



# ESTIMATING CASH FLOWS

Cash is king...

# Steps in Cash Flow Estimation

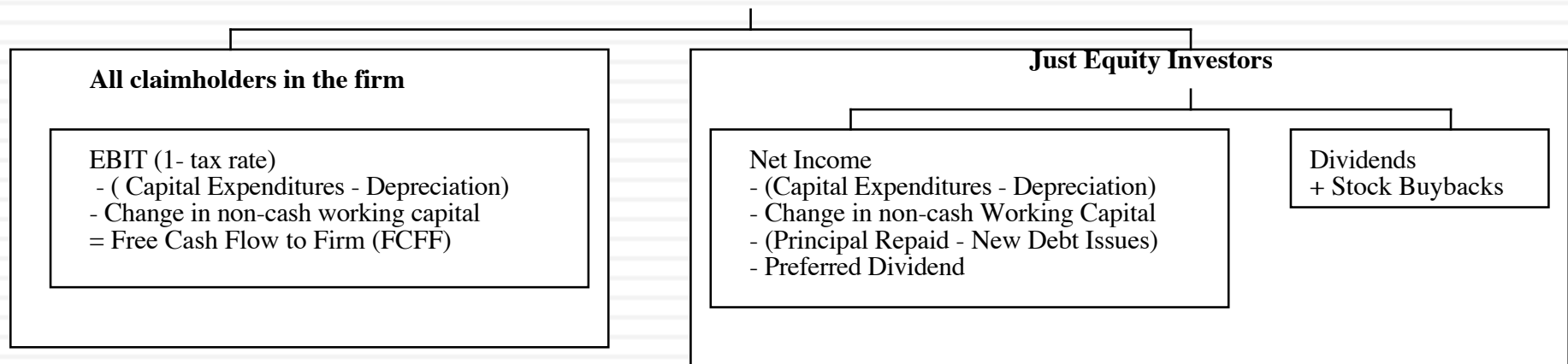
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- Estimate the current earnings of the firm
  - ▣ If looking at cash flows to equity, look at earnings after interest expenses - i.e. net income
  - ▣ If looking at cash flows to the firm, look at operating earnings after taxes
- Consider how much the firm invested to create future growth
  - ▣ If the investment is not expensed, it will be categorized as capital expenditures. To the extent that depreciation provides a cash flow, it will cover some of these expenditures.
  - ▣ Increasing working capital needs are also investments for future growth
- If looking at cash flows to equity, consider the cash flows from net debt issues (debt issued - debt repaid)

# Measuring Cash Flows

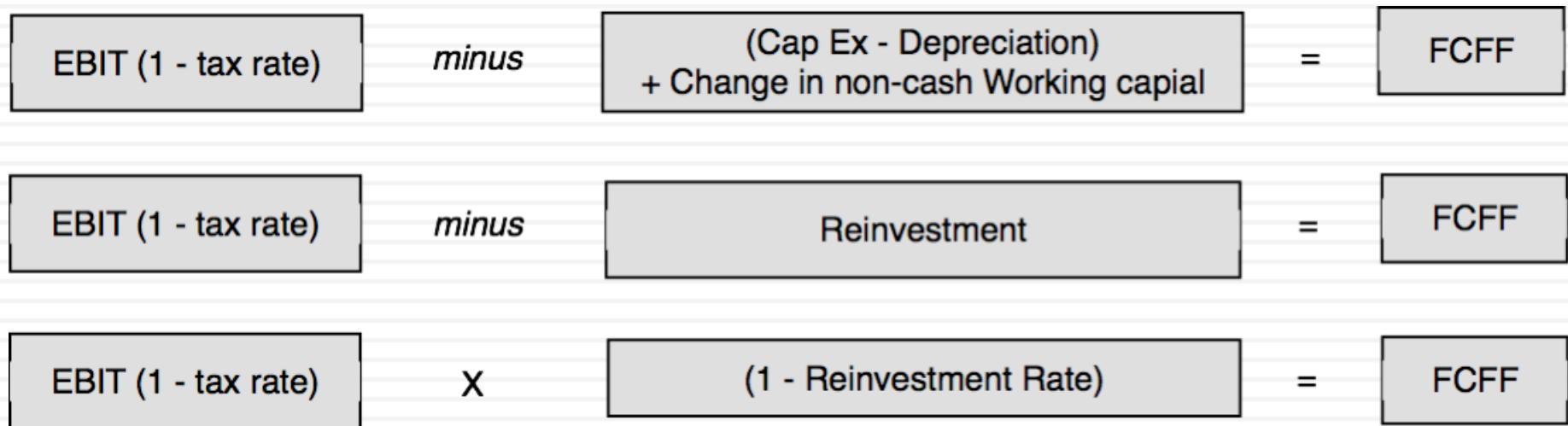
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Cash flows can be measured to



# Measuring Cash Flow to the Firm: Three pathways to the same end game

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Where are the tax savings from interest expenses?

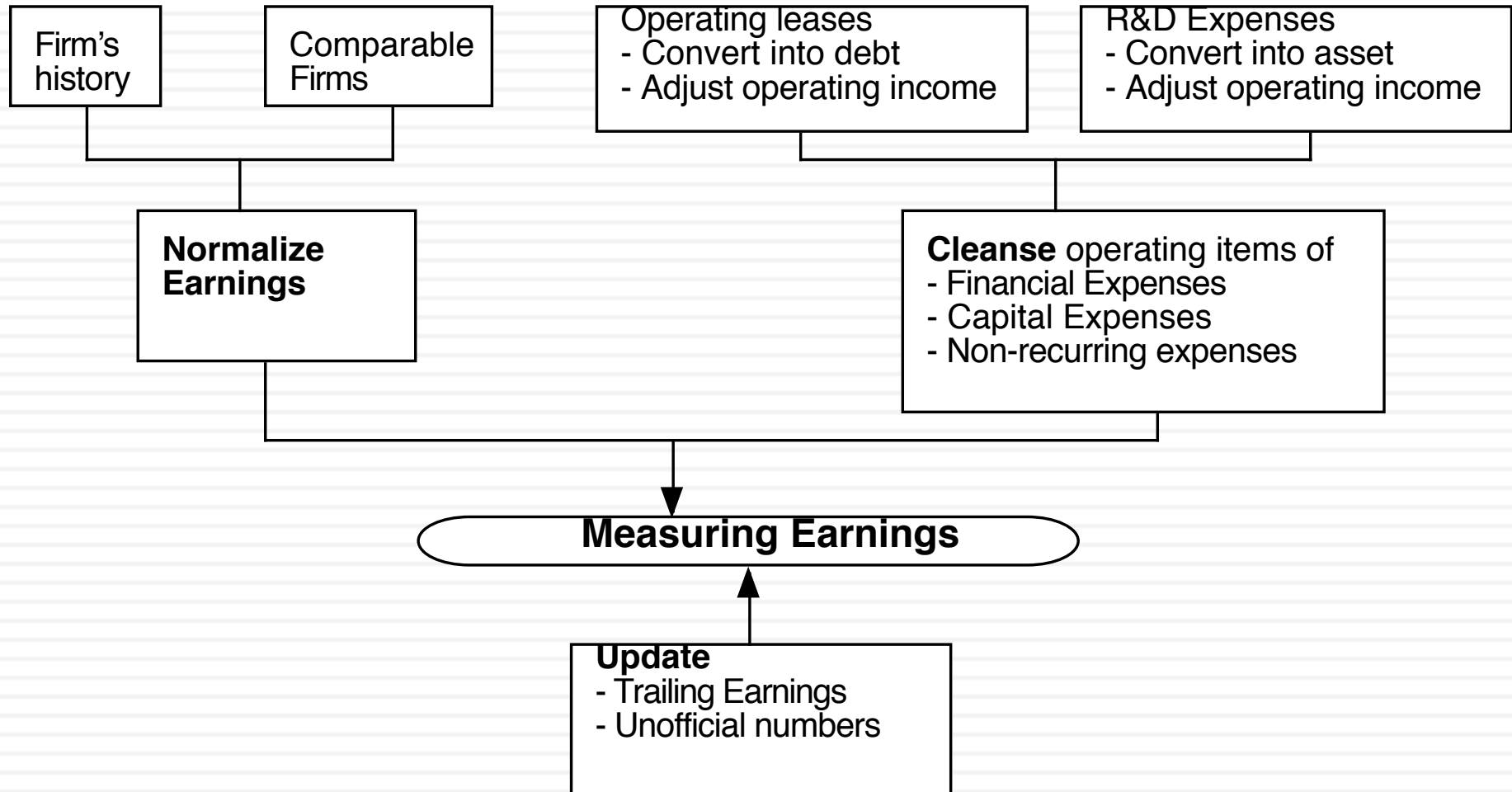
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# Cash Flows I

Accounting Earnings, Flawed but Important

# From Reported to Actual Earnings

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# I. Update Earnings

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- When valuing companies, we often depend upon financial statements for inputs on earnings and assets. Annual reports are often outdated and can be updated by using-
  - ▣ Trailing 12-month data, constructed from quarterly earnings reports.
  - ▣ Informal and unofficial news reports, if quarterly reports are unavailable.
- Updating makes the most difference for smaller and more volatile firms, as well as for firms that have undergone significant restructuring.
- Time saver: To get a trailing 12-month number, all you need is one 10K and one 10Q (example third quarter). Use the Year to date numbers from the 10Q. For example, to get trailing revenues from a third quarter 10Q:
  - ▣  $\text{Trailing 12-month Revenue} = \text{Revenues (in last 10K)} - \text{Revenues from first 3 quarters of last year} + \text{Revenues from first 3 quarters of this year.}$

## II. Correcting Accounting Earnings

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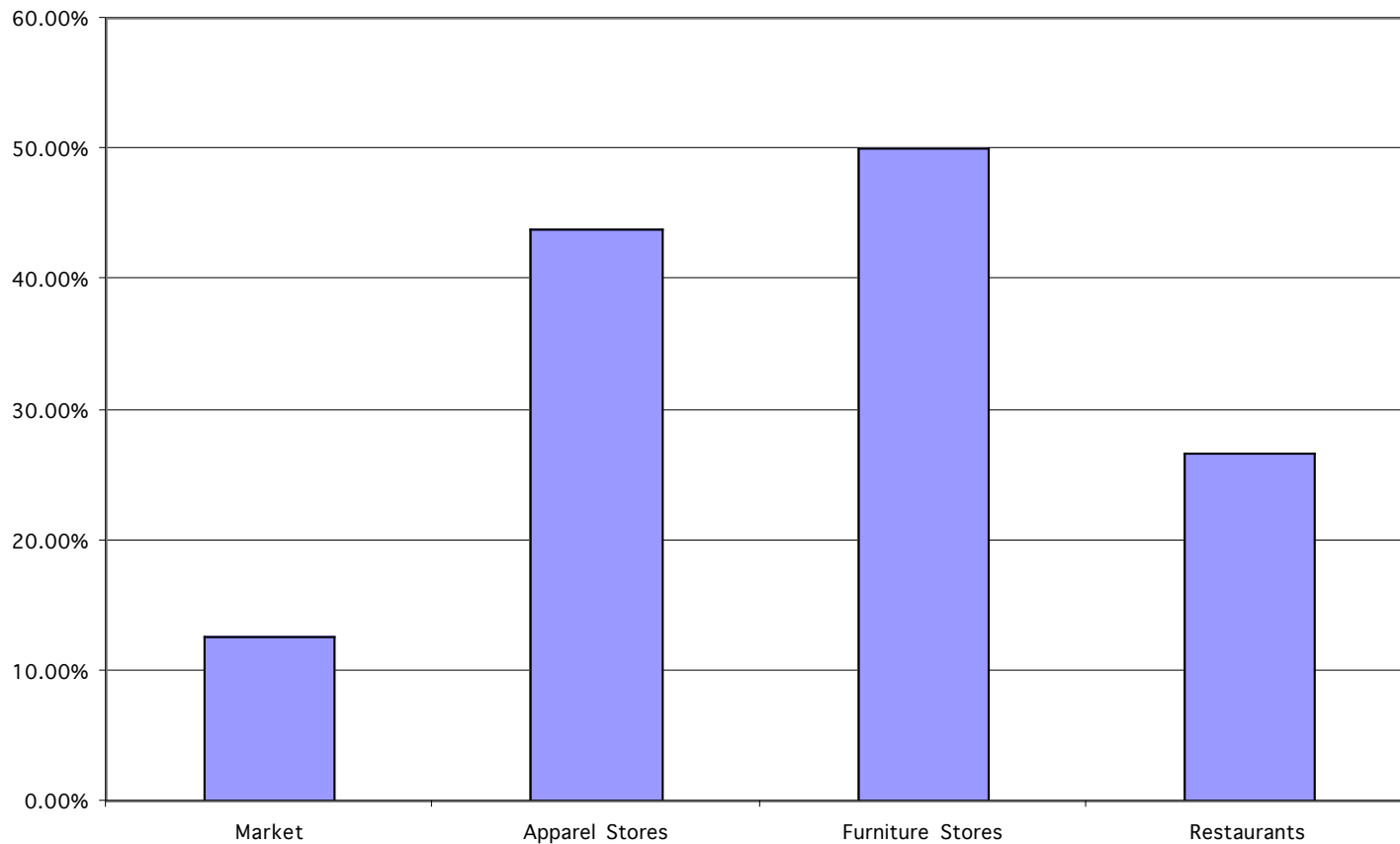
- Make sure that there are no financial expenses mixed in with operating expenses
  - ▣ Financial expense: Any commitment that is tax deductible that you have to meet no matter what your operating results: Failure to meet it leads to loss of control of the business.
  - ▣ Example: Operating Leases: While accounting convention treats operating leases as operating expenses, they are really financial expenses and need to be reclassified as such. This has no effect on equity earnings but does change the operating earnings
- Make sure that there are no capital expenses mixed in with the operating expenses
  - ▣ Capital expense: Any expense that is expected to generate benefits over multiple periods.
  - ▣ R & D Adjustment: Since R&D is a capital expenditure (rather than an operating expense), the operating income has to be adjusted to reflect its treatment.



# The Magnitude of Operating Leases

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Operating Lease expenses as % of Operating Income



# Dealing with Operating Lease Expenses

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- Operating Lease Expenses are treated as operating expenses in computing operating income. In reality, operating lease expenses should be treated as financing expenses, with the following adjustments to earnings and capital:
- Debt Value of Operating Leases = Present value of Operating Lease Commitments at the pre-tax cost of debt
- When you convert operating leases into debt, you also create an asset to counter it of exactly the same value.
- Adjusted Operating Earnings
  - Adjusted Operating Earnings = Operating Earnings + Operating Lease Expenses - Depreciation on Leased AssetAs an approximation, this works:
  - Adjusted Operating Earnings = Operating Earnings + Pre-tax cost of Debt \* PV of Operating Leases.

# Operating Leases at The Gap in 2003

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- The Gap has conventional debt of about \$ 1.97 billion on its balance sheet and its pre-tax cost of debt is about 6%. Its operating lease payments in the 2003 were \$978 million and its commitments for the future are below:

Year	Commitment (millions)	Present Value (at 6%)
1	\$899.00	\$848.11
2	\$846.00	\$752.94
3	\$738.00	\$619.64
4	\$598.00	\$473.67
5	\$477.00	\$356.44
6&7	\$982.50 each year	\$1,346.04

- Debt Value of leases = \$4,396.85 (Also value of leased asset)
- Debt outstanding at The Gap = \$1,970 m + \$4,397 m = \$6,367 m
- Adjusted Operating Income = Stated OI + OL exp this year - Deprec' n  
= \$1,012 m + 978 m - 4397 m / 7 = \$1,362 million (7 year life for assets)
- Approximate OI = \$1,012 m + \$ 4397 m (.06) = \$1,276 m

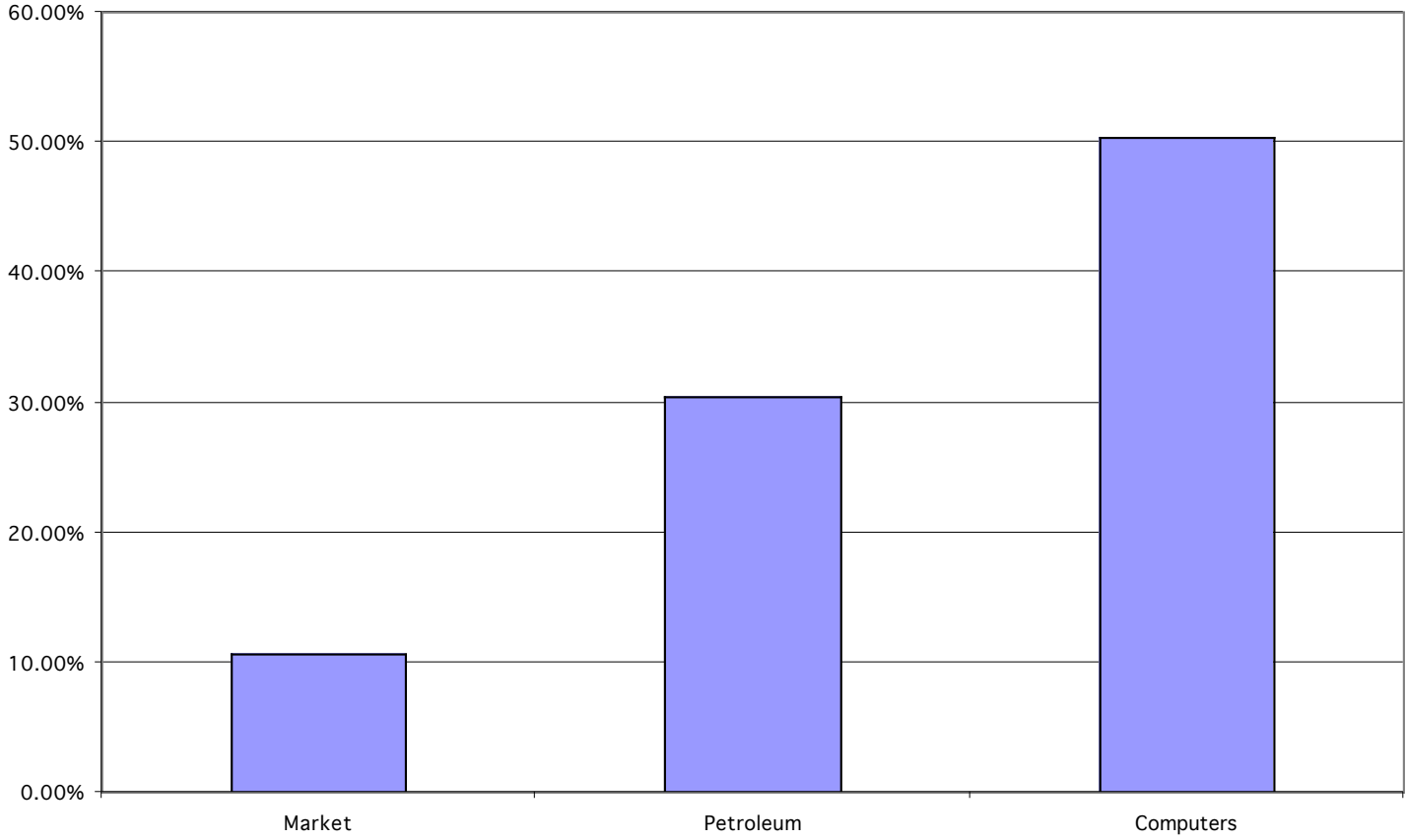
# The Collateral Effects of Treating Operating Leases as Debt

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<i>Conventional Accounting</i>	<i>Operating Leases Treated as Debt</i>								
<p><i>Income Statement</i></p> <p>EBIT&amp; Leases = 1,990                      - Op Leases = 978                      EBIT = 1,012</p>	<p><i>Income Statement</i></p> <p>EBIT&amp; Leases = 1,990                      - Deprecn: OL= 628                      EBIT = 1,362</p> <p>Interest expense will rise to reflect the conversion of operating leases as debt. Net income should not change.</p>								
<p><i>Balance Sheet</i></p> <p>Off balance sheet (Not shown as debt or as an asset). Only the conventional debt of \$1,970 million shows up on balance sheet</p>	<p><i>Balance Sheet</i></p> <table> <tr> <td>Asset</td> <td></td> <td>Liability</td> <td></td> </tr> <tr> <td>OL Asset</td> <td>4397</td> <td>OL Debt</td> <td>4397</td> </tr> </table> <p>Total debt = 4397 + 1970 = \$6,367 million</p>	Asset		Liability		OL Asset	4397	OL Debt	4397
Asset		Liability							
OL Asset	4397	OL Debt	4397						
<p>Cost of capital = <math>8.20\%(7350/9320) + 4\%(1970/9320) = 7.31\%</math></p> <p>Cost of equity for The Gap = 8.20%</p> <p>After-tax cost of debt = 4%</p> <p>Market value of equity = 7350</p>	<p>Cost of capital = <math>8.20\%(7350/13717) + 4\%(6367/13717) = 6.25\%</math></p>								
<p>Return on capital = <math>1012(1-.35)/(3130+1970) = 12.90\%</math></p>	<p>Return on capital = <math>1362(1-.35)/(3130+6367) = 9.30\%</math></p>								

# The Magnitude of R&D Expenses

R&D as % of Operating Income



# R&D Expenses: Operating or Capital Expenses

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- Accounting standards require us to consider R&D as an operating expense even though it is designed to generate future growth. It is more logical to treat it as capital expenditures.
- To capitalize R&D,
  - Specify an amortizable life for R&D (2 - 10 years)
  - Collect past R&D expenses for as long as the amortizable life
  - Sum up the unamortized R&D over the period. (Thus, if the amortizable life is 5 years, the research asset can be obtained by adding up 1/5th of the R&D expense from five years ago, 2/5th of the R&D expense from four years ago....:

# Capitalizing R&D Expenses: SAP

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- R & D was assumed to have a 5-year life.

Year	R&D Expense	Unamortized	Amortization this year	
Current	1020.02	1.00	1020.02	
-1	993.99	0.80	795.19	€ 198.80
-2	909.39	0.60	545.63	€ 181.88
-3	898.25	0.40	359.30	€ 179.65
-4	969.38	0.20	193.88	€ 193.88
-5	744.67	0.00	0.00	€ 148.93
Value of research asset =			€ 2,914 million	
Amortization of research asset in 2004 =			€ 903 million	
Increase in Operating Income = 1020 - 903 =			€ 117 million	

# The Effect of Capitalizing R&D at SAP

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<i>Conventional Accounting</i>	<i>R&amp;D treated as capital expenditure</i>						
<p><i>Income Statement</i></p> <p>EBIT&amp; R&amp;D = 3045                      - R&amp;D = 1020                      EBIT = 2025                      EBIT (1-t) = 1285 m</p>	<p><i>Income Statement</i></p> <p>EBIT&amp; R&amp;D = 3045                      - Amort: R&amp;D = 903                      EBIT = 2142 (Increase of 117 m)                      EBIT (1-t) = 1359 m                      Ignored tax benefit = (1020-903)(.3654) = 43                      Adjusted EBIT (1-t) = 1359+43 = 1402 m                      (Increase of 117 million)                      Net Income will also increase by 117 million</p>						
<p><i>Balance Sheet</i></p> <p>Off balance sheet asset. Book value of equity at 3,768 million Euros is understated because biggest asset is off the books.</p>	<p><i>Balance Sheet</i></p> <table> <tr> <td>Asset</td> <td>Liability</td> </tr> <tr> <td>R&amp;D Asset 2914</td> <td>Book Equity +2914</td> </tr> <tr> <td colspan="2">Total Book Equity = 3768+2914= 6782 mil</td> </tr> </table>	Asset	Liability	R&D Asset 2914	Book Equity +2914	Total Book Equity = 3768+2914= 6782 mil	
Asset	Liability						
R&D Asset 2914	Book Equity +2914						
Total Book Equity = 3768+2914= 6782 mil							
<p><i>Capital Expenditures</i></p> <p>Conventional net cap ex of 2 million Euros</p>	<p><i>Capital Expenditures</i></p> <p>Net Cap ex = 2+ 1020 - 903 = 119 mil</p>						
<p><i>Cash Flows</i></p> <p>EBIT (1-t) = 1285                      - Net Cap Ex = 2                      FCFF = 1283</p>	<p><i>Cash Flows</i></p> <p>EBIT (1-t) = 1402                      - Net Cap Ex = 119                      FCFF = 1283 m</p>						
<p>Return on capital = 1285/(3768+530)</p>	<p>Return on capital = 1402/(6782+530)</p>						



# III. One-Time and Non-recurring Charges

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- Assume that you are valuing a firm that is reporting a loss of \$ 500 million, due to a one-time charge of \$ 1 billion. What is the earnings you would use in your valuation?
  - a. A loss of \$ 500 million
  - b. A profit of \$ 500 million
- Would your answer be any different if the firm had reported one-time losses like these once every five years?
  - a. Yes
  - b. No

# IV. Accounting Malfeasance....

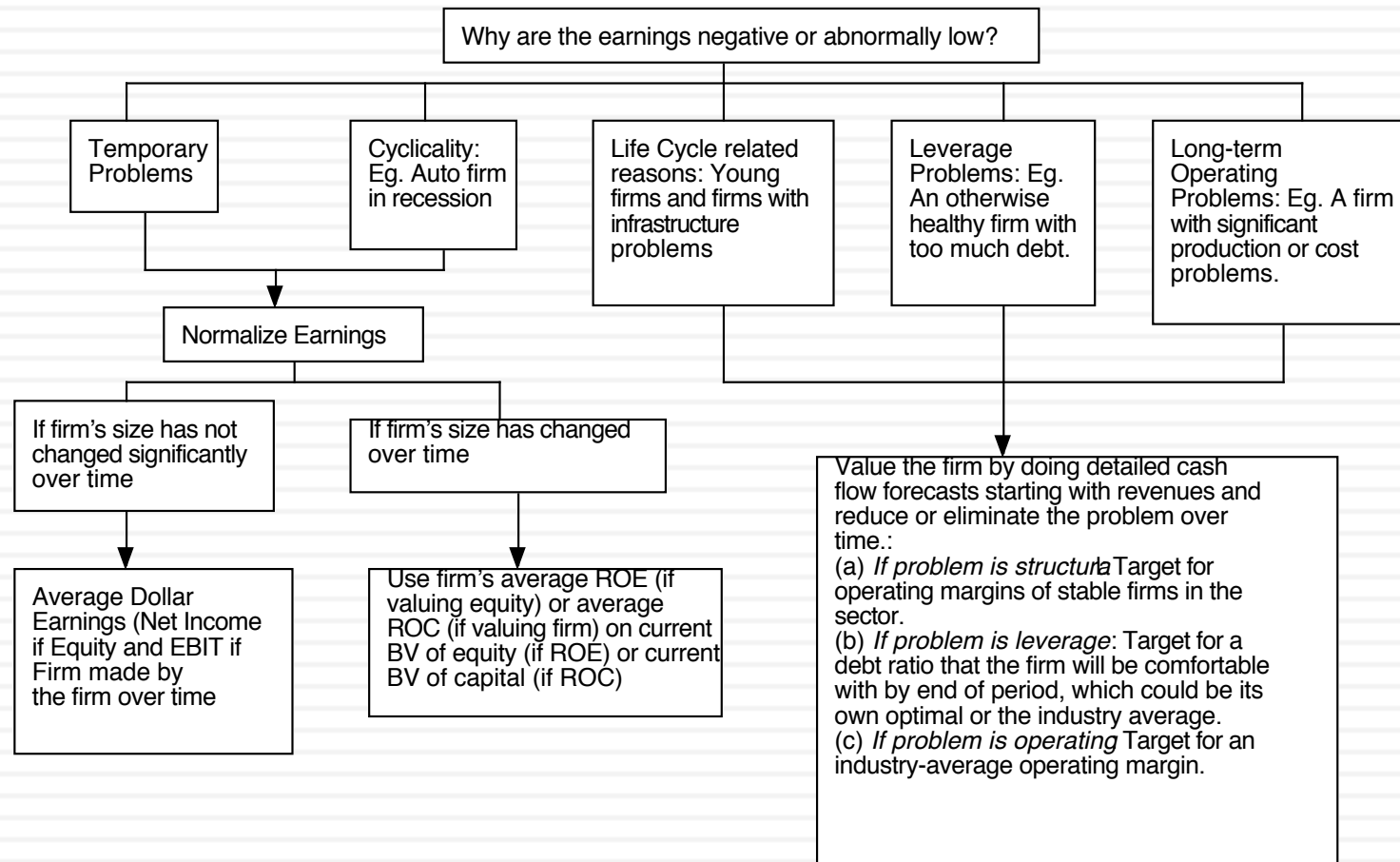
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- Though all firms may be governed by the same accounting standards, the fidelity that they show to these standards can vary. More aggressive firms will show higher earnings than more conservative firms.
- While you will not be able to catch outright fraud, you should look for warning signals in financial statements and correct for them:
  - ▣ Income from unspecified sources - holdings in other businesses that are not revealed or from special purpose entities.
  - ▣ Income from asset sales or financial transactions (for a non-financial firm)
  - ▣ Sudden changes in standard expense items - a big drop in S,G &A or R&D expenses as a percent of revenues, for instance.
  - ▣ Frequent accounting restatements
  - ▣ Accrual earnings that run ahead of cash earnings consistently
  - ▣ Big differences between tax income and reported income

# V. Dealing with Negative or Abnormally Low Earnings

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## A Framework for Analyzing Companies with Negative or Abnormally Low Earnings



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# Cash Flows II

## Taxes and Reinvestment

# What tax rate?

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- The tax rate that you should use in computing the after-tax operating income should be
  - a. The effective tax rate in the financial statements (taxes paid/Taxable income)
  - b. The tax rate based upon taxes paid and EBIT (taxes paid/EBIT)
  - c. The marginal tax rate for the country in which the company operates
  - d. The weighted average marginal tax rate across the countries in which the company operates
  - e. None of the above
  - f. Any of the above, as long as you compute your after-tax cost of debt using the same tax rate

# The Right Tax Rate to Use

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- The choice really is between the effective and the marginal tax rate. In doing projections, it is far safer to use the marginal tax rate since the effective tax rate is really a reflection of the difference between the accounting and the tax books.
- By using the marginal tax rate, we tend to understate the after-tax operating income in the earlier years, but the after-tax tax operating income is more accurate in later years
- If you choose to use the effective tax rate, adjust the tax rate towards the marginal tax rate over time.
  - ▣ While an argument can be made for using a weighted average marginal tax rate, it is safest to use the marginal tax rate of the country

# A Tax Rate for a Money Losing Firm

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- Assume that you are trying to estimate the after-tax operating income for a firm with \$ 1 billion in net operating losses carried forward. This firm is expected to have operating income of \$ 500 million each year for the next 3 years, and the marginal tax rate on income for all firms that make money is 40%. Estimate the after-tax operating income each year for the next 3 years.

	Year 1	Year 2	Year 3
EBIT	500	500	500
Taxes			
EBIT (1-t)			
Tax rate			

# Net Capital Expenditures

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- Net capital expenditures represent the difference between capital expenditures and depreciation. Depreciation is a cash inflow that pays for some or a lot (or sometimes all of) the capital expenditures.
- In general, the net capital expenditures will be a function of how fast a firm is growing or expecting to grow. High growth firms will have much higher net capital expenditures than low growth firms.
- Assumptions about net capital expenditures can therefore never be made independently of assumptions about growth in the future.



# Capital expenditures should include

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- Research and development expenses, once they have been re-categorized as capital expenses. The adjusted net cap ex will be
  - ▣ Adjusted Net Capital Expenditures = Net Capital Expenditures + Current year's R&D expenses - Amortization of Research Asset
- Acquisitions of other firms, since these are like capital expenditures. The adjusted net cap ex will be
  - ▣ Adjusted Net Cap Ex = Net Capital Expenditures + Acquisitions of other firms - Amortization of such acquisitions
- Two caveats:
  1. Most firms do not do acquisitions every year. Hence, a normalized measure of acquisitions (looking at an average over time) should be used
  2. The best place to find acquisitions is in the statement of cash flows, usually categorized under other investment activities

# Cisco's Acquisitions: 1999

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Acquired	Method of Acquisition	Price Paid
GeoTel	Pooling	\$1,344
Fibex	Pooling	\$318
Sentient	Pooling	\$103
American Internet	Purchase	\$58
Summa Four	Purchase	\$129
Clarity Wireless	Purchase	\$153
Selsius Systems	Purchase	\$134
PipeLinks	Purchase	\$118
Amteva Tech	Purchase	\$159
		\$2,516

# Cisco's Net Capital Expenditures in 1999

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Cap Expenditures (from statement of CF) = \$ 584 mil

- Depreciation (from statement of CF) = \$ 486 mil

Net Cap Ex (from statement of CF) = \$ 98 mil

+ R & D expense = \$ 1,594 mil

- Amortization of R&D = \$ 485 mil

+ Acquisitions = \$ 2,516 mil

Adjusted Net Capital Expenditures = \$3,723 mil

□ (Amortization was included in the depreciation number)

# Working Capital Investments

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- In accounting terms, the working capital is the difference between current assets (inventory, cash and accounts receivable) and current liabilities (accounts payables, short term debt and debt due within the next year)
- A cleaner definition of working capital from a cash flow perspective is the difference between non-cash current assets (inventory and accounts receivable) and non-debt current liabilities (accounts payable)
- For firms in some sectors, it is the investment in working capital that is the bigger part of reinvestment.

# Working Capital: General Propositions

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1. Working Capital Detail: While some analysts break down working capital into detail (inventory, deferred taxes, payables etc.), it is a pointless exercise unless you feel that you can bring some specific information that lets you forecast the details.
2. Working Capital Volatility: Changes in non-cash working capital from year to year tend to be volatile. So, building of the change in the most recent year is dangerous. It is better to either estimate the change based on working capital as a percent of sales, while keeping an eye on industry averages.
3. Negative Working Capital: Some firms have negative non-cash working capital. Assuming that this will continue into the future will generate positive cash flows for the firm and will get more positive as growth increases.

# Volatile Working Capital?

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	<i>Amazon</i>	<i>Cisco</i>	<i>Motorola</i>
Revenues	\$ 1,640	\$12,154	\$30,931
Non-cash WC	-\$419	-\$404	\$2547
% of Revenues	-25.53%	-3.32%	8.23%
Change from last year	\$ (309)	(\$700)	(\$829)
Average: last 3 years	-15.16%	-3.16%	8.91%
Average: industry	8.71%	-2.71%	7.04%
	<i>My Prediction</i>		
WC as % of Revenue	3.00%	0.00%	8.23%

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# Cash Flows III

From the firm to equity

# Dividends and Cash Flows to Equity

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- In the strictest sense, the only cash flow that an investor will receive from an equity investment in a publicly traded firm is the dividend that will be paid on the stock.
- Actual dividends, however, are set by the managers of the firm and may be much lower than the potential dividends (that could have been paid out)
  - managers are conservative and try to smooth out dividends
  - managers like to hold on to cash to meet unforeseen future contingencies and investment opportunities
- When actual dividends are less than potential dividends, using a model that focuses only on dividends will understate the true value of the equity in a firm.



# Measuring Potential Dividends

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- Some analysts assume that the earnings of a firm represent its potential dividends. This cannot be true for several reasons:
  - ▣ Earnings are not cash flows, since there are both non-cash revenues and expenses in the earnings calculation
  - ▣ Even if earnings were cash flows, a firm that paid its earnings out as dividends would not be investing in new assets and thus could not grow
  - ▣ Valuation models, where earnings are discounted back to the present, will over estimate the value of the equity in the firm
- The potential dividends of a firm are the cash flows left over after the firm has made any “investments” it needs to make to create future growth and net debt repayments (debt repayments - new debt issues)
  - ▣ The common categorization of capital expenditures into discretionary and non-discretionary loses its basis when there is future growth built into the valuation.

# Estimating Cash Flows: FCFE

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## □ Cash flows to Equity for a Levered Firm

Net Income

- (Capital Expenditures - Depreciation)

- Changes in non-cash Working Capital

- (Principal Repayments - New Debt Issues)

= Free Cash flow to Equity

□ I have ignored preferred dividends. If preferred stock exist, preferred dividends will also need to be netted out

# Estimating FCFE when Leverage is Stable


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Net Income

- (1- DR) (Capital Expenditures - Depreciation)
- (1- DR) Working Capital Needs
- = Free Cash flow to Equity

DR = Debt/Capital Ratio

For this firm,

- ▣ Proceeds from new debt issues = Principal Repayments +   
(Capital Expenditures - Depreciation + Working Capital Needs)
- ▣ In computing FCFE, the book value debt to capital ratio should be used when looking back in time but can be replaced with the market value debt to capital ratio, looking forward.

# Estimating FCFE: Disney

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- Net Income=\$ 1533 Million
- Capital spending = \$ 1,746 Million
- Depreciation per Share = \$ 1,134 Million
- Increase in non-cash working capital = \$ 477 Million
- Debt to Capital Ratio (DR) = 23.83%
- Estimating FCFE (1997):

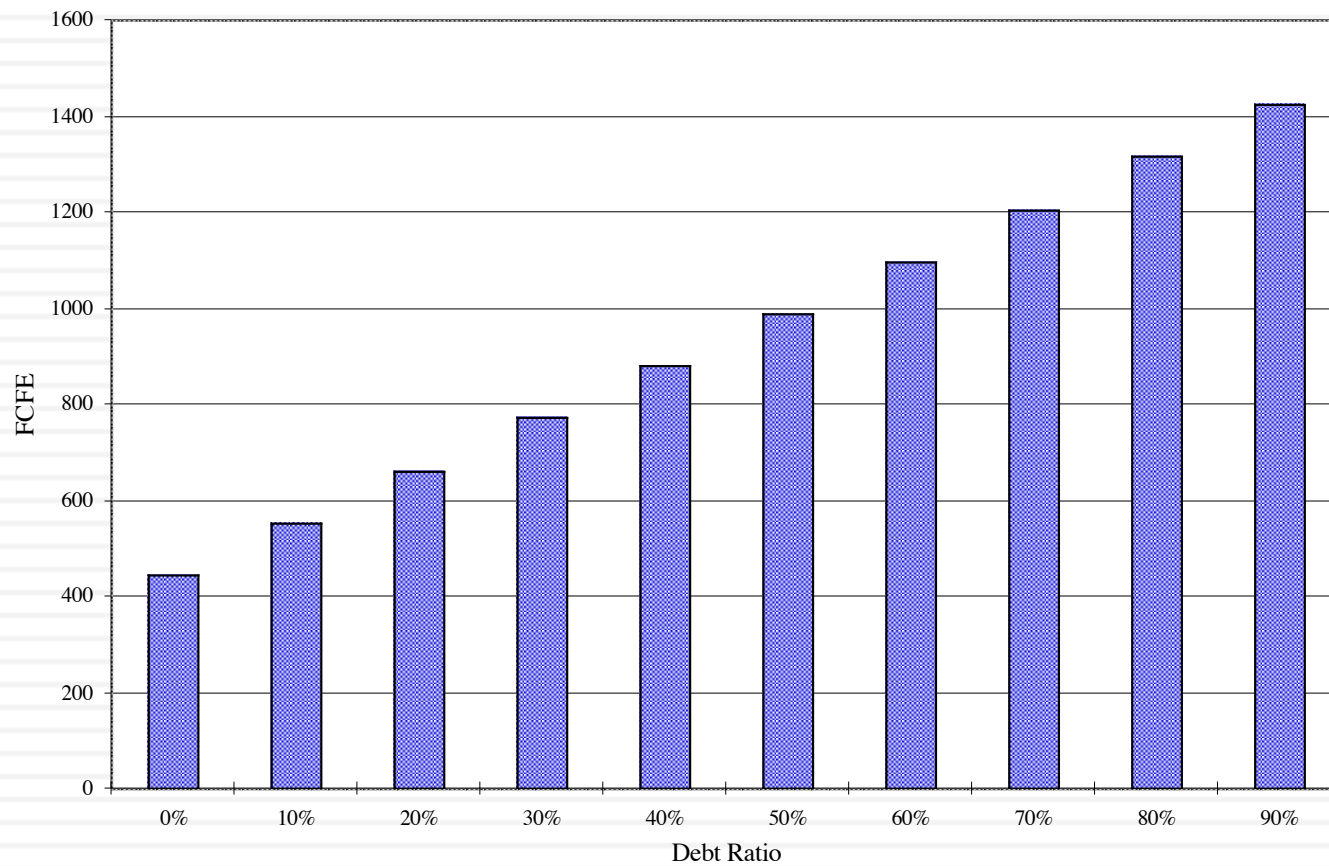
Net Income	\$1,533 Mil
- (Cap. Exp - Depr)*(1-DR)	\$465.90 [(1746-1134)(1-.2383)]
Chg. Working Capital*(1-DR)	\$363.33 [477(1-.2383)]
= Free CF to Equity	\$ 704 Million

Dividends Paid	\$ 345 Million
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# FCFE and Leverage: Is this a free lunch?

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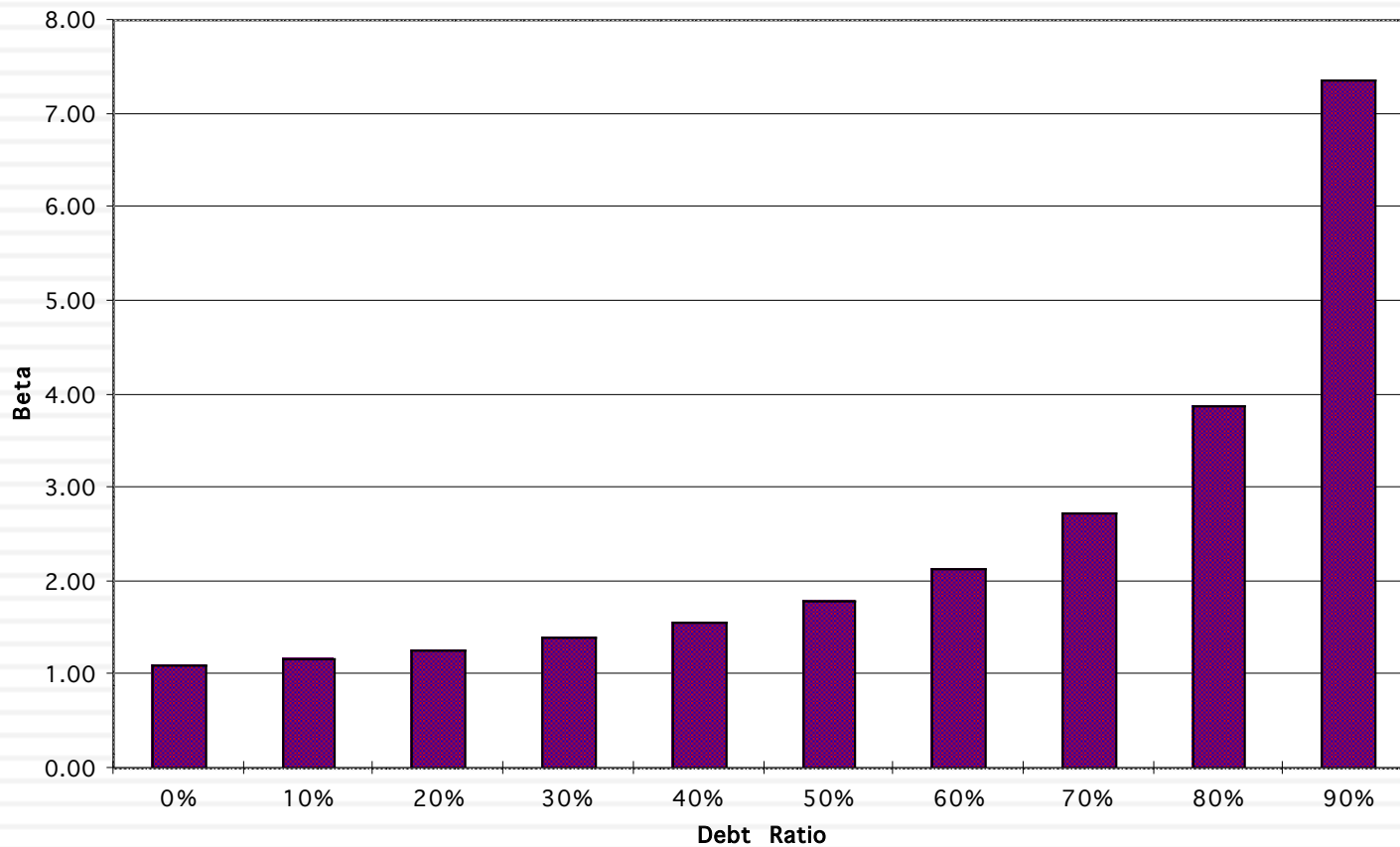
Debt Ratio and FCFE: Disney



# FCFE and Leverage: The Other Shoe Drops

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Debt Ratio and Beta



# Leverage, FCFE and Value

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- In a discounted cash flow model, increasing the debt/equity ratio will generally increase the expected free cash flows to equity investors over future time periods and also the cost of equity applied in discounting these cash flows. Which of the following statements relating leverage to value would you subscribe to?
  - a. Increasing leverage will increase value because the cash flow effects will dominate the discount rate effects
  - b. Increasing leverage will decrease value because the risk effect will be greater than the cash flow effects
  - c. Increasing leverage will not affect value because the risk effect will exactly offset the cash flow effect
  - d. Any of the above, depending upon what company you are looking at and where it is in terms of current leverage