



# Anatomy of a Leveraged Buyout: Leverage + Control + Going Private

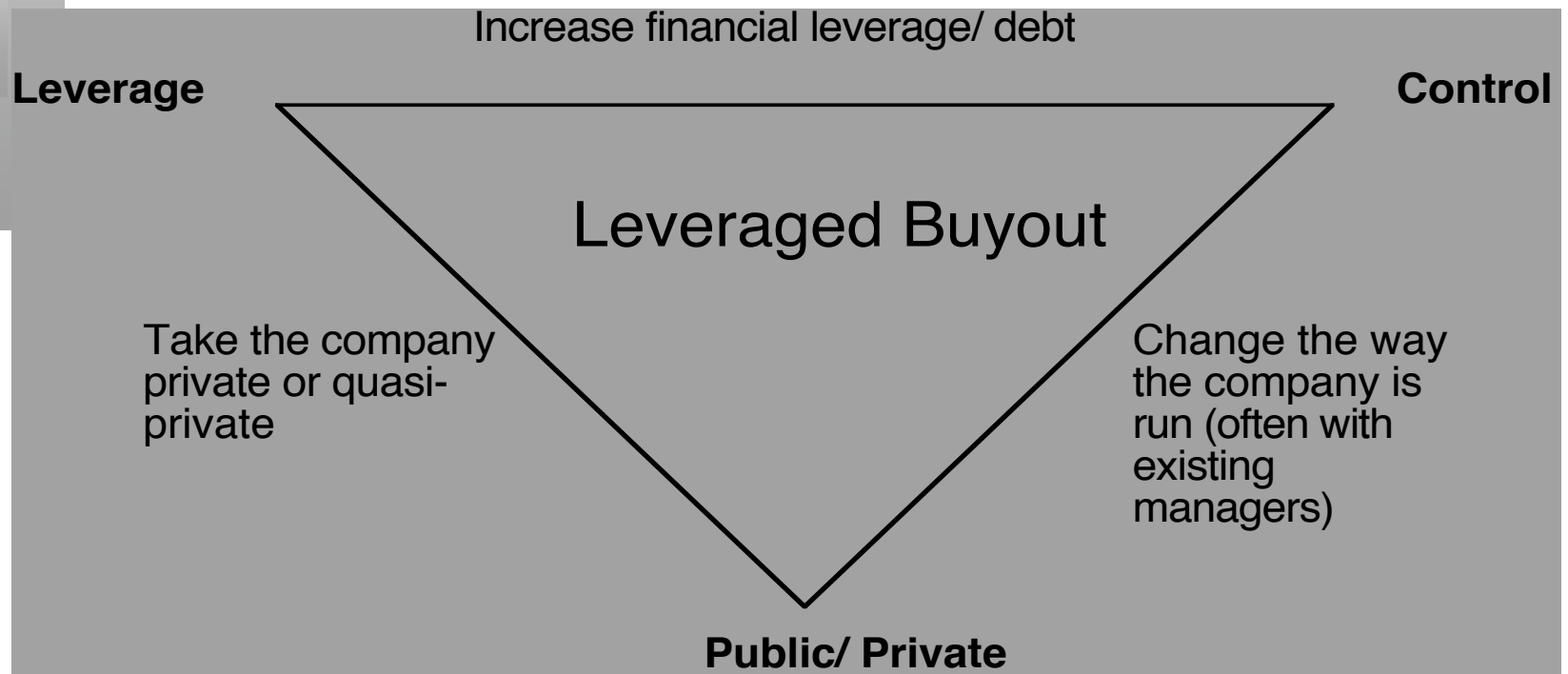
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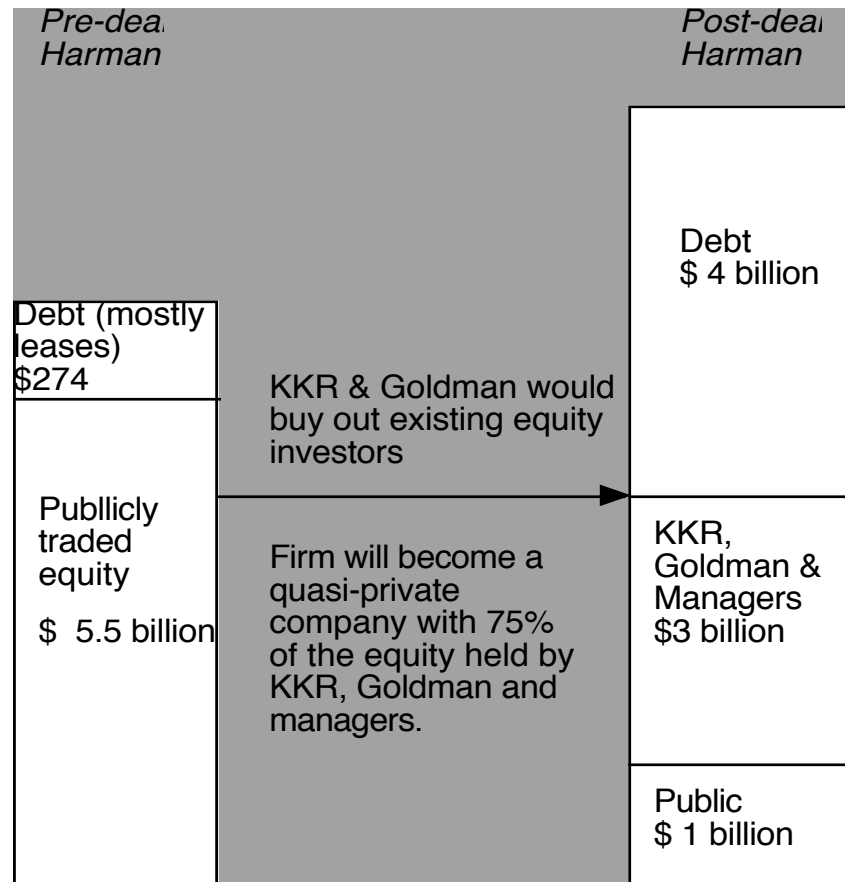
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Stern School of Business

# Leveraged Buyouts: The Three Possible Components



# One Example: The Harman Deal



## Issues in valuing leveraged buyouts

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- Given that there are three significant changes - an increase in financial leverage, a change in control/management at the firm and a transition from public to private status - what are the valuation consequences of each one?
- Are there correlations across the three? In other words, is the value of financial leverage increased or decreased by the fact that control is changing at the same time? How does going private alter the way we view the first two?
- Given that you are not required to incorporate all three in a transaction, when does it make sense to do a leveraged buyout? How about just a buyout? How about just going for a change in control? Just a change in leverage?



# I. Value and Leverage

# What is debt...

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- General Rule: Debt generally has the following characteristics:
  - Commitment to make fixed payments in the future
  - The fixed payments are tax deductible
  - Failure to make the payments can lead to either default or loss of control of the firm to the party to whom payments are due.
- Using this principle, you should include the following in debt
  - All interest bearing debt, short as well as long term
  - All lease commitments, operating as well as capital

# The fundamental question: Does the mix of debt and equity affect the value of a business?

Assets		Liabilities	
Existing Investments Generate cashflows today Includes long lived (fixed) and short-lived (working capital) assets	Assets in Place	Debt	Fixed Claim on cash flows Little or No role in management <i>Fixed Maturity</i> <i>Tax Deductible</i>
Expected Value that will be created by future investments	Growth Assets	Equity	Residual Claim on cash flows Significant Role in management <i>Perpetual Lives</i>

Different Value? ←

→ Different Financing Mix?

## A basic proposition about debt and value

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- For debt to affect value, there have to be tangible benefits and costs associated with using debt instead of equity.
  - If the benefits exceed the costs, there will be a gain in value to equity investors from the use of debt.
  - If the benefits exactly offset the costs, debt will not affect value
  - If the benefits are less than the costs, increasing debt will lower value



# Debt: The Basic Trade Off

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## **Advantages of Borrowing**

### *1. Tax Benefit:*

Higher tax rates --> Higher tax benefit

### *2. Added Discipline:*

Greater the separation between managers and stockholders --> Greater the benefit

## **Disadvantages of Borrowing**

### *1. Bankruptcy Cost:*

Higher business risk --> Higher Cost

### *2. Agency Cost:*

Greater the separation between stockholders & lenders --> Higher Cost

### *3. Loss of Future Financing Flexibility:*

Greater the uncertainty about future financing needs --> Higher Cost

## A Hypothetical Scenario

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- (a) There are no taxes
- (b) Managers have stockholder interests at heart and do what's best for stockholders.
- (c) No firm ever goes bankrupt
- (d) Equity investors are honest with lenders; there is no subterfuge or attempt to find loopholes in loan agreements
- (e) Firms know their future financing needs with certainty

What happens to the trade off between debt and equity? How much should a firm borrow?

# The Miller-Modigliani Theorem

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- In an environment, where there are no taxes, default risk or agency costs, capital structure is irrelevant.
- The value of a firm is independent of its debt ratio and the cost of capital will remain unchanged as the leverage changes.

## But here is the real world...

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- In a world with taxes, default risk and agency costs, it is no longer true that debt and value are unrelated.
- In fact, increasing debt can increase the value of some firms and reduce the value of others.
- For the same firm, debt can increase value up to a point and decrease value beyond that point.

## Tools for assessing the effects of debt

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- The Cost of Capital Approach: The optimal debt ratio is the one that minimizes the cost of capital for a firm.
- The Enhanced Cost of Capital Approach: The optimal debt ratio is the one that creates a combination of cash flows and cost of capital that maximizes firm value.
- The Adjusted Present Value Approach: The optimal debt ratio is the one that maximizes the overall value of the firm.

## a. The Cost of Capital Approach

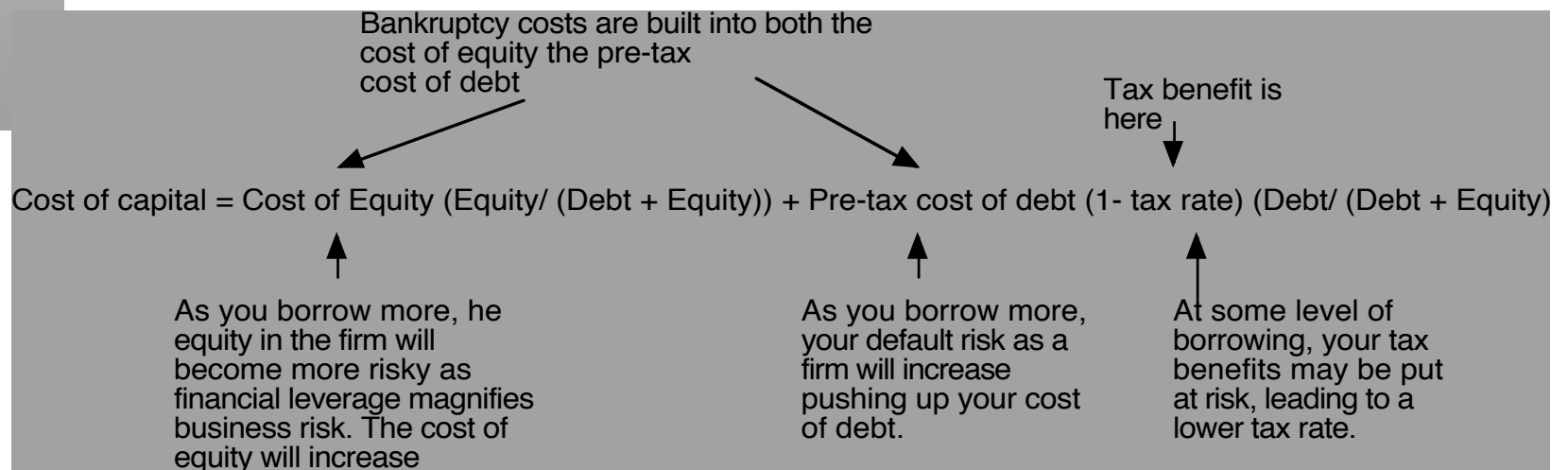
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Operating Cash flow is assumed to be unaffected by changing debt ratio

$$\text{Value of Firm} = \sum_{t=1}^{t=\infty} \frac{\text{Free Cash Flow to the Firm}_t}{(1 + \text{Cost of Capital})^t}$$

If changing the debt ratio changes the cost of capital, the optimal debt ratio is the one that minimizes the cost of capital.

# How the debt trade off manifests itself in the cost of capital...



## The mechanics of cost of capital computation..

*Cost of Equity =  $R_f + \text{Beta (Equity Risk Premium)}$*

Start with the beta of the business (asset or unlevered beta)

As the firm borrows more, recompute the debt to equity ratio (D/E) .

Compute a levered beta based on this debt to equity ratio  
Levered beta = Unlevered beta  $(1 + (1-t) (D./E))$

Estimate the cost of equity based on the levered beta

*Pre-tax cost of debt =  $R_f + \text{Default spread}$*

Estimate the interest expense at each debt level

Compute an interest coverage ratio based on expense  
Interest coverage ratio = Operating income / Interest expense

Estimate a synthetic rating at each level of debt

Use the rating to come up with a default spread, which when added to the riskfree rate should yield the pre-tax cost of debt



## Harman : Working out the mechanics..

Asset or unlevered beta = 1.45

Marginal tax rate = 38%

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	1.45	10.30%	AAA	4.85%	38.00%	3.01%	10.30%	\$5,660
10%	1.55	10.70%	AAA	4.85%	38.00%	3.01%	9.93%	\$6,063
20%	1.67	11.20%	A	5.35%	38.00%	3.32%	9.62%	\$6,443
30%	1.83	11.84%	BB	7.00%	38.00%	4.34%	9.59%	\$6,485
40%	2.05	12.70%	B-	10.50%	38.00%	6.51%	10.22%	\$5,740
50%	2.39	14.04%	CC	14.50%	35.46%	9.36%	11.70%	\$4,507
60%	3.06	16.74%	C	16.50%	25.97%	12.21%	14.02%	\$3,342
70%	4.08	20.82%	C	16.50%	22.26%	12.83%	15.22%	\$2,938
80%	6.12	28.98%	C	16.50%	19.48%	13.29%	16.42%	\$2,616
90%	12.98	56.40%	D	24.50%	11.66%	21.64%	25.12%	\$1,401

As the cost of capital decreases, the firm value increases. The change in firm value is computed based upon the change in the cost of capital and a perpetual growth rate.

The optimal debt ratio for Harman Audio is about 30% of overall firm value. In September 2007, the overall firm value (debt + equity) was about \$ 6 billion, yielding an optimal dollar debt of approximately \$1.8 billion.

## Harman's existing debt

- The market value of interest bearing debt can be estimated:
  - In September 2007, Harman had book value of debt of \$76.5 million, interest expenses of \$9.6 million, a current cost of borrowing of 4.85% and an weighted average maturity of 4 years.

Estimated MV of Harman Debt =  $9.6 \left[ \frac{1 - \frac{1}{(1.0485)^4}}{.0485} \right] + \frac{76.5}{(1.0485)^4} = \$97 \text{ million}$

- Harman has lease commitments

Year	Commitment	Present Value
1	\$43.50	\$41.49
2	\$40.90	\$37.20
3	\$38.50	\$33.40
4	\$23.90	\$19.78
5	\$19.20	\$15.15
6-?	\$31.45	\$126.58
Debt Value of leases =		\$273.60

- Debt outstanding at Harman = \$ 97 + \$ 274= \$ 371 million

## Limitations of the Cost of Capital approach

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- It is static: The most critical number in the entire analysis is the operating income. If that changes, the optimal debt ratio will change.
- It ignores indirect bankruptcy costs: The operating income is assumed to stay fixed as the debt ratio and the rating changes.
- Beta and Ratings: It is based upon rigid assumptions of how market risk and default risk get borne as the firm borrows more money and the resulting costs.

## b. Enhanced Cost of Capital Approach

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- Distress cost affected operating income: In the enhanced cost of capital approach, the indirect costs of bankruptcy are built into the expected operating income. As the rating of the firm declines, the operating income is adjusted to reflect the loss in operating income that will occur when customers, suppliers and investors react.
- Dynamic analysis: Rather than look at a single number for operating income, you can draw from a distribution of operating income (thus allowing for different outcomes).

## Estimating the Distress Effect- Harman

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<i>Rating</i>	<i>Drop in EBITDA</i>
A or higher	No effect
A-	2.00%
BBB	5.00%
BB +	10.00%
BB	15.00%
B+	20.00%
B	20.00%
B-	25.00%
CCC	40.00%
CC	40.00%
C	40.00%
D	50.00%

Indirect bankruptcy costs manifest themselves when the rating drops to A and then start becoming larger as the rating drops below investment grade.

## The Optimal Debt Ratio with Indirect Bankruptcy Costs

Debt Ratio	Beta	Cost of Equity	Bond Rating	Interest rate on debt	Tax Rate	Cost of Debt (after-tax)	WACC	Firm Value (G)
0%	1.45	10.30%	AAA	4.85%	38.00%	3.01%	10.30%	\$5,549
10%	1.55	10.70%	AAA	4.85%	38.00%	3.01%	9.93%	\$6,141
20%	1.67	11.20%	A-	5.50%	38.00%	3.41%	9.64%	\$6,480
30%	1.92	12.17%	C	16.50%	24.55%	12.45%	12.26%	\$1,276
40%	2.33	13.82%	D	24.50%	8.94%	22.31%	17.21%	\$365
50%	2.80	15.68%	D	24.50%	7.16%	22.75%	19.21%	\$308
60%	3.49	18.48%	D	24.50%	5.96%	23.04%	21.21%	\$266
70%	4.66	23.14%	D	24.50%	5.11%	23.25%	23.21%	\$234
80%	6.99	32.46%	D	24.50%	4.47%	23.40%	25.21%	\$209
90%	13.98	60.42%	D	24.50%	3.98%	23.53%	27.21%	\$189

Optimal debt ratio is at 20% (\$1.2 billion). Beyond 20%, the operating income effect will overwhelm any potential tax benefits.

## c. The APV Approach to Optimal Capital Structure

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- In the adjusted present value approach, the value of the firm is written as the sum of the value of the firm without debt (the unlevered firm) and the effect of debt on firm value
- Firm Value = Unlevered Firm Value + (Tax Benefits of Debt - Expected Bankruptcy Cost from the Debt)
- The optimal dollar debt level is the one that maximizes firm value

## Implementing the APV Approach

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- Step 1: Estimate the unlevered firm value. This can be done in one of two ways:
  1. Estimating the unlevered beta, a cost of equity based upon the unlevered beta and valuing the firm using this cost of equity (which will also be the cost of capital, with an unlevered firm)
  2. Alternatively,  $\text{Unlevered Firm Value} = \text{Current Market Value of Firm} - \text{Tax Benefits of Debt (Current)} + \text{Expected Bankruptcy cost from Debt}$
- Step 2: Estimate the tax benefits at different levels of debt. The simplest assumption to make is that the savings are perpetual, in which case
  - $\text{Tax benefits} = \text{Dollar Debt} * \text{Tax Rate}$
- Step 3: Estimate a probability of bankruptcy at each debt level, and multiply by the cost of bankruptcy (including both direct and indirect costs) to estimate the expected bankruptcy cost.



## Harman: APV at Debt Ratios

Based upon  
synthetic rating

Bankruptcy cost  
estimated to be  
25% of firm value

Debt Ratio	\$ Debt	Tax Rate	Unlevered Firm	Tax Benefits	Bond Rating	Probability of D	Expected Bankr	Value of Leverage
0%	\$0	38.00%	\$5,596	\$0	AAA	0.01%	\$0	\$5,596
10%	\$563	38.00%	\$5,596	\$214	AAA	0.01%	\$0	\$5,810
20%	\$1,127	38.00%	\$5,596	\$428	A	0.53%	\$8	\$6,016
30%	\$1,690	38.00%	\$5,596	\$642	B+	19.28%	\$301	\$5,938
40%	\$2,253	38.00%	\$5,596	\$856	CC	65.00%	\$1,049	\$5,404
50%	\$2,817	35.95%	\$5,596	\$1,013	CC	65.00%	\$1,074	\$5,535
60%	\$3,380	17.73%	\$5,596	\$599	D	100.00%	\$1,549	\$4,647
70%	\$3,943	15.20%	\$5,596	\$599	D	100.00%	\$1,549	\$4,647
80%	\$4,506	13.30%	\$5,596	\$599	D	100.00%	\$1,549	\$4,647
90%	\$5,070	11.82%	\$5,596	\$599	D	100.00%	\$1,549	\$4,647

Based on the adjusted present value model, the optimal dollar debt level at Harman is \$1.12 billion. The firm value is maximized at that point

## The “key” determinants of debt capacity are tax rates and cash flows

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- In all three approaches, the capacity of a firm to borrow money is determined by its cash flows, not its market value or growth prospects.
  - The greater the cash flows generated are as a percent of enterprise value, the higher the optimal debt ratio of a firm.
  - The more stable and predictable these cash flows are, the higher the optimal debt ratio of a firm.
- The most significant benefit of debt is a tax benefit. Higher tax rates should lead to higher debt ratios. With a zero tax rate the optimal debt ratio will be zero.

Implication: Mature or declining firms in businesses that generate high and predictable cash flows will be the best candidates for financial leverage.

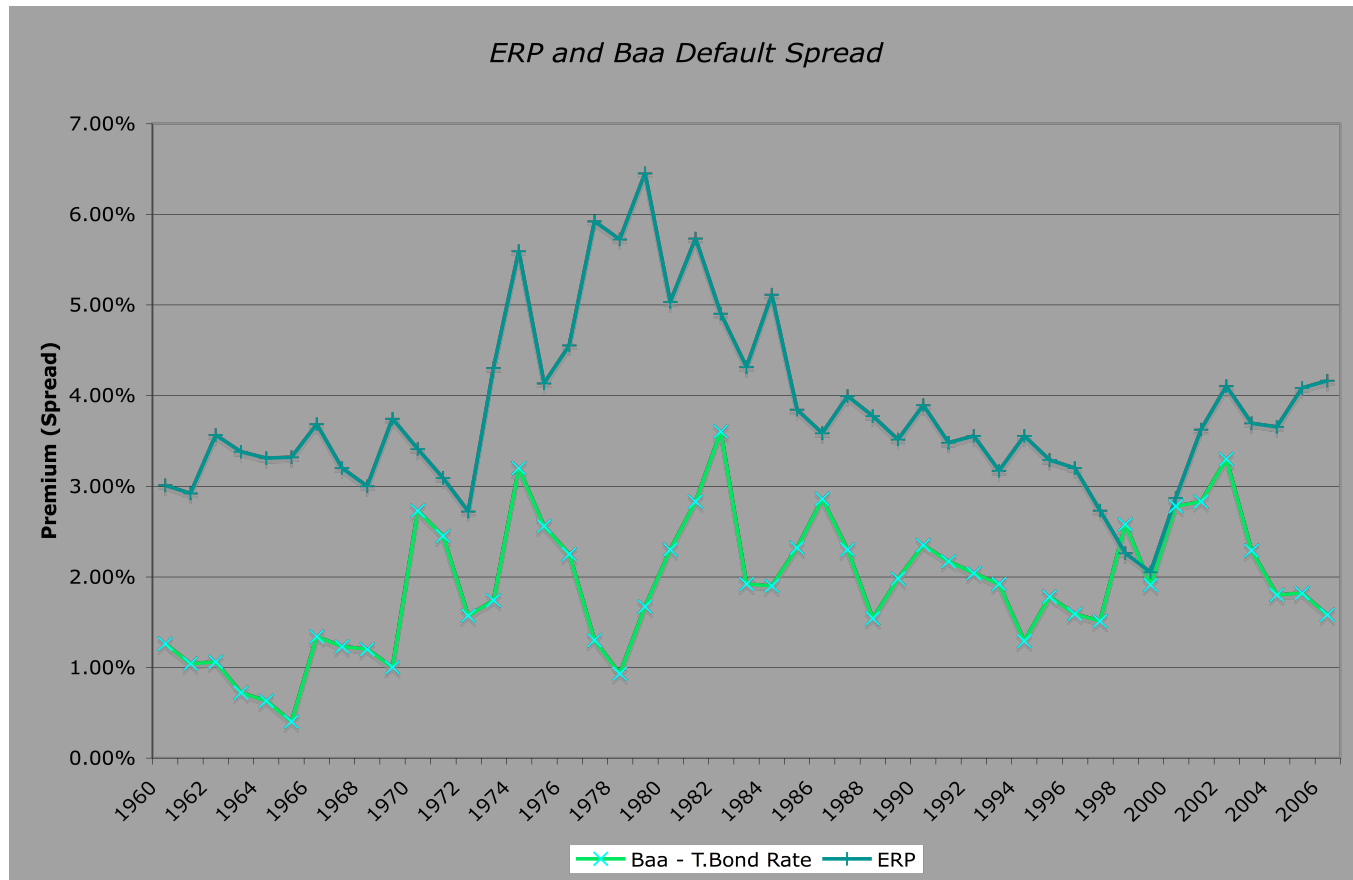
- Does Harman pass the test?

## The macro environment has a relatively small effect on optimal debt ratios

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- Myth 1: Optimal debt ratios will increase as interest rates decline. While it is true that lower interest rates push down the cost of debt, they also push down the cost of equity.
- Myth 2: Optimal debt ratios will increase as default spreads decline. Default spreads have historically declined in buoyant markets, which also push equity risk premiums down. In other words, both the cost of debt and equity become cheaper.

But bond markets and equity markets sometime deviate...





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## II. The Value of Control

## Why control matters...

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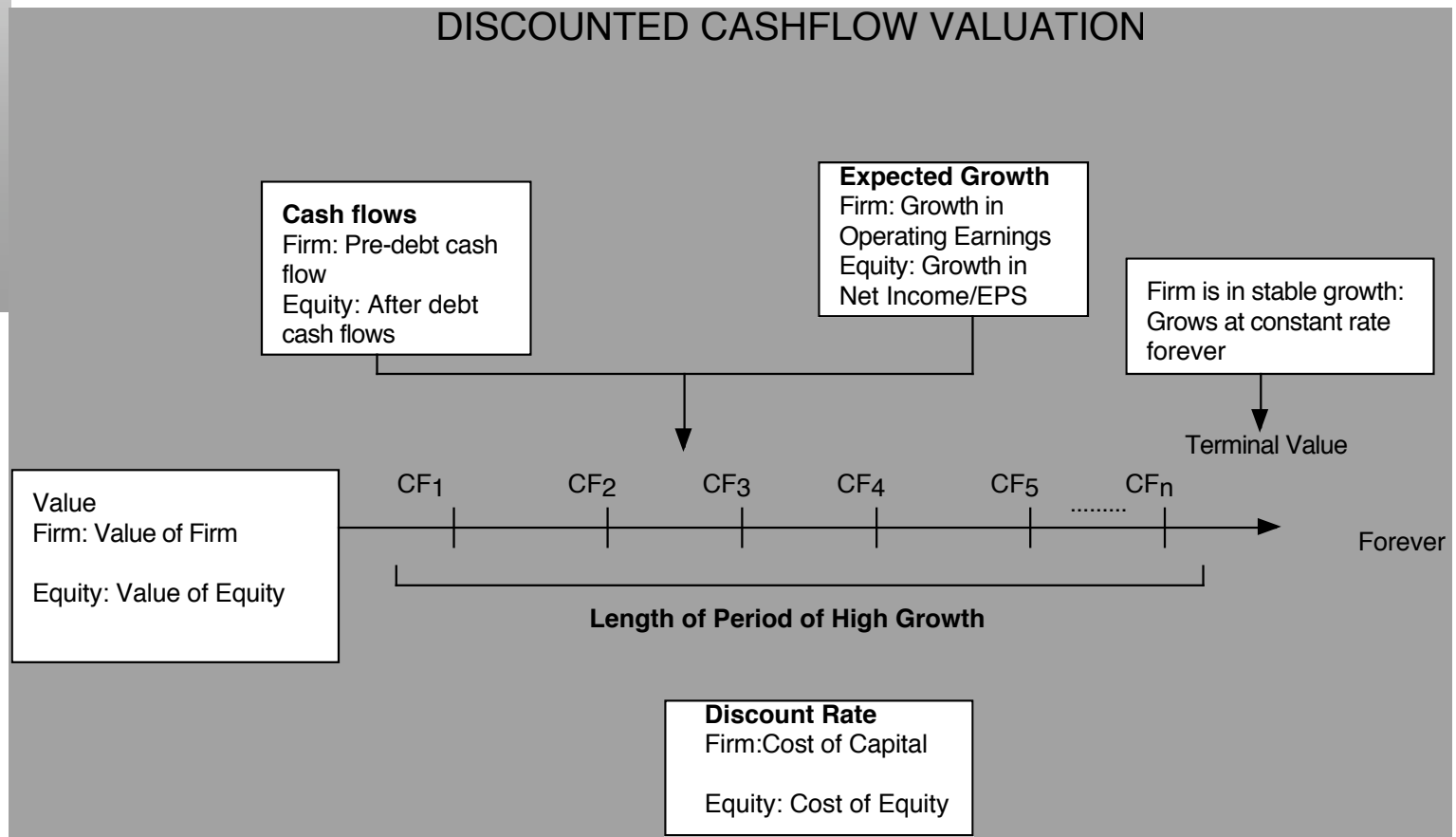
- When valuing a firm, the value of control is often a key factor in determining value.
- For instance,
  - In acquisitions, acquirers often pay a premium for control that can be substantial
  - When buying shares in a publicly traded company, investors often pay a premium for voting shares because it gives them a stake in control.
  - In private companies, there is often a discount attached to buying minority stakes in companies because of the absence of control.

## What is the value of control?

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- The value of controlling a firm derives from the fact that you believe that you or someone else would operate the firm differently (and better) from the way it is operated currently.
- The expected value of control is the product of two variables:
  - the change in value from changing the way a firm is operated
  - the probability that this change will occur

# The determinants of value





# Harman: Status Quo

**Current Cashflow to Firm**  
 EBIT(1-t) : 248  
 - Nt CpX 67  
 - Chg WC 37  
 = FCFF 144  
 Reinvestment Rate =  $104/248=42\%$

Reinvestment Rate  
42.00%

**Expected Growth in EBIT (1-t)**  
 $.42 * .1456 = .0613$   
**6.13%**

Return on Capital  
14.56%

Stable Growth  
 $g = 4\%$ ; Beta = 1.00;  
 Cost of capital = 7.40%  
 ROC = 12%; Tax rate = 38%  
 Reinvestment Rate = 33.33%

Terminal Value<sub>5</sub> =  $231(.074 - .04) = 6799$

Op. Assets 4,886  
 + Cash: 106  
 - Debt 350  
 = Equity 4,641  
 - Options 119  
 Value/Share \$69.32

Year	1	2	3	4	5
EBIT (1-t)	\$263	\$279	\$296	\$314	\$334
- Reinvestment	\$111	\$117	\$125	\$132	\$140
FCFF	\$152	\$162	\$172	\$182	\$193

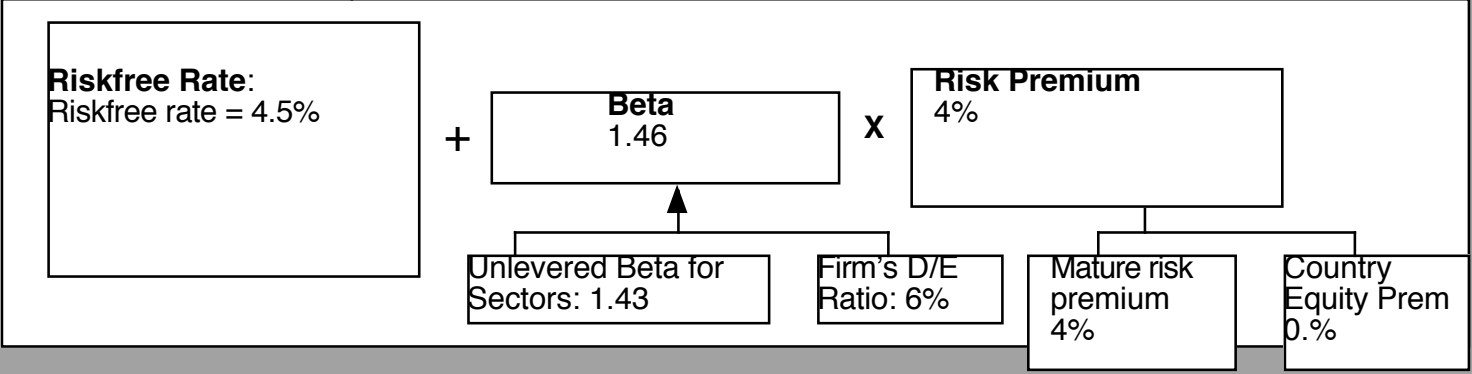
Term Yr  
 346.9  
 115.6  
 231.3

Discount at Cost of Capital (WACC) =  $10.34\% (.94) + 3.01\% (0.06) = 9.91\%$

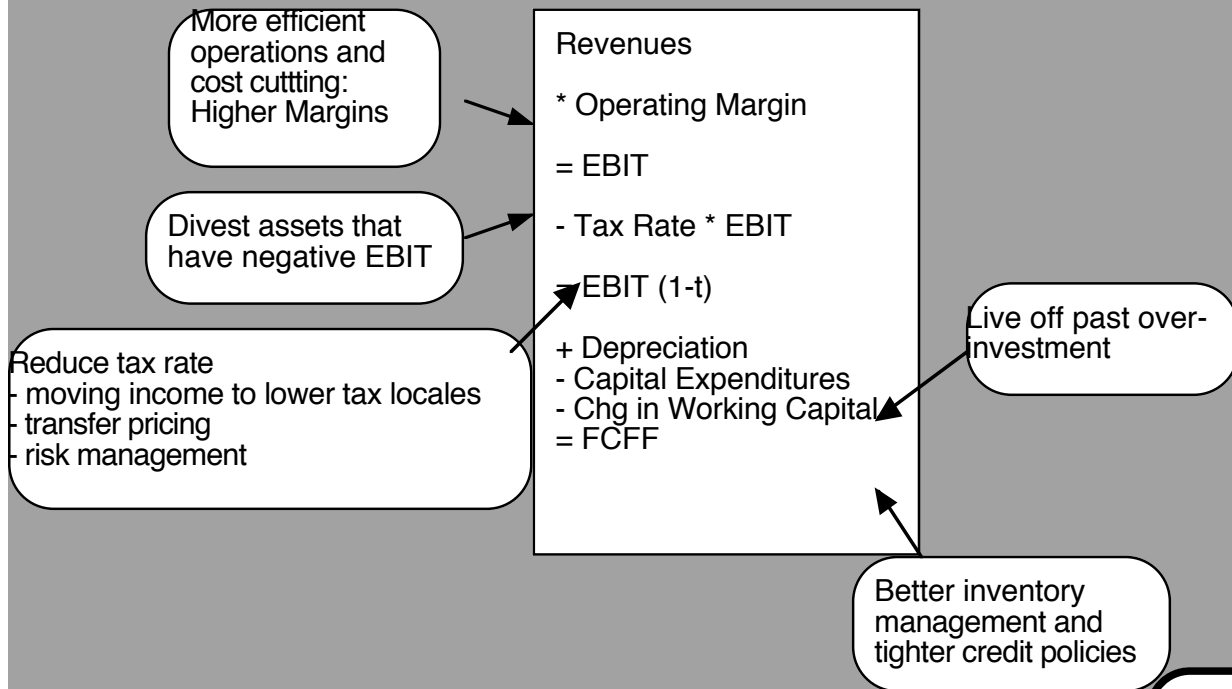
**Cost of Equity**  
10.34%

**Cost of Debt**  
 $(4.5\% + \% + .35\%)(1 - .38)$   
 = 3.01%

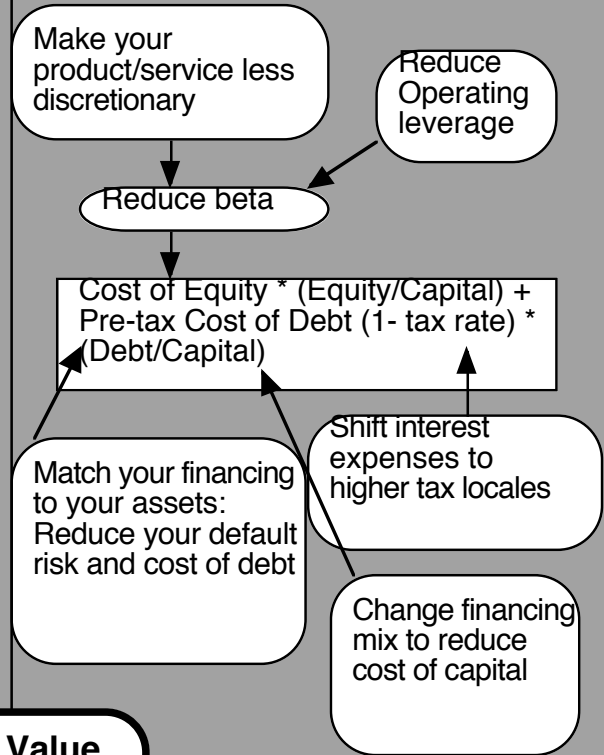
**Weights**  
 E = 94% D = 6%



*Increase Cash Flows*

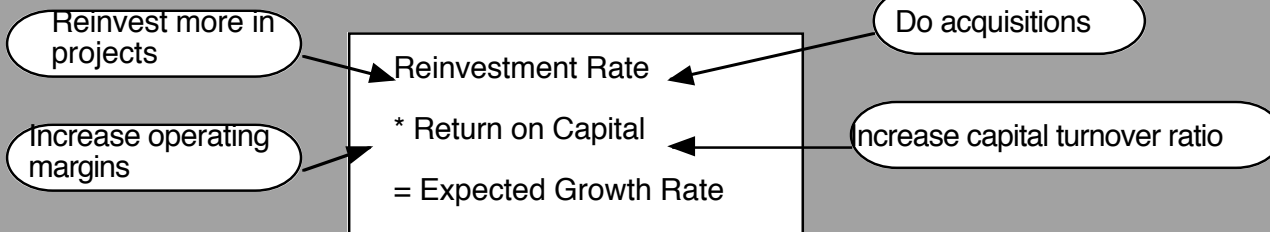


*Reduce the cost of capital*

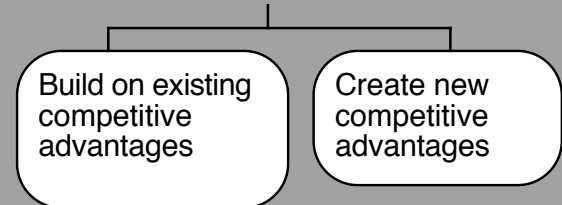


**Firm Value**

*Increase Expected Growth*



*Increase length of growth period*



# Harman: Restructured

**Current Cashflow to Firm**  
 EBIT(1-t) : 248  
 - Nt CpX 67  
 - Chg WC 37  
 = FCFF 144  
 Reinvestment Rate =  $104/248=42\%$

Reinvestment Rate  
70.00%

**Expected Growth in EBIT (1-t)**  
 $.70 \times .15 = .105$   
**10.5%**

Return on Capital  
15%

Stable Growth  
 $g = 4\%$ ; Beta = 1.00;  
 Cost of capital = 7.48%  
 ROC = 12%; Tax rate = 38%  
 Reinvestment Rate = 33.33%

Terminal Value<sub>5</sub> =  $284(.074 - .04) = 8155$

Op. Assets 5588  
 + Cash: 106  
 - Debt 350  
 = Equity 5,325  
 - Options 119  
 Value/Share \$80.22

Year	1	2	3	4	5
EBIT (1-t)	\$274.7	\$303.5	\$335.4	\$370.6	\$409.6
- Reinvestment	\$192.3	\$212.5	\$234.8	\$259.4	\$286.7
FCFF	\$82.4	\$91.1	\$100.6	\$111.2	\$122.9

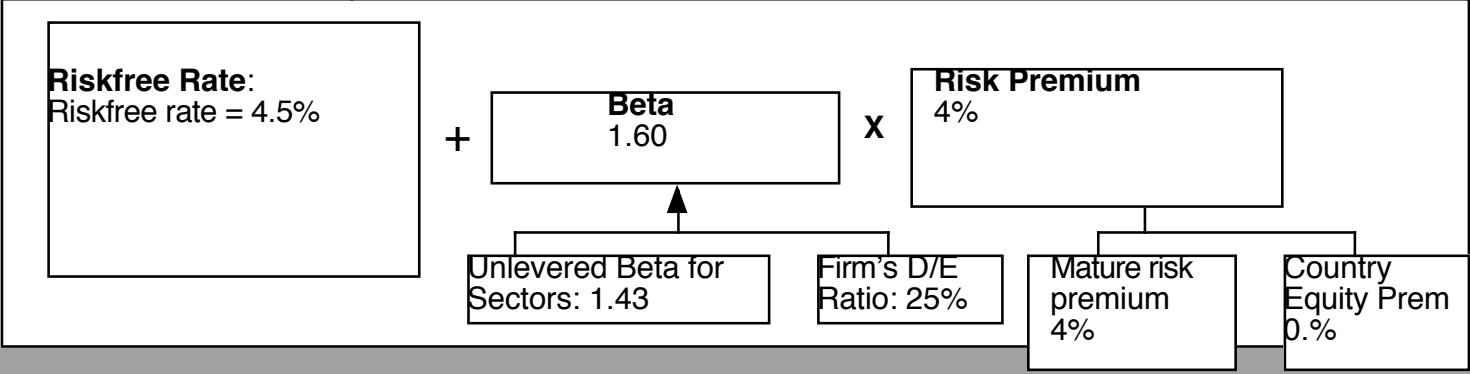
Term Yr  
 425.9  
 141.9  
 284.0

Discount at Cost of Capital (WACC) =  $10.90\% (.80) + 3.41\% (0.20) = 9.40\%$

**Cost of Equity**  
10.90%

**Cost of Debt**  
 $(4.5\% + \% + 1\%)(1 - .38)$   
 = 3.41%

**Weights**  
 E = 80% D = 20%



## Mechanisms for control

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- Put pressure on existing managers to change their ways: With activist investing and proxy contests, you can try to put pressure on existing managers to change their ways.
  - Pluses: Relatively low cost
  - Minuses: Managers may be entrenched
- Change the managers of the company: The board of directors, in exceptional cases, can force out the CEO of a company and change top management.
  - Pluses: Disruptions minimizes
  - Minuses: Board has to be activist and has to pick a good successor
- Acquisitions: If internal processes for management change fail, stockholders have to hope that another firm or outside investor will try to take over the firm (and change its management).

## Implications for the control premium

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- a. *The value of control will vary across firms:* Since the control premium is the difference between the status-quo value of a firm and its optimal value, it follows that the premium should be larger for poorly managed firms and smaller for well managed firms.
- b. *There can be no rule of thumb on control premium:* Since control premium will vary across firms, there can be no simple rule of thumb that applies across all firms. The notion that control is always 20-30% of value cannot be right.
- c. *The control premium should vary depending upon why a firm is performing badly:* The control premium should be higher when a firm is performing badly because of poor management decisions than when a firm's problems are caused by external factors over which management has limited or no control.
- d. *The control premium should be a function of the ease of making management changes:* It is far easier to change the financing mix of an under levered company than it is to modernize the plant and equipment of a manufacturing company with old and outdated plants.

## The perfect “control” target

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- If control is the motive for an acquisition, the target firm should possess the following characteristics:
  - Its stock has underperformed the sector and the market
  - Its margins are lower than the sector with no offsetting benefits (higher turnover ratios, for instance)
  - Its returns on equity and capital lag its costs of equity and capital
  - The fault lies within the company and can be fixed
- Does Harman pass the test?
  - Its operating margin is about 11%; the average for the sector is 8%.
  - Its return on capital is about 15%; its cost of capital is less than 10%;
  - Its stock has earned roughly similar returns as the rest of the sector



### III. The Public/ Private Transition

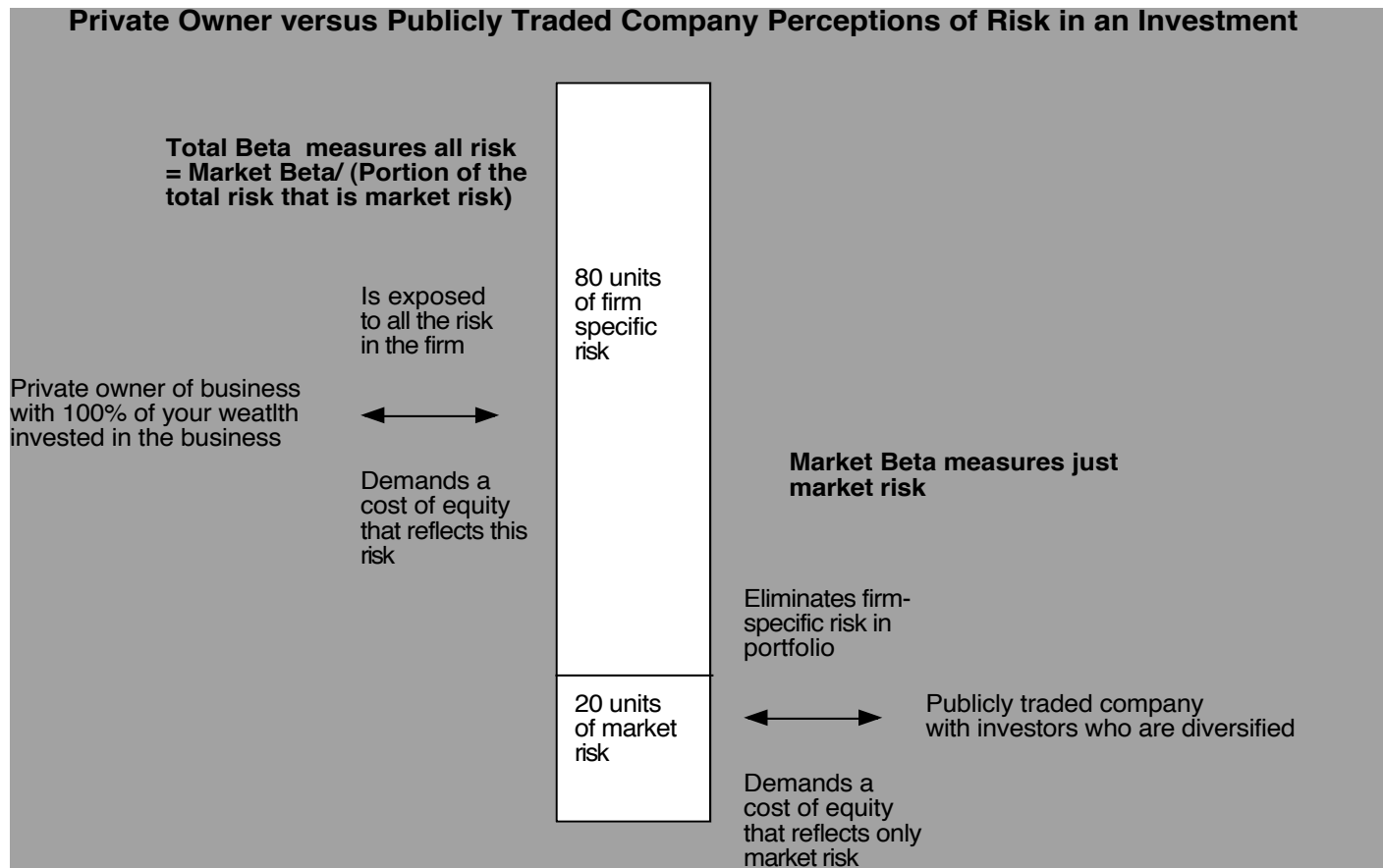
## Why go public?

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- To raise capital: It is true that private companies have access to new sources of capital (private equity, venture capital) that might not have been accessible decades ago, but it is usually less expensive to raise equity in public markets than from private hands.
- To monetize value: Even if a private firm is valuable, the value is an abstraction. Being traded puts a “price” on the company, allowing its owners to get both bragging rights and financial advantages.
- To bear risk more efficiently : Much of the risk in any business is firm-specific and diversifiable. Private business owners are often invested primarily or only in their businesses. The marginal investors in a public company are more likely to be diversified and price the business based on the risks that they perceive.



# Perceived Risk: Private versus Public



## Implications for valuation...

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- In estimating the cost of equity for a publicly traded firm, we use the market beta (or betas) to come up with the cost of equity. Implicitly, we are assuming that the firm-specific risk will be diversified away and not affect the cost of equity.
- For a private business owner, this reasoning is flawed. If he or she is completely invested only in this business, the beta has to reflect total risk and not just market risk.

Total Beta = Market Beta/ Correlation of business with market

- Using this approach for Harman, we arrive at the following:

<i>Valued as</i>	<i>Beta</i>	<i>Cost of capital</i>	<i>Estimated Value of Business</i>
Public firm	1.46	9.91%	\$4.9 billion
Private business	2.97	15.6%	\$2.4 billion

## Why go private?

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- Agency issues: The managers at a publicly traded company may have little incentive to do what's best for the company because it is the stockholders' money that they are playing with.
- Disclosure costs: Publicly traded firms have to meet far more disclosure requirements (FASB, Sarbanes Oxley, SEC) etc. Not only does it cost money to comply but competitors may be getting valuable information on strategies and products.
- Time horizon: To the extent that publicly traded firms are at the mercy of the short term whims of analysts and investors, going private may allow these firms to make decisions that are best for the long term.
- Public pressure: It is easier to bring public pressure on a publicly traded firm (through regulators, investors etc.) than on a private business.

## Minimizing the privatizing cost..

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- The cost of going private (in terms of inefficient risk bearing) is far too large for it to make sense for a publicly traded firm to go private permanently into the hands of a single owner.
- The cost of bearing risk inefficiently can be reduced by
  - Having a portfolio of private businesses (The KKR solution); this increases the correlation with the market and lowers total beta.
  - Going private temporarily (with the intent of going public again); this will result in the higher cost of capital being applied only for the expected “going private” period.
- Even with these actions, there is a significant residual risk borne by private equity investors. That risk can be eliminated by the private equity investors itself going public. (the Blackstone solution)

## Good candidates for going private..

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- Assuming that you are planning to take a company private temporarily and as part of a portfolio of such investments, the best candidates for going private would be companies that have the following characteristics:
  - Top managers are not significant stockholders in the firm
  - The actions that the firm needs to take to fix its problems are likely to be painful in the short term. The pain will be reflected in lower earnings and potentially in actions that create social backlash (layoffs, factory shutdowns...)
  - Analysts following the company are not giving it credit for long term actions and focusing primarily on earnings in the near term.
- Does Harman pass the test?



## IV. Interactions and Conclusion..

## Leverage and Control

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- The good: A firm that is restructuring to fix its operating problems is likely to become healthier and be more likely to pay off its debt obligations. In practical terms, the default risk in this firm decreases because of the possibility of restructuring.
- The bad: Firms that restructure are changing themselves on multiple dimensions - business mix, cash flows and assets. Lenders who do not monitor the process may very well find the assets that secure their loans eliminated from under them and be left holding the bag. The equity investors who control the business can also direct cashflows into their own pockets (management fees...)

Implication: Lenders in leveraged buyouts need to take an active role in the restructuring process and should demand an equity stake in the business.

## Control and Going Private

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- The Good: Since the managers of the business are now the owners, they are likely to become much more aware of default risk and distress (since it is their wealth at play) and be less likely to be overly aggressive risk takers.
- The Bad: If things start going bad and the managers decide that they have little to lose, they will start taking not just more risks but imprudent risks. In effect, their equity positions have become options and more risk makes them more valuable.

Implication: Lenders have to step in much sooner and more aggressively, if firms get into trouble. Letting managers/owners make decisions in their firms can provide a license to steal. It follows that lending should be restricted to businesses with transparent and easily understood operations.



## Leverage and Going Private

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- The Good: You could make the owners of the company personally liable for the loans taken by the company. That increases your security and reduces default costs.
- The Bad: Their lawyers are likely to be more creative and inventive than your lawyers. Assets and cash mysteriously find nooks and crannies to hide...

Implication: Hot deals, where borrowers set the terms, are unlikely to be good deals for lenders.

## The bottom line

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- Each of the three components in an LBO - changing leverage, acquiring control and going private - has effects on value but the effects can be positive or negative.
- The components are separable. There are some firms that are good candidates for leveraged recaps (the L in the LBO), others that are ripe for a hostile acquisition (the B in the LBO) and still others that may benefit from a short period out of the public limelight (the O in the LBO). There may even be a few that are ready for two out of the three components....The list of firms that are right for all three components at the same time is likely to be a very short one.