the cash flows from both existing assets and growth assets?

Primary risk is from the economy for cyclical firms and from commodity price movements for commodity companies. These risks can stay dormant for long periods of apparent prosperity. When will the firm become a mature fiirm, and what are the potential roadblocks?

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

Aswath Damodaran

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

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

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

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

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

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

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

	Base \	′ear		1		2		3		4		5	Те	rminal Year		
Revenues	\$ 20	1,569	\$	209,450	\$	217,639	\$	226,149	\$	234,991	\$	244,180	\$	249,063	Г	Operating
Operating Margin	3.01	.%		6.18%		7.76%		8.56%		8.95%		9.35%		9.35%		margin
Operating Income	\$ 6,0	65.00	\$	12,942.85	\$	16,899.10	\$	19,352.39	\$	21,040.39	\$	22,830.80	\$	23,287.41	-	converges on
Effective tax rate	30.0	0%		30.00%		30.00%		30.00%		30.00%		30.00%		30.00%		Shell's historical
AT Operating Income	\$ 4,2	45.50	\$	9,060.00	\$	11,829.37	\$	13,546.68	\$	14,728.27	\$	15,981.56	\$	16,301.19		average margin
+ Depreciation	\$ 26,7	14.00	\$	27,759	\$	28,844	\$	29,972	\$	31,144	\$	32,361				of 9.35% from
- Cap Ex	\$ 31,8	54.00	\$	33,099	\$	34,394	\$	35,738	\$	37,136	\$	38,588				200-2015
- Chg in WC			\$	472.88	\$	491.37	\$	510.58	\$	530.55	\$	551.29				200-2013
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%		Return on
Cumulated Discount Factor				1.0991		1.2080		1.3277		1.4593		1.6039				capital reverts
Present Value			\$	2,953.45	\$	4,791.47	\$	5,474.95	\$	5,622.81	\$	140,940.73				and stays at
Value of Operating Assets	\$ 159,7	83.41														Shell's historic
+ Cash	\$ 31,7	52.00														average of
+ Cross Holdings	\$ 33,5	66.00		Added	loi	ng term in	ves	tments in	joir	nt venture	s ai	nd				12.37% from
- Debt	\$ 58,3	79.00		subt	ac	ted out mi	nor	ity interes	t in	consolida	tec					200-2015
- Minority Interets	\$ 1,2	45.00					h	oldings.							_	
Value of Equity	\$ 165,4	77.41														
Number of shares	4209	9.7														
Value per share	\$	39.31														

### Shell's Revenues & Oil Prices

![](_page_35_Figure_1.jpeg)

![](_page_36_Figure_0.jpeg)

![](_page_36_Figure_1.jpeg)

Percentiles:	Forecast values
0%	\$6.55
<b>1</b> 0%	\$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
<b>5</b> 100%	\$197.11

![](_page_36_Figure_3.jpeg)