



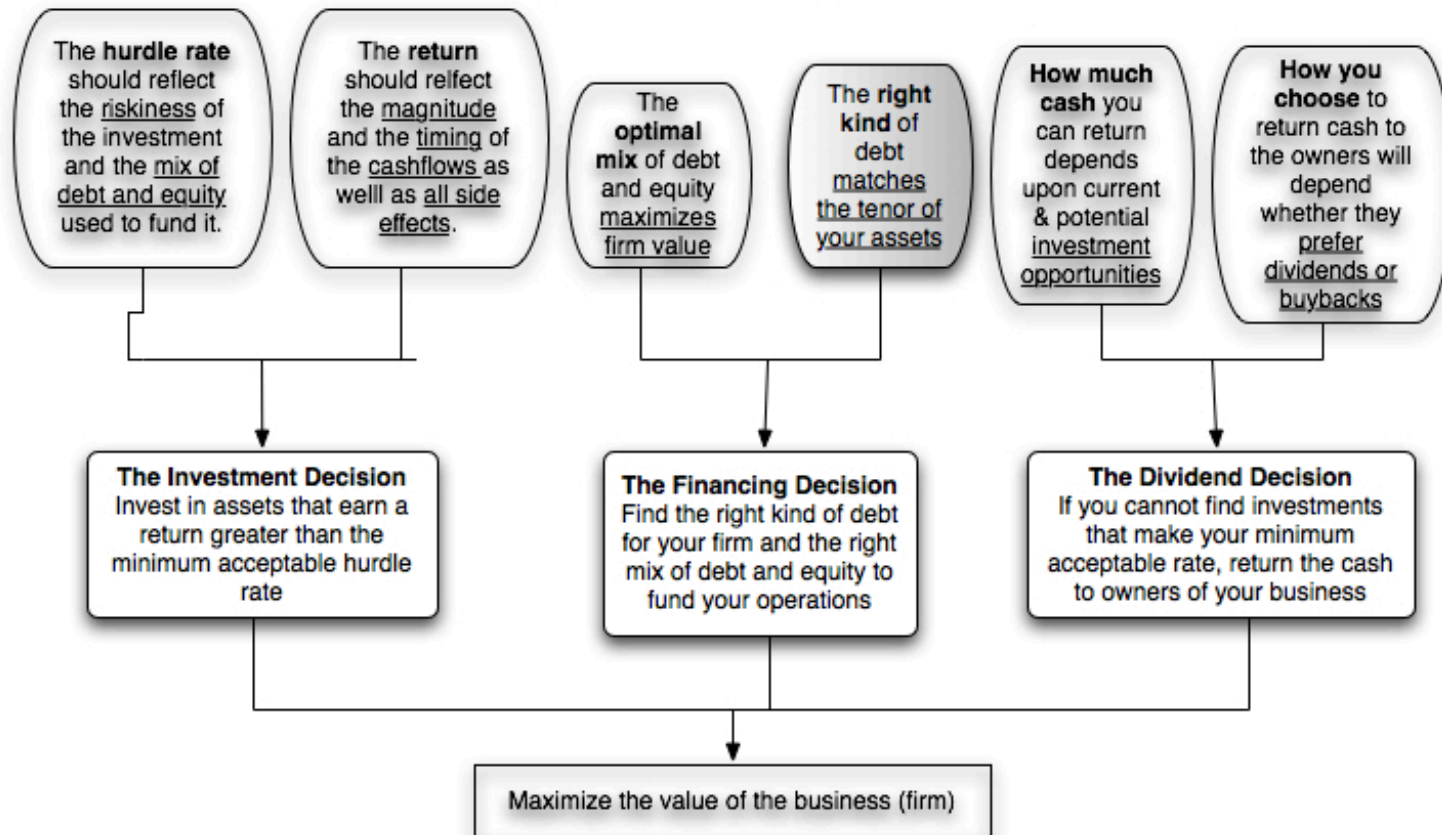
GETTING TO THE OPTIMAL: TIMING AND FINANCING CHOICES

You can take it slow.. Or perhaps not...

Big Picture...

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Chapter 9: The Financing Details



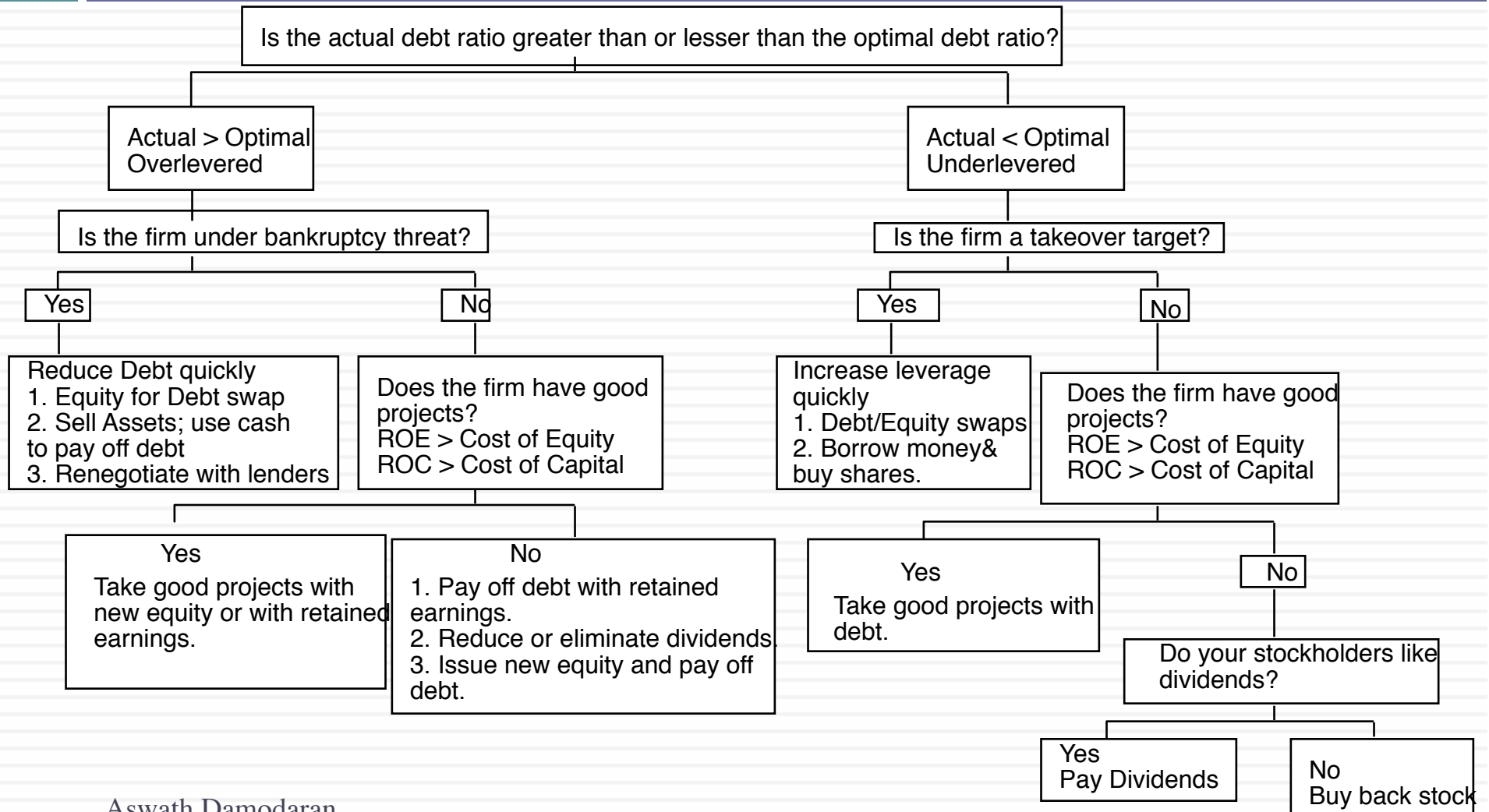
Now that we have an optimal.. And an actual..
What next?

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- At the end of the analysis of financing mix (using whatever tool or tools you choose to use), you can come to one of three conclusions:
 1. The firm has the right financing mix
 2. It has too little debt (it is under levered)
 3. It has too much debt (it is over levered)
- The next step in the process is
 - Deciding how much quickly or gradually the firm should move to its optimal
 - Assuming that it does, the right kind of financing to use in making this adjustment

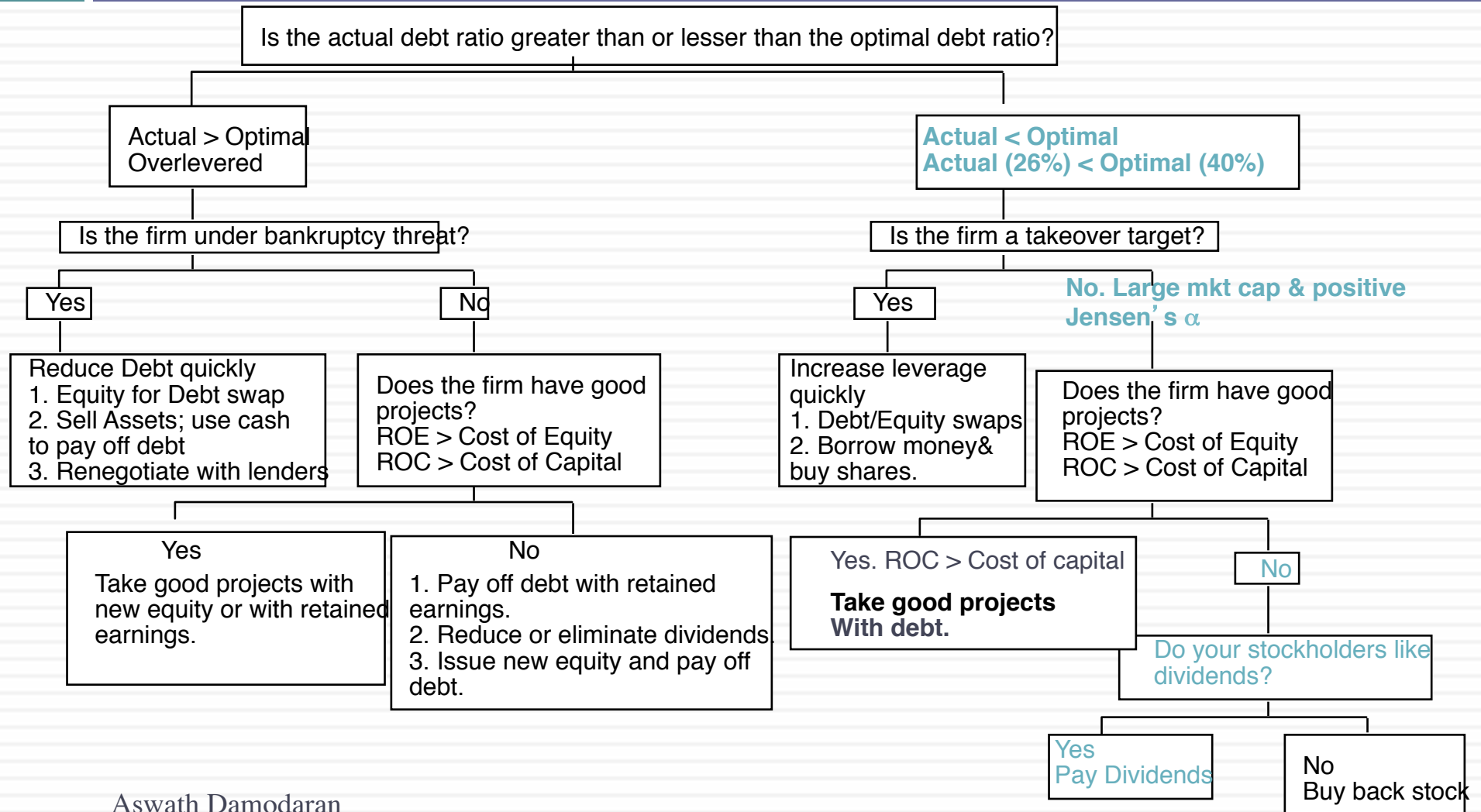
A Framework for Getting to the Optimal

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Disney: Applying the Framework

97



6 Application Test: Getting to the Optimal

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- ☐ Based upon your analysis of both the firm's capital structure and investment record, what path would you map out for the firm?
 - a. Immediate change in leverage
 - b. Gradual change in leverage
 - c. No change in leverage
- ☐ Would you recommend that the firm change its financing mix by
 - a. Paying off debt/Buying back equity
 - b. Take projects with equity/debt

The Mechanics of Changing Debt Ratio over time... quickly...

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To decrease the debt ratio

Sell operating assets and use cash to pay down debt.

Issue new stock to retire debt or get debt holders to accept equity in the firm.

Assets	Liabilities
Cash	Debt
Operating Assets in place	
Growth Assets	Equity
<i>Sell operating assets and use cash to buy back stock or pay a special dividend</i>	<i>Borrow money and buy back stock or pay a large special dividend</i>

To increase the debt ratio

The mechanics of changing debt ratios over time... gradually...

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- To change debt ratios over time, you use the same mix of tools that you used to change debt ratios gradually:
 - ▣ Dividends and stock buybacks: Dividends and stock buybacks will reduce the value of equity.
 - ▣ Debt repayments: will reduce the value of debt.
- The complication of changing debt ratios over time is that firm value is itself a moving target.
 - ▣ If equity is fairly valued today, the equity value should change over time to reflect the expected price appreciation:
 - ▣ Expected Price appreciation = Cost of equity – Dividend Yield
 - ▣ Debt will also change over time, in conjunction as firm value changes.

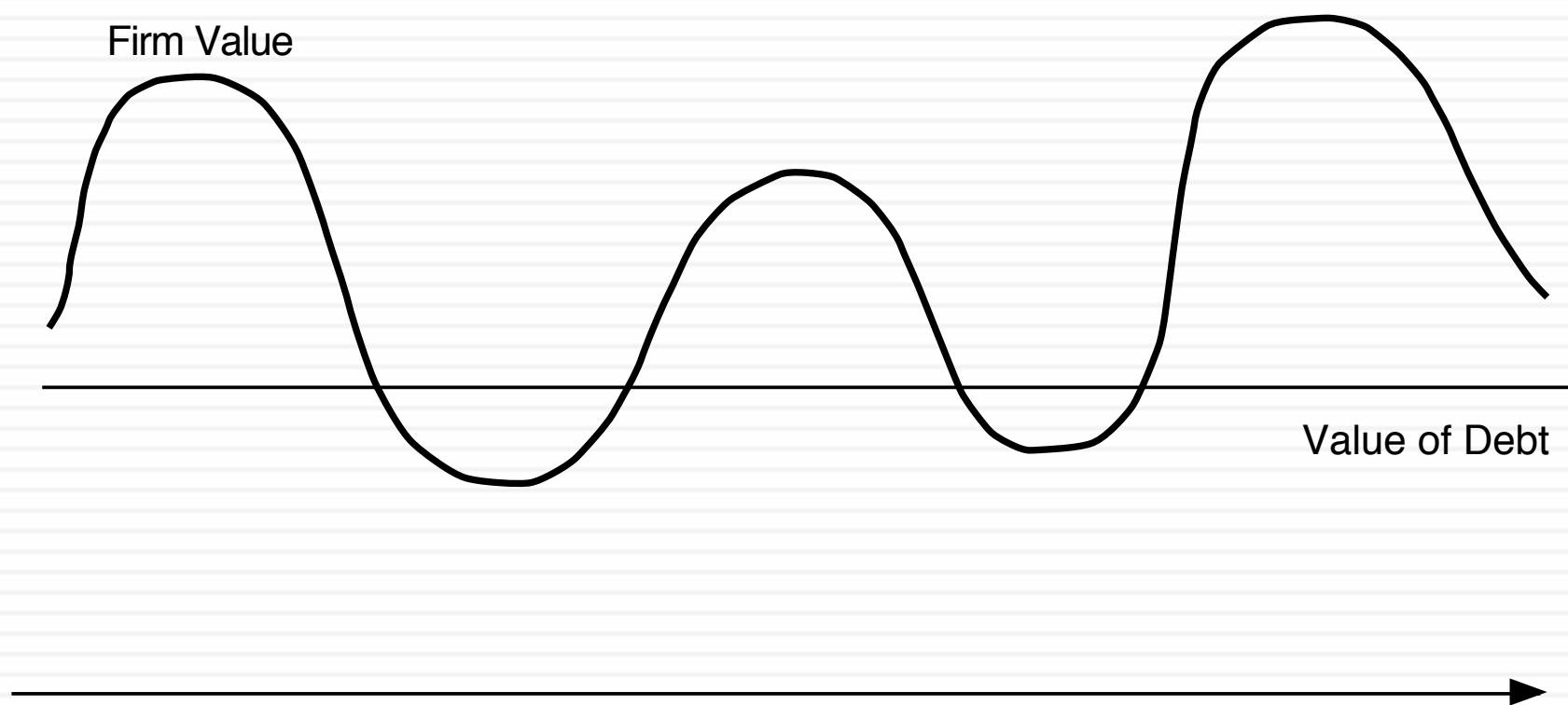
Designing Debt: The Fundamental Principle

101

- The objective in designing debt is to make the cash flows on debt match up as closely as possible with the cash flows that the firm makes on its assets.
- By doing so, we reduce our risk of default, increase debt capacity and increase firm value.

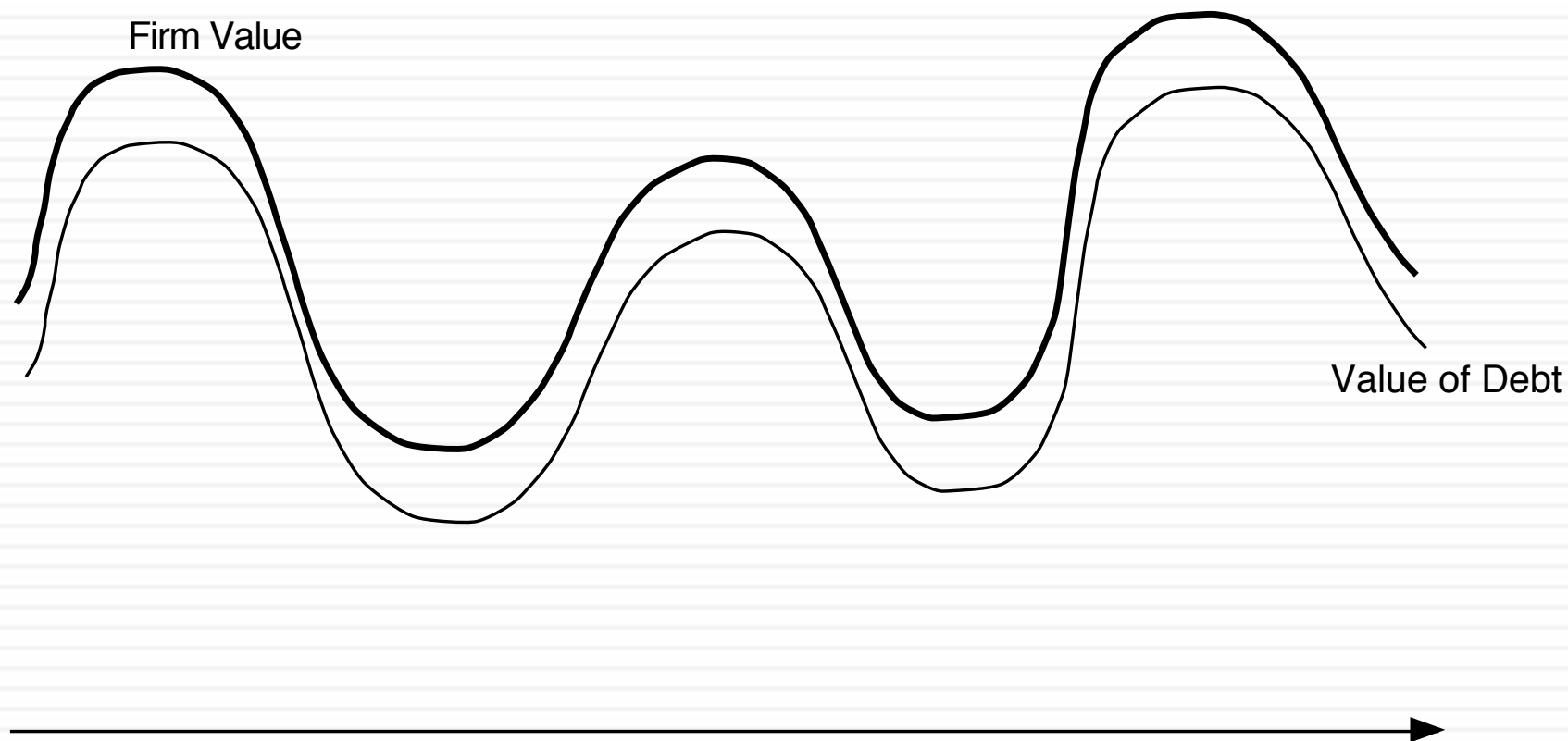
Firm with mismatched debt

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Firm with matched Debt

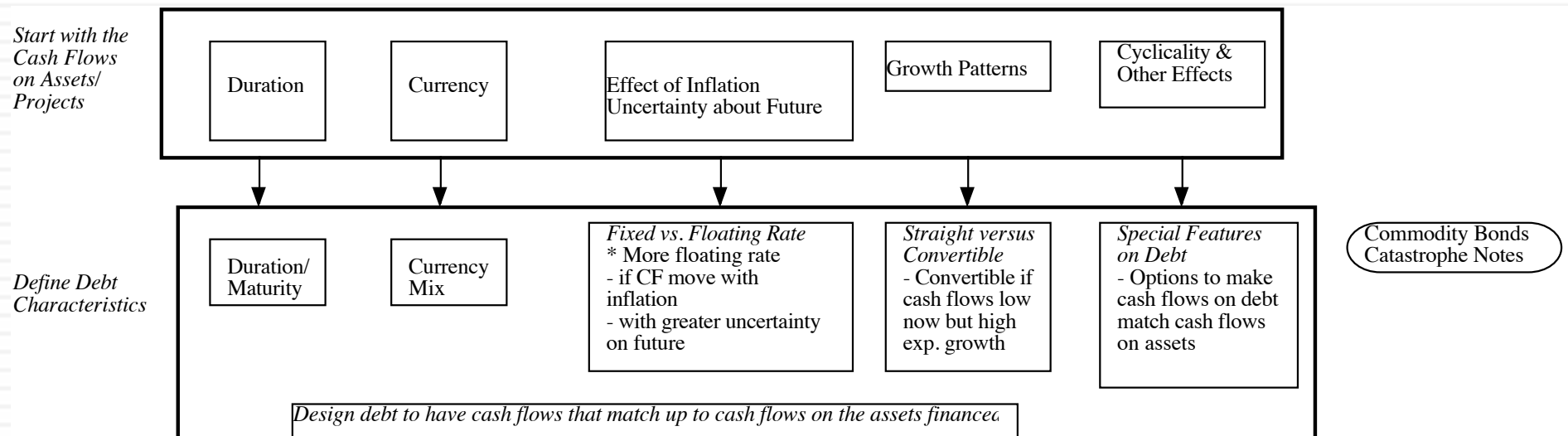
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Design the perfect financing instrument

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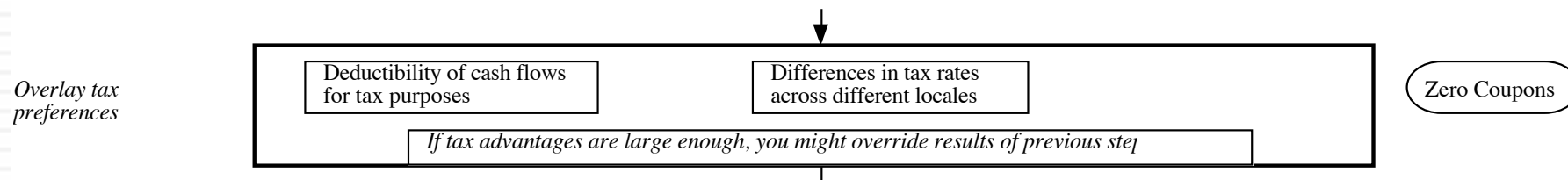
- The perfect financing instrument will
 - Have all of the tax advantages of debt
 - While preserving the flexibility offered by equity



Ensuring that you have not crossed the line drawn by the tax code

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- All of this design work is lost, however, if the security that you have designed does not deliver the tax benefits.
- In addition, there may be a trade off between mismatching debt and getting greater tax benefits.

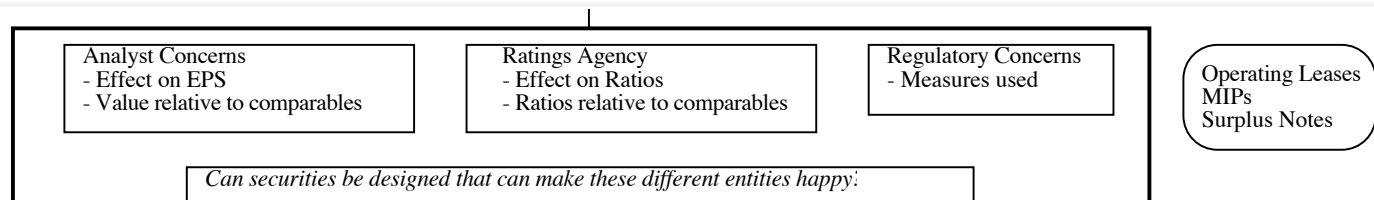


While keeping equity research analysts, ratings agencies and regulators applauding

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- ❑ Ratings agencies want companies to issue equity, since it makes them safer.
- ❑ Equity research analysts want them not to issue equity because it dilutes earnings per share.
- ❑ Regulatory authorities want to ensure that you meet their requirements in terms of capital ratios (usually book value).
- ❑ Financing that leaves all three groups happy is nirvana.

*Consider
ratings agency
& analyst concerns*



Debt or Equity: The Strange Case of Trust Preferred

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- Trust preferred stock has
 - ▣ A fixed dividend payment, specified at the time of the issue
 - ▣ That is tax deductible
 - ▣ And failing to make the payment can give these shareholders voting rights
- When trust preferred was first created, ratings agencies treated it as equity. As they have become more savvy, ratings agencies have started giving firms only partial equity credit for trust preferred.

Debt, Equity and Quasi Equity

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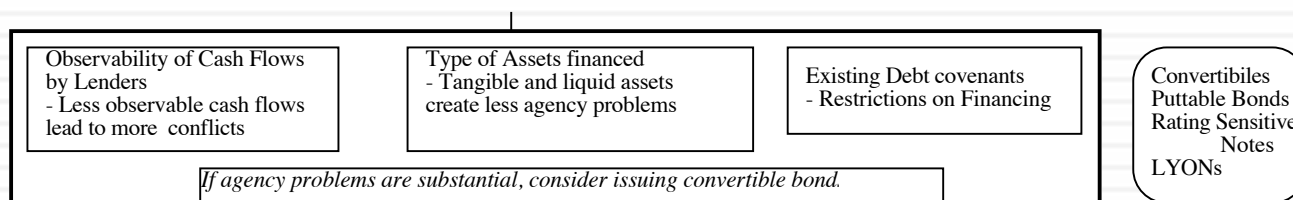
- Assuming that trust preferred stock gets treated as equity by ratings agencies, which of the following firms is the most appropriate firm to be issuing it?
 - a. A firm that is under levered, but has a rating constraint that would be violated if it moved to its optimal
 - b. A firm that is over levered that is unable to issue debt because of the rating agency concerns.

Soothe bondholder fears

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- There are some firms that face skepticism from bondholders when they go out to raise debt, because
 - ▣ Of their past history of defaults or other actions
 - ▣ They are small firms without any borrowing history
- Bondholders tend to demand much higher interest rates from these firms to reflect these concerns.

Factor in agency conflicts between stock and bond holders



And do not lock in market mistakes that work against you

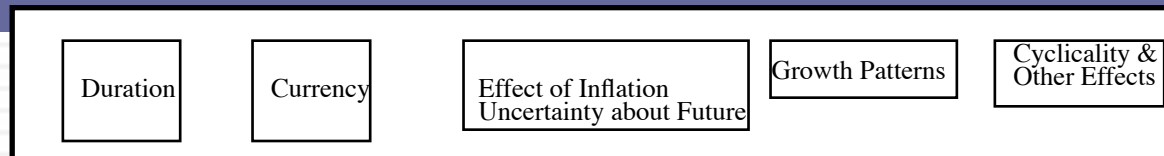
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- Ratings agencies can sometimes under rate a firm, and markets can under price a firm's stock or bonds. If this occurs, firms should not lock in these mistakes by issuing securities for the long term. In particular,
 - ▣ Issuing equity or equity based products (including convertibles), when equity is under priced transfers wealth from existing stockholders to the new stockholders
 - ▣ Issuing long term debt when a firm is under rated locks in rates at levels that are far too high, given the firm's default risk.
- What is the solution
 - ▣ If you need to use equity?
 - ▣ If you need to use debt?

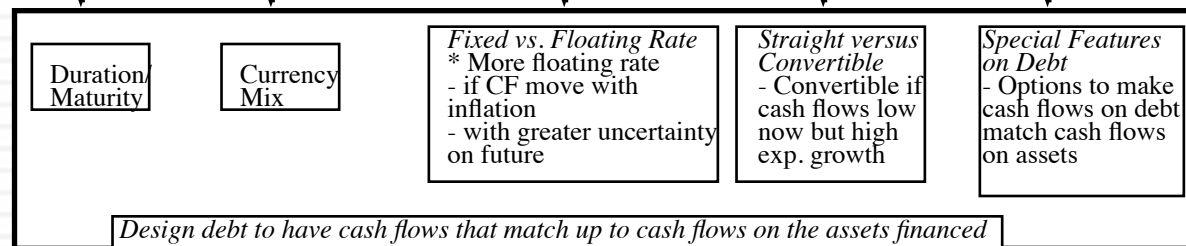
Designing Debt: Bringing it all together

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Start with the Cash Flows on Assets/ Projects

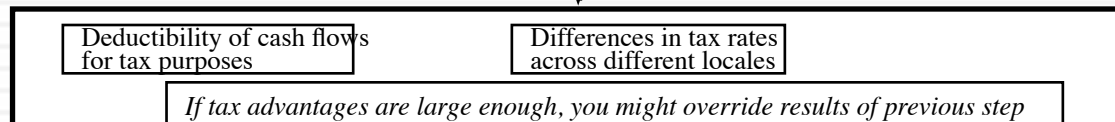


Define Debt Characteristics



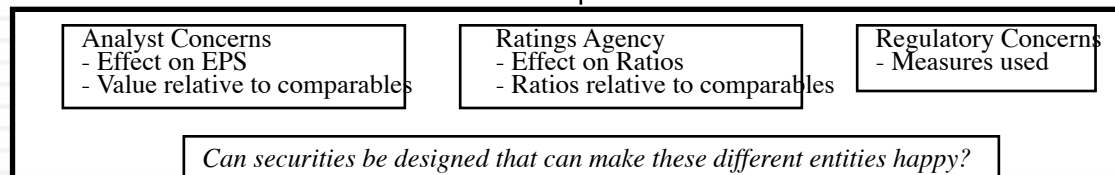
Commodity Bonds
Catastrophe Notes

Overlay tax preferences



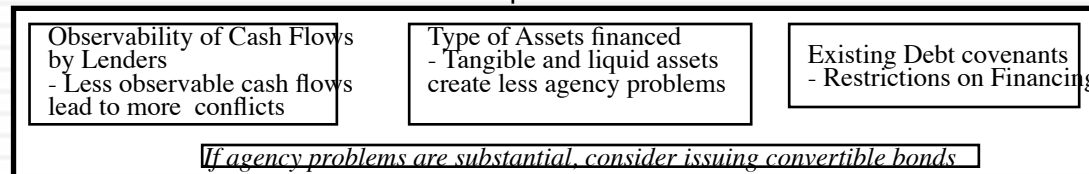
Zero Coupons

Consider ratings agency & analyst concerns



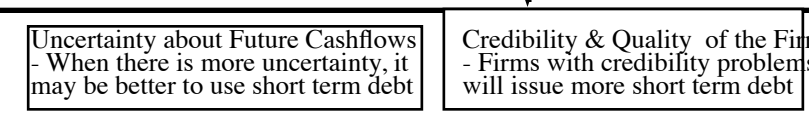
Operating Leases
MIPs
Surplus Notes

Factor in agency conflicts between stock and bond holders



Convertibles
Puttable Bonds
Rating Sensitive Notes
LYONs

Consider Information Asymmetries



Approaches for evaluating Asset Cash Flows

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I. Intuitive Approach

- ▣ Are the projects typically long term or short term? What is the cash flow pattern on projects?
- ▣ How much growth potential does the firm have relative to current projects?
- ▣ How cyclical are the cash flows? What specific factors determine the cash flows on projects?

II. Project Cash Flow Approach

- ▣ Estimate expected cash flows on a typical project for the firm
- ▣ Do scenario analyses on these cash flows, based upon different macro economic scenarios

III. Historical Data

- ▣ Operating Cash Flows
- ▣ Firm Value

I. Intuitive Approach - Disney

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<i>Business</i>	<i>Project Cash Flow Characteristics</i>	<i>Type of Financing</i>
Studio entertainment	<p>Movie projects are likely to</p> <ol style="list-style-type: none"> 1. Be short-term 2. Have cash outflows primarily in dollars (because Disney makes most of its movies in the U.S.), but cash inflows could have a substantial foreign currency component (because of overseas revenues) 3. Have net cash flows that are heavily driven by whether the movie is a hit, which is often difficult to predict 	<p>Debt should be</p> <ol style="list-style-type: none"> 1. Short-term 2. Primarily dollar debt 3. If possible, tied to the success of movies (Lion King or Mulan bonds)
Media networks	<p>Projects are likely to be</p> <ol style="list-style-type: none"> 1. Short-term 2. Primarily in dollars, though foreign component is growing 3. Driven by advertising revenues and show success (Nielsen ratings) 	<p>Debt should be</p> <ol style="list-style-type: none"> 1. Short-term 2. Primarily dollar debt 3. If possible, linked to network ratings
Park resorts	<p>Projects are likely to be</p> <ol style="list-style-type: none"> 1. Very long-term 2. Primarily in dollars, but a significant proportion of revenues come from foreign tourists, who are likely to stay away if the dollar strengthens 3. Affected by success of studio entertainment and media networks divisions 	<p>Debt should be</p> <ol style="list-style-type: none"> 1. Long-term 2. Mix of currencies, based on tourist makeup
Consumer products	<p>Projects are likely to be short- to medium-term and linked to the success of the movie division; most of Disney's product offerings are derived from their movie productions</p>	<p>Debt should be</p> <ol style="list-style-type: none"> a. Medium-term b. Dollar debt

6 Application Test: Choosing your Financing Type

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- Based upon the business that your firm is in, and the typical investments that it makes, what kind of financing would you expect your firm to use in terms of
 - a. Duration (long term or short term)
 - b. Currency
 - c. Fixed or Floating rate
 - d. Straight or Convertible

II. Project Specific Financing

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- With project specific financing, you match the financing choices to the project being funded. The benefit is that the debt is truly customized to the project.
- Project specific financing makes the most sense when you have a few large, independent projects to be financed. It becomes both impractical and costly when firms have portfolios of projects with interdependent cashflows.

Duration of Disney Theme Park

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Year (t)	Annual Cashflow	Terminal Value	Present Value @ 8.62%	Present value *t
0	-\$2,000		-\$2,000	\$0
1	-\$1,000		-\$921	-\$921
2	-\$860		-\$729	-\$1,457
3	-\$270		-\$211	-\$632
4	\$332		\$239	\$956
5	\$453		\$300	\$1,500
6	\$502		\$305	\$1,833
7	\$538		\$302	\$2,112
8	\$596		\$307	\$2,460
9	\$660		\$313	\$2,821
10	\$692	\$10,669	\$4,970	\$49,704
			\$2,877	\$58,375

Duration of the Project = $58,375 / 2,877 = 20.29$ years

The perfect theme park debt...

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- The perfect debt for this theme park would have a duration of roughly 20 years and be in a mix of Latin American currencies (since it is located in Brazil), reflecting where the visitors to the park are coming from.
- If possible, you would tie the interest payments on the debt to the number of visitors at the park.

III. Firm-wide financing

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- Rather than look at individual projects, you could consider the firm to be a portfolio of projects. The firm's past history should then provide clues as to what type of debt makes the most sense.
- Operating Cash Flows
 - The question of how sensitive a firm's asset cash flows are to a variety of factors, such as interest rates, inflation, currency rates and the economy, can be directly tested by regressing changes in the operating income against changes in these variables.
 - This analysis is useful in determining the coupon/interest payment structure of the debt.
- Firm Value
 - The firm value is clearly a function of the level of operating income, but it also incorporates other factors such as expected growth & cost of capital.
 - The firm value analysis is useful in determining the overall structure of the debt, particularly maturity.

Disney: Historical Data

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Date	Operating Income (OI)	Firm Value (V)	% Chg in OI	% Chg in V
2008	\$7,404	\$72,357	8.42%	-6.55%
2007	\$6,829	\$77,428	27.53%	-2.13%
2006	\$5,355	\$79,116	30.39%	35.81%
2005	\$4,107	\$58,256	1.46%	3.09%
2004	\$4,048	\$56,510	49.21%	8.41%
2003	\$2,713	\$52,125	13.80%	19.03%
2002	\$2,384	\$43,792	-15.82%	-7.02%
2001	\$2,832	\$47,099	12.16%	-46.31%
2000	\$2,525	\$87,716	-22.64%	34.80%
1999	\$3,264	\$65,073	-15.07%	1.50%
1998	\$3,843	\$64,110	-2.59%	-1.63%
1997	\$3,945	\$65,173	30.46%	19.16%
1996	\$3,024	\$54,695	33.68%	70.95%
1995	\$2,262	\$31,995	25.43%	38.75%
1994	\$1,804	\$23,059	15.59%	3.69%
1993	\$1,560	\$22,238	21.23%	8.65%
1992	\$1,287	\$20,467	28.18%	26.57%
1991	\$1,004	\$16,171	-21.98%	27.90%
1990	\$1,287	\$12,643	16.01%	-24.90%
1989	\$1,109	\$16,834	40.64%	-2.64%
1988	\$789	\$17,290	11.65%	65.50%
1987	\$707	\$10,447	53.02%	85.24%
1986	\$462	\$5,640	25.15%	61.24%
1985	\$369	\$3,498	157.99%	24.37%

The Macroeconomic Data

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Date	T.Bond Rate	Change in rate	GDP (Deflated)	% Chg in GDP	CPI	Change in CPI	Weighted Dollar	% Change in \$
2008	2.52%	-1.44%	11989	-1.18%	-0.14%	-4.26%	81.01	10.88%
2007	4.02%	-0.65%	12133	2.93%	4.30%	2.19%	73.06	-11.30%
2006	4.70%	0.30%	11787	3.40%	2.07%	-1.84%	82.37	-2.28%
2005	4.39%	0.16%	11399	3.68%	3.99%	0.66%	84.29	3.98%
2004	4.22%	0.13%	10994	3.72%	3.30%	1.34%	81.06	-3.92%
2003	4.08%	0.05%	10600	4.32%	1.93%	-0.65%	84.37	-14.59%
2002	4.03%	-0.97%	10161	2.80%	2.60%	1.44%	98.78	-11.17%
2001	5.05%	-0.18%	9884	-0.04%	1.14%	-2.50%	111.20	7.45%
2000	5.24%	-0.98%	9888	2.24%	3.73%	0.96%	103.49	7.73%
1999	6.28%	1.56%	9671	4.70%	2.74%	1.04%	96.06	1.68%
1998	4.65%	-1.03%	9237	4.51%	1.68%	0.11%	94.47	-4.08%
1997	5.74%	-0.63%	8838	4.33%	1.57%	-1.43%	98.49	9.40%
1996	6.41%	0.80%	8471	4.43%	3.04%	0.31%	90.03	4.14%
1995	5.57%	-2.09%	8112	2.01%	2.72%	-0.08%	86.45	-0.71%
1994	7.82%	1.92%	7952	4.12%	2.80%	0.27%	87.07	-5.37%
1993	5.79%	-0.83%	7637	2.50%	2.52%	-0.72%	92.01	0.56%
1992	6.68%	-0.02%	7451	4.15%	3.26%	0.64%	91.50	6.89%
1991	6.70%	-1.26%	7154	1.09%	2.60%	-2.89%	85.60	0.69%
1990	8.06%	0.12%	7077	0.65%	5.65%	0.43%	85.01	-8.00%
1989	7.93%	-1.11%	7031	2.66%	5.20%	0.51%	92.40	2.04%
1988	9.14%	0.26%	6849	3.66%	4.67%	0.60%	90.55	1.05%
1987	8.86%	1.53%	6607	4.49%	4.05%	2.54%	89.61	-12.01%
1986	7.22%	-1.61%	6323	2.83%	1.47%	-2.33%	101.84	-15.26%
1985	8.98%	-2.27%	6149	4.19%	3.89%	3.89%	120.18	-13.51%
1984	11.51%		5902				138.96	

I. Sensitivity to Interest Rate Changes

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- How sensitive is the firm's value and operating income to changes in the level of interest rates?
- The answer to this question is important because it
 - ▣ it provides a measure of the duration of the firm's projects
 - ▣ it provides insight into whether the firm should be using fixed or floating rate debt.

Firm Value versus Interest Rate Changes

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- Regressing changes in firm value against changes in interest rates over this period yields the following regression –

$$\text{Change in Firm Value} = 0.1949 - 2.94 (\text{Change in Interest Rates})$$

(2.89) (0.50)

T statistics are in brackets.

- The coefficient on the regression (-2.94) measures how much the value of Disney as a firm changes for a unit change in interest rates.

Why the coefficient on the regression is duration..

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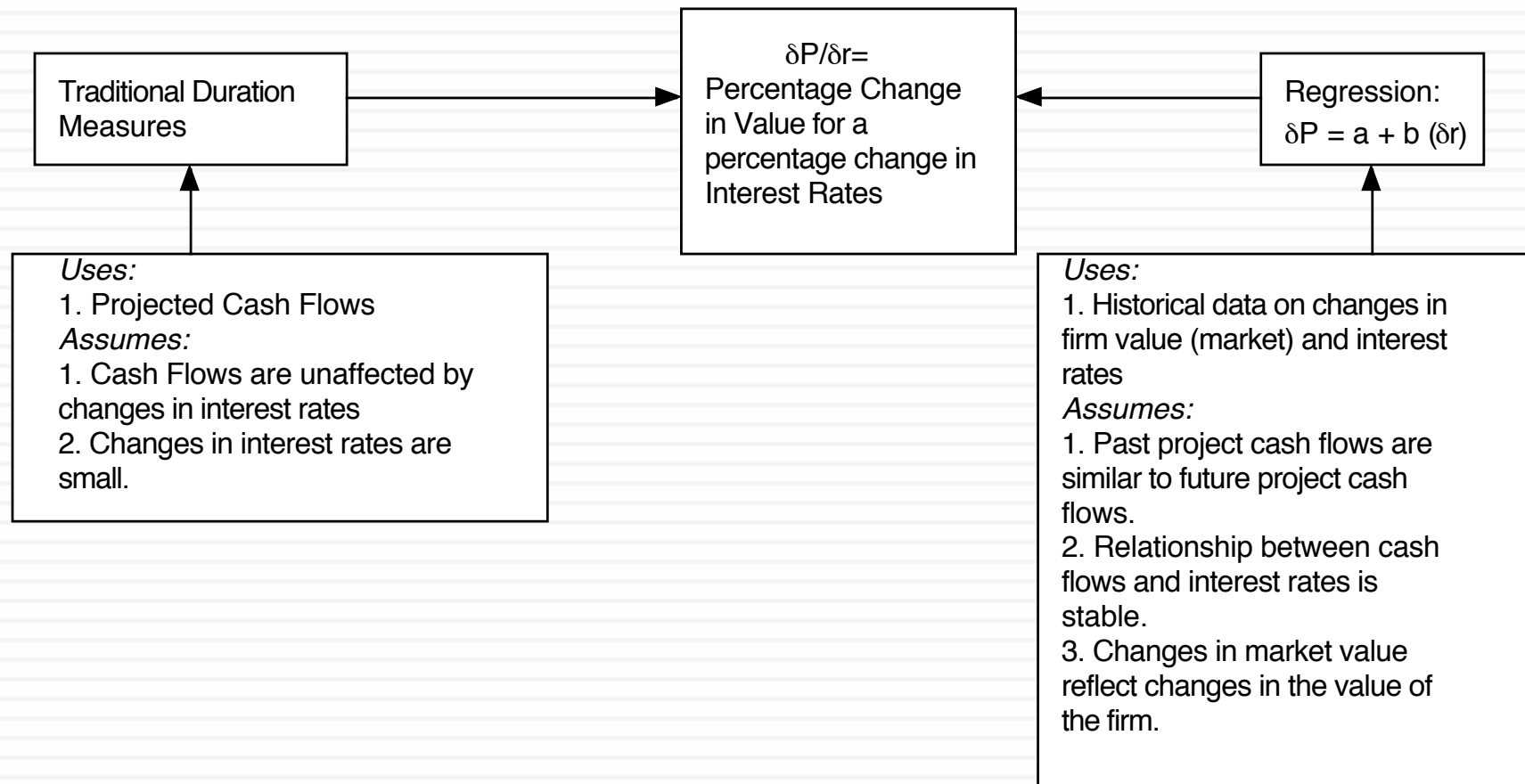
- The duration of a straight bond or loan issued by a company can be written in terms of the coupons (interest payments) on the bond (loan) and the face value of the bond to be –

$$\text{Duration of Bond} = \frac{dP/P}{dr/r} = \frac{\left[\sum_{t=1}^{t=N} \frac{t * \text{Coupon}_t}{(1+r)^t} + \frac{N * \text{Face Value}}{(1+r)^N} \right]}{\left[\sum_{t=1}^{t=N} \frac{\text{Coupon}_t}{(1+r)^t} + \frac{\text{Face Value}}{(1+r)^N} \right]}$$

- The duration of a bond measures how much the price of the bond changes for a unit change in interest rates.
- Holding other factors constant, the duration of a bond will increase with the maturity of the bond, and decrease with the coupon rate on the bond.

Duration: Comparing Approaches

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Operating Income versus Interest Rates

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- Regressing changes in operating cash flow against changes in interest rates over this period yields the following regression –

$$\begin{array}{rcl} \text{Change in Operating Income} & = & 0.1958 \quad + \quad 6.59 \text{ (Change in Interest Rates)} \\ & & (2.74) \quad \quad \quad (1.06) \end{array}$$

Conclusion: Disney's operating income, unlike its firm value, has moved with interest rates.

- Generally speaking, the operating cash flows are smoothed out more than the value and hence will exhibit lower duration than the firm value.

II. Sensitivity to Changes in GDP/ GNP

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- How sensitive is the firm's value and operating income to changes in the GNP/GDP?
- The answer to this question is important because
 - it provides insight into whether the firm's cash flows are cyclical and
 - whether the cash flows on the firm's debt should be designed to protect against cyclical factors.
- If the cash flows and firm value are sensitive to movements in the economy, the firm will either have to issue less debt overall, or add special features to the debt to tie cash flows on the debt to the firm's cash flows.

Regression Results

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- Regressing changes in firm value against changes in the GDP over this period yields the following regression –

$$\text{Change in Firm Value} = 0.0826 + 8.89 (\text{GDP Growth})$$

(0.65) (2.36)

Conclusion: Disney is sensitive to economic growth

- Regressing changes in operating cash flow against changes in GDP over this period yields the following regression –

$$\text{Change in Operating Income} = 0.04 + 6.06 (\text{GDP Growth})$$

(0.22) (1.30)

Conclusion: Disney's operating income is sensitive to economic growth as well.

III. Sensitivity to Currency Changes

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- How sensitive is the firm's value and operating income to changes in exchange rates?
- The answer to this question is important, because
 - ▣ it provides a measure of how sensitive cash flows and firm value are to changes in the currency
 - ▣ it provides guidance on whether the firm should issue debt in another currency that it may be exposed to.
- If cash flows and firm value are sensitive to changes in the dollar, the firm should
 - ▣ figure out which currency its cash flows are in;
 - ▣ and issued some debt in that currency

Regression Results

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- Regressing changes in firm value against changes in the dollar over this period yields the following regression –

$$\begin{array}{rcl} \text{Change in Firm Value} = & 0.17 & -2.04 (\text{Change in Dollar}) \\ & (2.63) & (0.80) \end{array}$$

Conclusion: Disney's value is sensitive to exchange rate changes, decreasing as the dollar strengthens.

- Regressing changes in operating cash flow against changes in the dollar over this period yields the following regression –

$$\begin{array}{rcl} \text{Change in Operating Income} = & 0.19 & -1.57 (\text{Change in Dollar}) \\ & (2.42) & (1.73) \end{array}$$

Conclusion: Disney's operating income is also impacted by the dollar. A stronger dollar seems to hurt operating income.

IV. Sensitivity to Inflation

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- How sensitive is the firm's value and operating income to changes in the inflation rate?
- The answer to this question is important, because
 - it provides a measure of whether cash flows are positively or negatively impacted by inflation.
 - it then helps in the design of debt; whether the debt should be fixed or floating rate debt.
- If cash flows move with inflation, increasing (decreasing) as inflation increases (decreases), the debt should have a larger floating rate component.

Regression Results

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- Regressing changes in firm value against changes in inflation over this period yields the following regression –

$$\text{Change in Firm Value} = 0.18 + 2.71 (\text{Change in Inflation Rate})$$

(2.90) (0.80)

Conclusion: Disney's firm value does seem to increase with inflation, but not by much (statistical significance is low)

- Regressing changes in operating cash flow against changes in inflation over this period yields the following regression –

$$\text{Change in Operating Income} = 0.22 + 8.79 (\text{Change in Inflation Rate})$$

(3.28) (2.40)

Conclusion: Disney's operating income seems to increase in periods when inflation increases, suggesting that Disney does have pricing power.

Summarizing...

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- Looking at the four macroeconomic regressions, we would conclude that
 - ▣ Disney's assets collectively have a duration of about 3 years
 - ▣ Disney is increasingly affected by economic cycles
 - ▣ Disney is hurt by a stronger dollar
 - ▣ Disney's operating income tends to move with inflation
- All of the regression coefficients have substantial standard errors associated with them. One way to reduce the error (a la bottom up betas) is to use sector-wide averages for each of the coefficients.

Bottom-up Estimates

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These weights reflect the estimated values of the businesses

	Sensitivity of firm value to				
Business	Interest rates	GDP Growth	Inflation	Currency	Disney weights
Studio entertainment	-3.7	0.56	1.41	-1.23	9.88%
Media networks	-4.5	0.7	-3.05	-1.58	58.92%
Park resorts	-6.47	0.22	-1.45	-3.21	29.88%
Consumer products	-4.88	0.13	-5.51	-3.01	1.32%
<i>Disney</i>	<i>-5.01</i>	<i>0.54</i>	<i>-2.16</i>	<i>-2.05</i>	

Recommendations for Disney

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- The debt issued should be long term and should have duration of about 5 years.
- A significant portion of the debt should be floating rate debt, reflecting Disney's capacity to pass inflation through to its customers and the fact that operating income tends to increase as interest rates go up.
- Given Disney's sensitivity to a stronger dollar, a portion of the debt should be in foreign currencies. The specific currency used and the magnitude of the foreign currency debt should reflect where Disney makes its revenues. Based upon 2008 numbers at least, this would indicate that about 20% of the debt should be in Euros and about 10% of the debt in Japanese Yen reflecting Disney's larger exposures in Europe and Asia. As its broadcasting businesses expand into Latin America, it may want to consider using either Mexican Peso or Brazilian Real debt as well.

Analyzing Disney's Current Debt

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- Disney has \$16 billion in debt with a face-value weighted average maturity of 5.38 years. Allowing for the fact that the maturity of debt is higher than the duration, this would indicate that Disney's debt is of the right maturity.
- Of the debt, about 10% is yen denominated debt but the rest is in US dollars. Based on our analysis, we would suggest that Disney increase its proportion of debt in other currencies to about 20% in Euros and about 5% in Chinese Yuan.
- Disney has no convertible debt and about 24% of its debt is floating rate debt, which is appropriate given its status as a mature company with significant pricing power. In fact, we would argue for increasing the floating rate portion of the debt to about 40%.

Adjusting Debt at Disney

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- It can swap some of its existing fixed rate, dollar debt for floating rate, foreign currency debt. Given Disney's standing in financial markets and its large market capitalization, this should not be difficult to do.
- If Disney is planning new debt issues, either to get to a higher debt ratio or to fund new investments, it can use primarily floating rate, foreign currency debt to fund these new investments. Although it may be mismatching the funding on these investments, its debt matching will become better at the company level.

Debt Design for other firms..

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<i>Company</i>	<i>The "right" debt</i>
Bookscape	<ul style="list-style-type: none"> • Long-term, because the store is a long-term investment; • Dollar-denominated, because all the cash flows are in dollars; and • Fixed rate debt, because Bookscape's lack of pricing power makes it unlikely that they can keep pace with inflation. <p><i>Existing debt: is an operating lease, which matches up to the right debt.</i></p>
Aracruz	<ul style="list-style-type: none"> • Long term, because a typical paper plant has a life in excess of twenty years; • Dollar-denominated, because the cash inflows are primarily in dollars; and • Given the volatility of paper prices, we would try to link the interest rate on debt to pulp prices, if possible. <p><i>Existing debt: is too \$R based and has average maturity of 3.2 years. While Aracruz is in no position to renegotiate this debt right now, it should consider shifting to longer term, US \$ based debt.</i></p>
Tata Chemicals	<ul style="list-style-type: none"> • Medium to long term debt, reflecting the life of the plant and equipment used to produce its fertilizer and chemical products • Fixed rate debt, since the company is unlikely to have much pricing power in this business. • Rupee denominated debt, since almost 90% of Tata Chemical's revenues come from India. <p><i>Existing debt: matches up for the most part though average duration (3 years) is lower than we would expect.</i></p>