Business Fundamentals for Analytics

Financial Management

Narayanan Jayaraman
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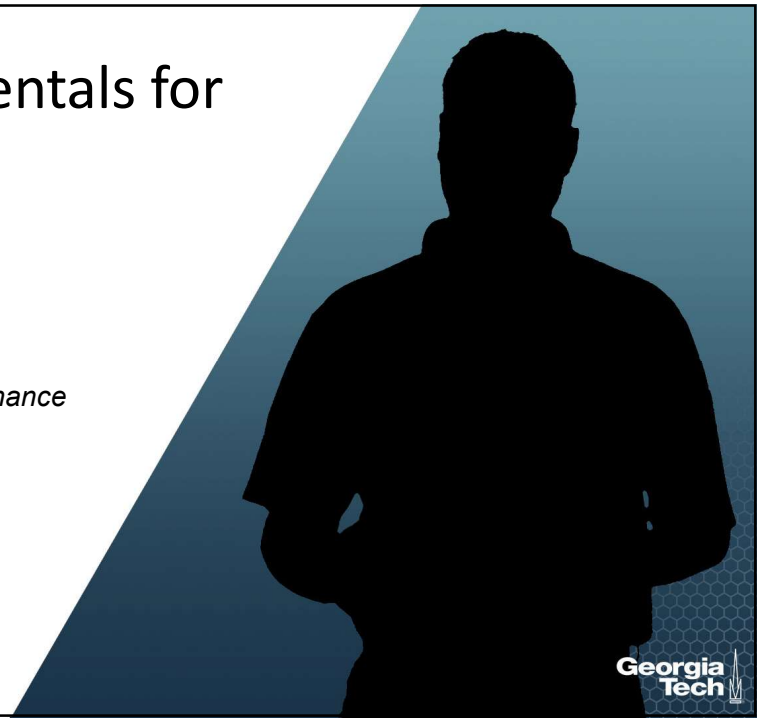
Cost of Capital- Part 1



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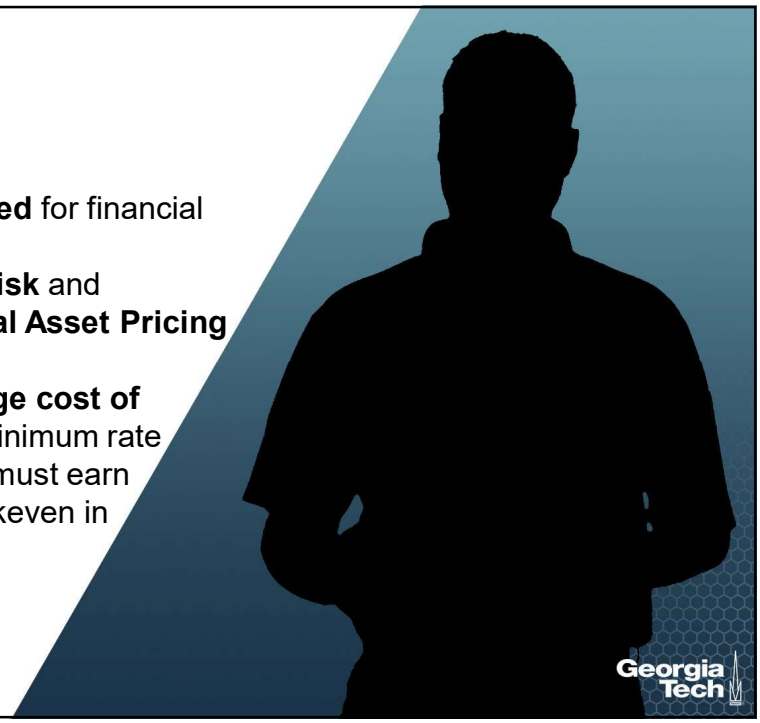
Learning Objectives

- Describe **how risk is measured** for financial instruments.
- Explain the relation between **risk** and **expected return** using **Capital Asset Pricing Model**.
- Estimate the **weighted average cost of capital** that determines the minimum rate of return that the corporation must earn on its invested capital to breakeven in economic terms.



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The Cost of Capital

- The **cost of capital** is the rate of return the corporation must earn on its invested capital in order to compensate for the time value of money and risk.
- The cost of capital is a weighted-average of the cost of debt and the cost of equity. This is called the **Weighted Average Cost of Capital (WACC).**

WACC = Cost of Debt x (1-Tax Rate) x ((Debt/Debt+Equity))
+ Cost of Equity x ((Equity/Debt+Equity))

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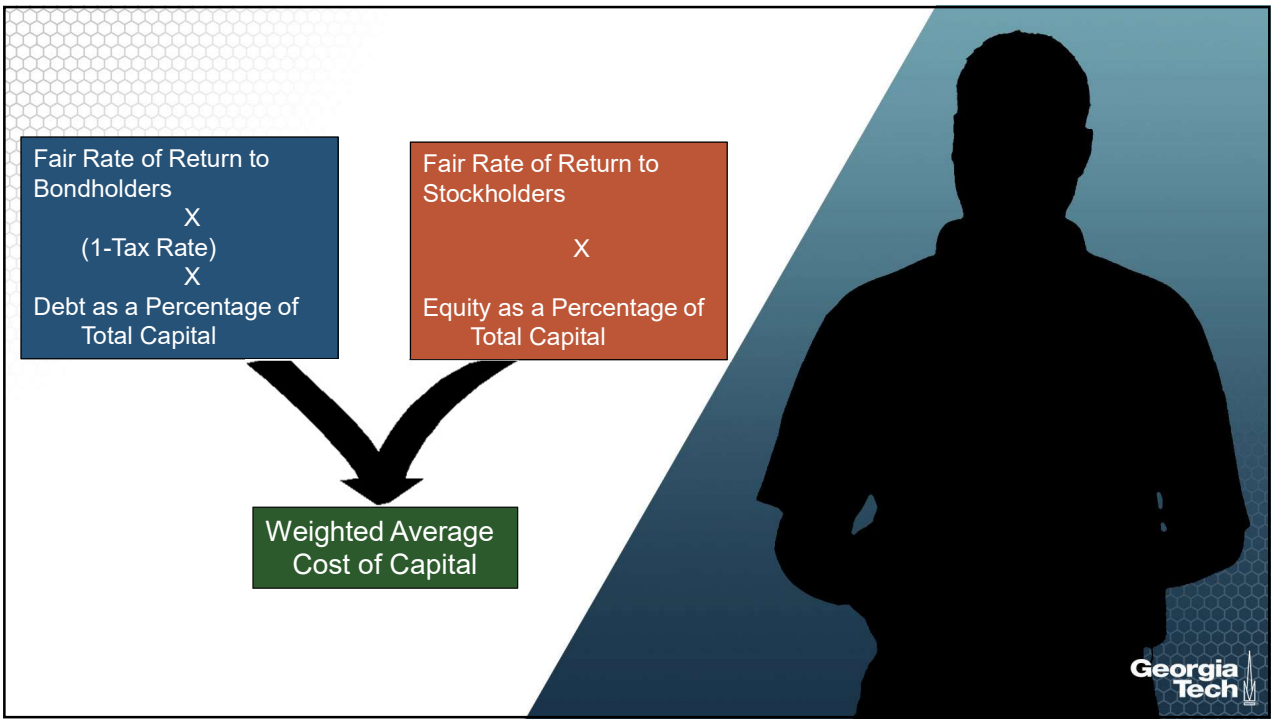

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Factors Influencing the Capital Structure Decision

There are many factors that influence a company's choice of capital structure. However, the four most important factors that influence this decision are:

- Taxes
- Stability of cash flows and earnings
- Financial and operating flexibility
- Type of assets

In general, companies in mature industries with fairly stable cash flows, tangible assets, and few investment opportunities can support higher debt levels

Companies in growth industries with significant investment opportunities, high variable cash flows and intangible assets can support much lower debt levels

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The Cost of Debt

The cost of debt is the rate of interest that the firm would pay on any new bank borrowing or bond issue

The cost of debt depends upon a number of factors, but the two most important factors are:

- Current interest rate on US Treasury bonds with the same maturity
- Default risk

Cost of Debt = Treasury Bond Rate + Default Premium

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Bond Ratings

Investment Grade	Moody's	S&P
High Quality	Aaa Aa	AAA AA
Medium Quality	A Baa	A BBB
Speculative Grade: Low Quality	Ba B	BB B
Lowest Quality	Caa Ca C	CCC CC C

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Moody's Debt Ratings

Aaa	Judged to be of the best quality. They carry the smallest degree of investment risk and are generally referred to as "gilt edged." Interest payments are protected by a large or exceptionally stable margin and principle is secure. While the various protective elements are likely to change, such changes as can be visualized are most unlikely to impair the fundamentally strong position of such issues.
Aa	Judged to be of high quality by all standards. Together with the Aaa group they comprise the high-grade bonds. They are rated lower than the best bonds because margins of protection may not be as large as in Aaa securities or fluctuation of protective elements may be of greater amplitude or there may be other elements present which make the long term risk appear to be somewhat larger than the Aaa securities.
A	Possess many favorable investment attributes and are considered as upper medium-grade obligations. Factors giving security to principal and interest are considered adequate, but elements may be present which suggest a susceptibility to impairment sometime in the future.

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Moody's Debt Ratings

Baa	Considered as medium-grade obligations. Interest payments and principle security appear adequate for the present but certain protective elements may be lacking or may be characteristically unreliable over any great length of time. Such bonds lack outstanding investment characteristics and in fact have speculative characteristics as well.
Ba	Judged to have speculative elements; their future cannot be considered as well-assured. Often the protection of interest and principal payments may be very moderate, and thereby not very well safeguarded during both good and bad times over the future. Uncertainty of position characterizes bonds in this class.
B	Generally lack characteristics of the desirable investment. Assurance of interest and principal payments or of maintenance of other terms of the contract over any long period of time may be small.

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Moody's Debt Ratings

Caa	Poor standing. Such issues may be in default or there may be present elements of danger with respect to principal and interest.
Ca	Represent obligations which are speculative in a high degree. Such issues are often in default or have other marked shortcomings.
C	Lowest rated class of bonds, and issues so rated can be regarded as having extremely poor prospects of ever attaining any real investment standing.

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Corporate Spread for Industrials

AAA	82 basis points
AA	84
A	111
BBB	183
BB	323
B	505
CCC	1219
100 Basis Points = 1 %	

Source: CreditSights, September 9, 2016

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Estimating Home Depot's Cost of Debt

Home Depot's outstanding public debt is rated A2 by Moody's.
(www.finra.org for bond ratings)

Use the Treasury Yield Curve and the Corporate Default Spreads to estimate the cost of debt for Home Depot. Make the appropriate calculations assuming a 10-year maturity.

Treasury Yield (10-Year Bond) 2.7%

\+ Default Spread _____

= Pre-Tax Cost of Debt _____

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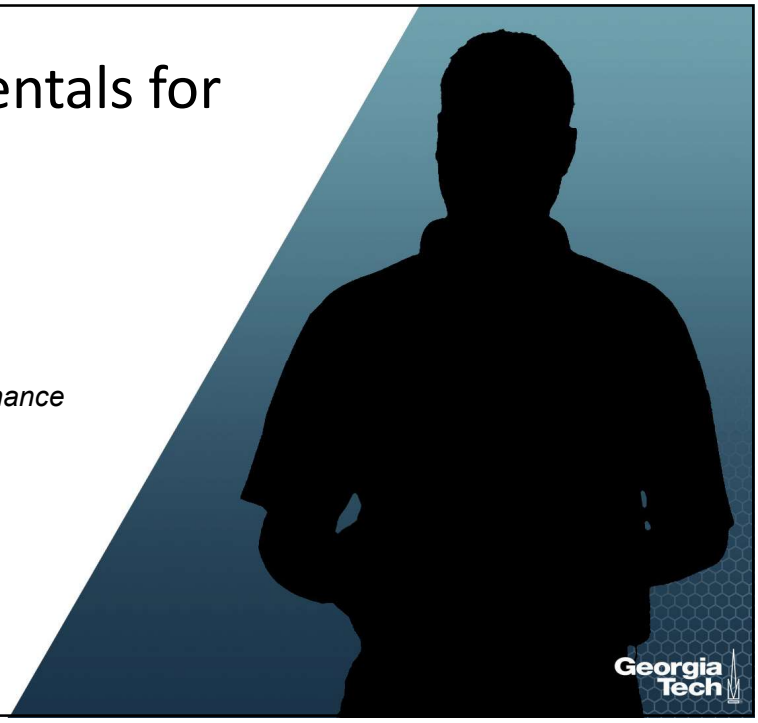
Cost of Capital- Part 2



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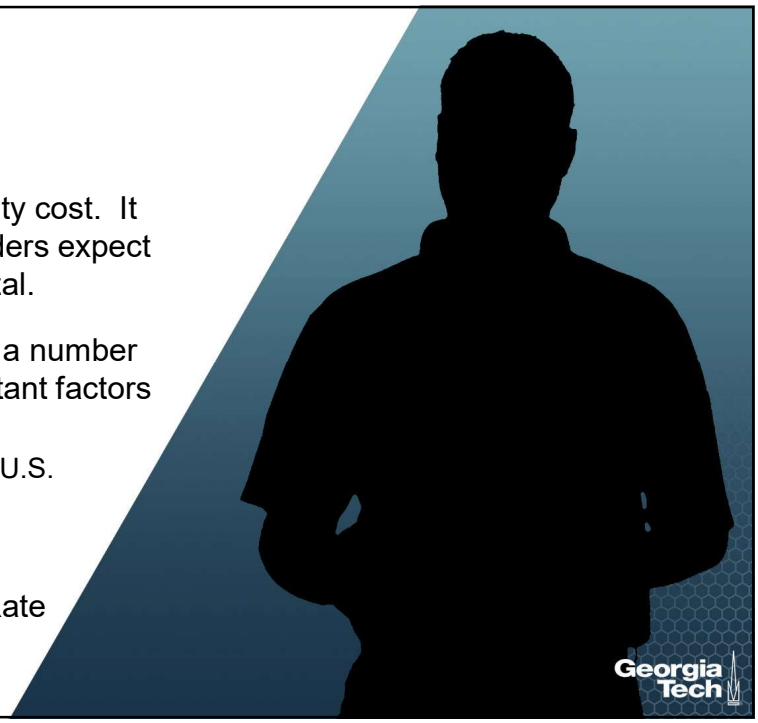
Cost of Equity

The cost of equity is an opportunity cost. It is the rate of return that stockholders expect the firm to earn on its equity capital.

The cost of equity depends upon a number of factors but the two most important factors are:

- Current interest rate on long-term U.S. Treasury bonds.
- Risk of equity

Cost of equity = Treasury Bond Rate
+ Risk Premium



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Reducing Risk Through Diversification

Consider an oil company with $1,000 cash that has the opportunity to invest in the development of an oil field. If the company invests in the development of the oil field, there is a 50% chance that the oil field will be dry and a 50% chance that will produce 40 barrels of oil over next year. However, the price at which oil can be sold is uncertain and depends upon the overall economic conditions. The table below summarizes the possible outcomes.

Economic Conditions	Prob.	Oil Price	Cash Flows Hit (50%)	Next Year Miss (50%)
Recession	50%	$50	$2,000	$0
Expansion	50%	$100	$4,000	$0

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Reducing Risk Through Diversification

Expected Cash Flow = .25 ($2,000) + .25 ($4,000)
+ .25 ($ 0) + .25 ($ 0)
= $1,500
Expected Return = (1500-1000)/1000 = 50%
Standard Deviation = 165.8%

Now suppose there are 1000 oil companies, all with same opportunity to invest $1,000 in the development of an oil field. The success or failure of the oil fields are independent of one another. What is the expected return and standard deviation of the entire portfolio of 1000 companies?

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Reducing Risk Through Diversification

In the limit, as the number of companies gets large, the standard deviation of the portfolio approaches the average covariance between companies.

Number of Companies	Expected Return	Standard Deviation
1	50%	165.8%
10	50%	70.7%
25	50%	59.2%
50	50%	54.8%
100	50%	52.4%
1000	50%	50.2%

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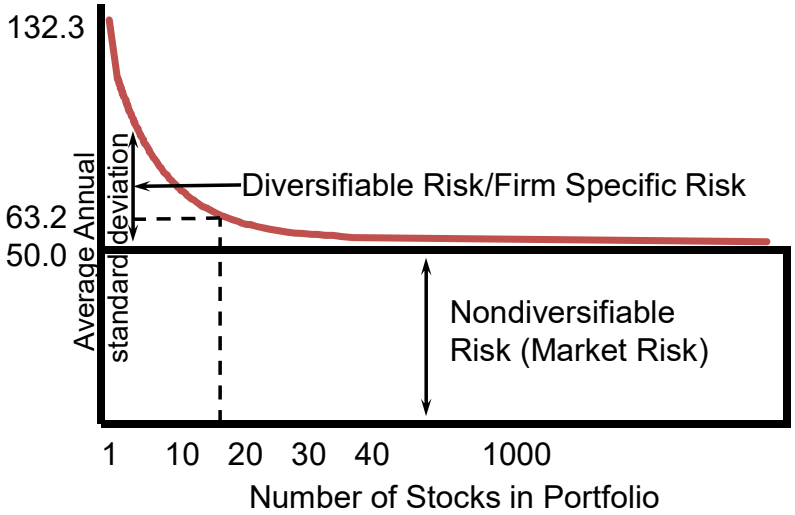
Diversification



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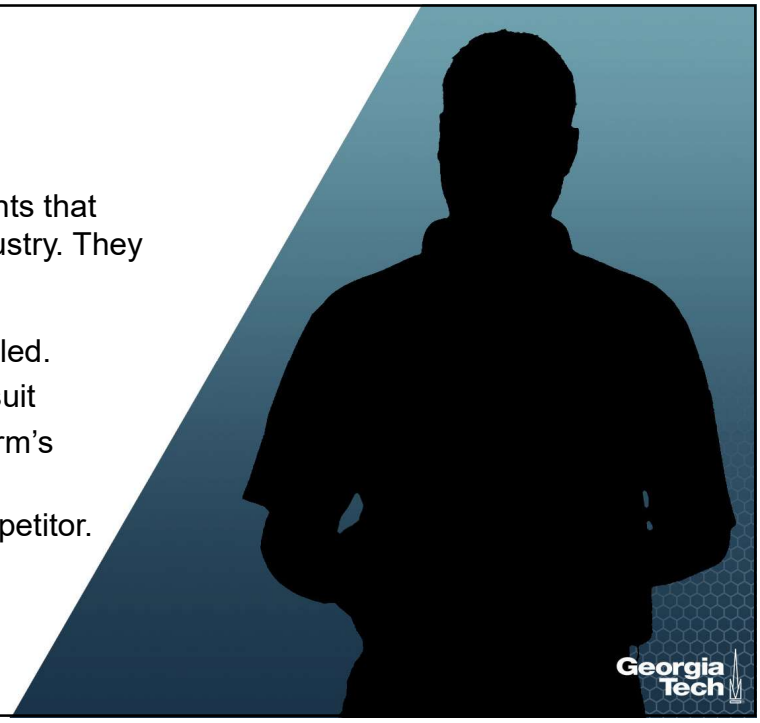
Firm-Specific Risk

Firm-specific risk factors are events that are unique to a single firm or industry. They include such things as:

- A firm's CEO suddenly gets killed.
- A company loses a major lawsuit
- A wildcat strike in one of the firm's plants.
- An unexpected entry of a competitor.



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Market Risk

Market risk factors are macroeconomic events that affect all firms to some degree. They include such things as:

- An unexpected increase in long-term interest rates.
- Changes in monetary or fiscal policy.
- U.S. Congress votes for a massive tax cut.
- An unexpected decline in the value of the U.S. dollar.

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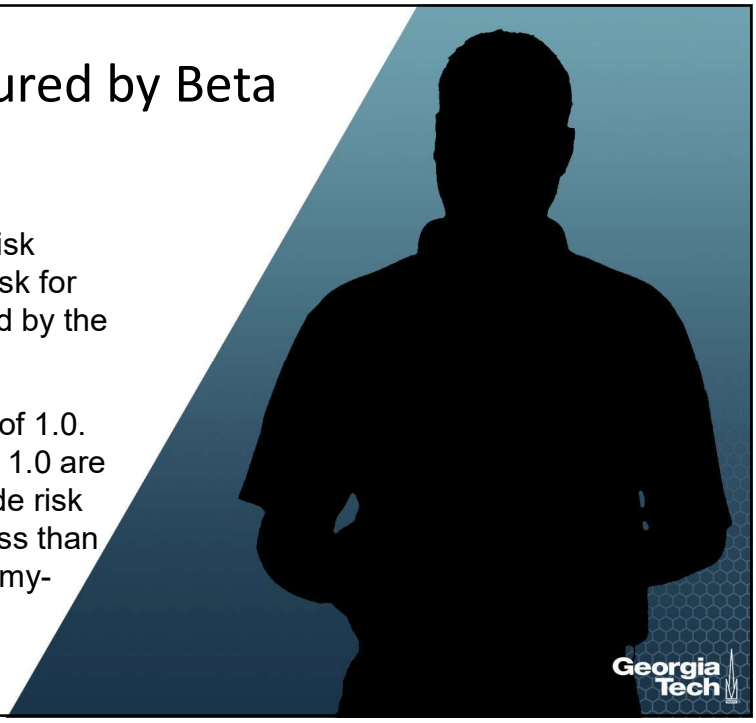
Market Risk is Measured by Beta

- Since firm-specific risk can be diversified away, only market risk matters to investors. Market risk for an individual stock is measured by the stock's beta.
- The average stock has a beta of 1.0. Stocks with betas greater than 1.0 are more sensitive to economy-wide risk factors and stocks with beta less than 1.0 are less sensitive to economy-wide risk factors.



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Market Risk is Measured by Beta (Cont'd)

- In general, the more cyclical a company's business, the higher will be its beta.
- The risk of a well-diversified portfolio depends upon the average beta of the stocks in the portfolio.

Total Portfolio Risk = Avg. Beta x Market Standard Deviation

- For example, a portfolio with an average beta of 0.5 will be half as volatile as the overall stock market, whereas a portfolio with an average beta of 2.0 will be twice as volatile as the overall stock market.

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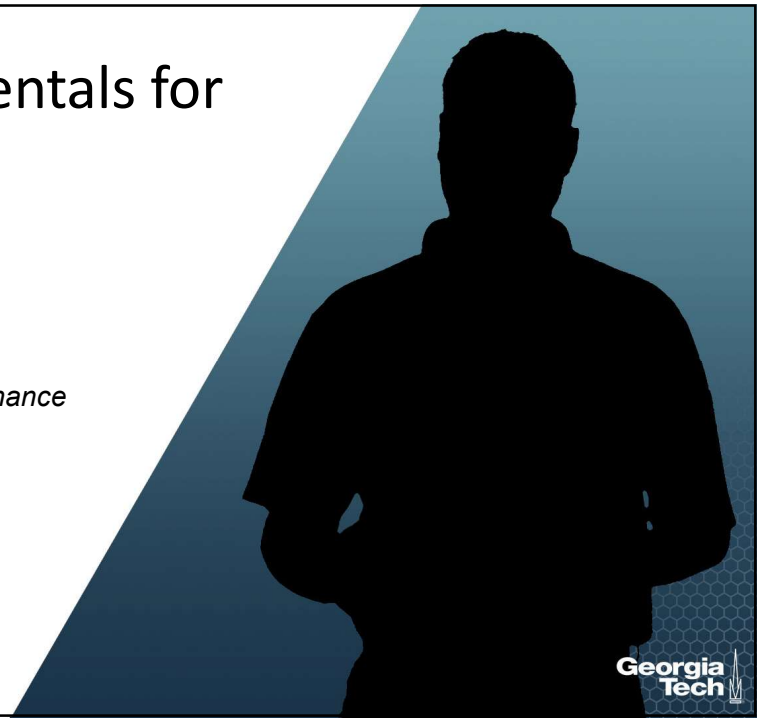
Cost of Capital- Part 3



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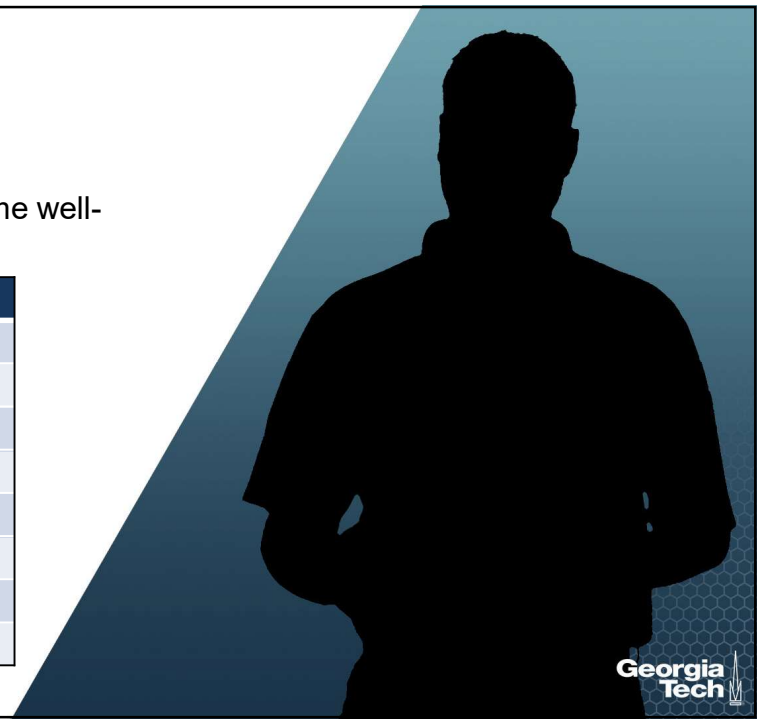
Company Betas

Listed below are the betas of some well-known companies.

Stock	Beta
Amazon.com	1.83
Wal-Mart	0.52
Microsoft	1.11
Intel	0.76
Merck	0.57
Ford	2.41
AT&T	0.61
Home Depot	1.12

Source: http://finance.yahoo.com



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Industry Betas

	Industry	Beta
High Risk	Computer Services	1.65
	Semi-conductors	1.50
	Motion Pictures	1.30
	Computer Hardware	1.25
	Airlines	1.20
	Electronics	1.15
Medium Risk	Steel	1.05
	Auto & Trucking	1.00
	Restaurants	1.00
	Pharmaceuticals	0.95
	Forestry & Wood	0.90
	Retail Dept. Stores	0.90
Low Risk	Communication Services	0.85
	Aerospace & Defense	0.80
	Food Processing	0.70
	Tobacco	0.70
	Oil & Gas	0.60
	Electric Utilities	0.30

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Relationship Between Beta and the Cost of Equity

The Capital Asset Pricing Model (CAPM) provides an estimate of the cost of equity based upon the stock's beta:

Cost of Equity	=	U.S. Treasury Rate + (Market Risk Premium) x Beta
where		
U.S. Treasury Rate	=	Current yield on long-term U.S. Treasury bonds.
Market Risk Premium	=	the average difference in the rate of return on stocks and long-term U.S. Treasury bonds.
Beta	=	measure of stock's market risk.

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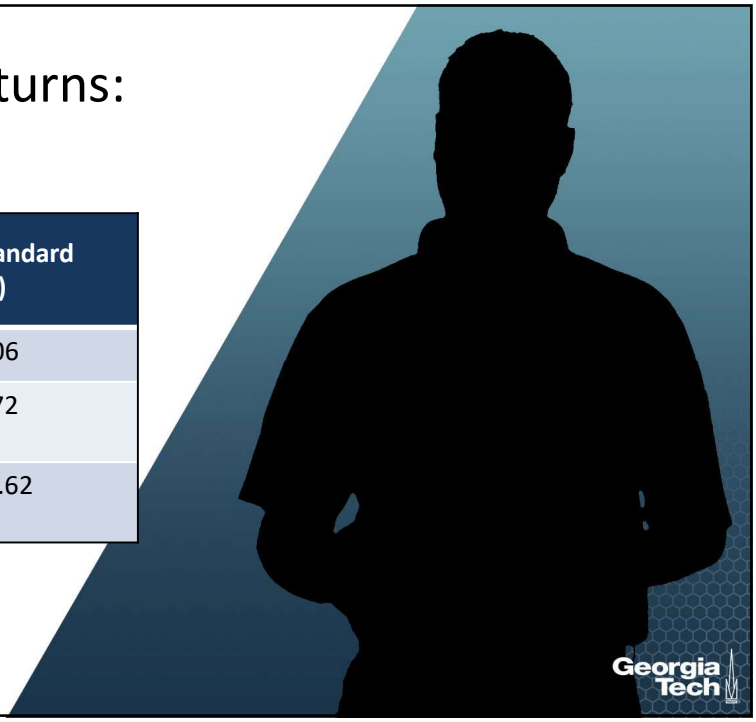
Annual Historical Returns: 1928-2017

Investment Return	Average Deviation (%)	Standard (%)
Treasury Bills	3.44	3.06
Long-Term 10-year Treasury Bonds	5.15	7.72
Large Company Stocks (S&P 500)	11.53	19.62

Source: http://pages.stern.nyu.edu/~adamodar/



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Using the CAPM to Estimate the Cost of Equity

Cost of Equity $= R_f$ + (Market Risk Premium) x Beta

U.S. Treasury Rate: As of April 2019, 10 year U.S. Treasury Bonds were yielding about 2.7%.

Market Risk Premium: The average difference in the rate of return on stocks and long-term U.S. Treasury bonds is about 6.38% (11.53- 5.15) over the 1928-2017 period.

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Using the CAPM to Estimate the Cost of Equity

Stock	Beta	Cost of Equity
Amazon.com	1.83	14.38% (2.7+6.38*1.83)
Wal-Mart	0.52	6.02%
Microsoft	1.11	9.78%
Intel	0.76	7.54%
Merck	0.57	6.33%
Ford	2.41	18.07%
AT&T	0.61	6.59%
Home Depot	1.12	9.85%

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The Home Depot, Inc. (HD)
NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

205.66 -0.89 (-0.43%)
At close: April 18 4:00PM EDT

Buy

Summary | Chart | Conversations | Statistics | Historical Data

Valuation Measures

Market Cap (intraday) [5]	226.79B
Enterprise Value [3]	253.14B
Trailing P/E	21.14
Forward P/E [1]	18.63
PEG Ratio (5 yr expected) [1]	1.90
Price/Sales (ttm)	2.10
Price/Book (mrq)	N/A
Enterprise Value/Revenue [3]	2.34
Enterprise Value/EBITDA [6]	14.12

Source: Yahoo Finance April 19, 2019

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Fiscal Year

Fiscal Year Ends	Feb 2, 2019
Most Recent Quarter (mrq)	Feb 2, 2019

Profitability

Profit Margin	10.28%
Operating Margin (ttm)	14.58%

Management Effectiveness

Return on Assets (ttm)	22.28%
Return on Equity (ttm)	N/A

Income Statement

Revenue (ttm)	108.2B
Revenue Per Share (ttm)	95.17
Quarterly Revenue Growth (yoy)	10.90%
Gross Profit (ttm)	37.16B
EBITDA	17.93B
Net Income Avi to Common (ttm)	11.12B
Diluted EPS (ttm)	9.73
Quarterly Earnings Growth (yoy)	31.80%

Balance Sheet

Total Cash (mrq)	1.78B
Total Cash Per Share (mrq)	1.61
Total Debt (mrq)	29.2B
Total Debt/Equity (mrq)	N/A
Current Ratio (mrq)	1.11
Book Value Per Share (mrq)	-1.70

Cash Flow Statement

Operating Cash Flow (ttm)	13.04B
Levered Free Cash Flow (ttm)	8.67B

Dividends & Splits

Forward Annual Dividend Rate [4]	5.44
Forward Annual Dividend Yield [4]	2.83%
Trailing Annual Dividend Rate [3]	4.45
Trailing Annual Dividend Yield [3]	2.15%
5 Year Average Dividend Yield [4]	1.98
Payout Ratio [4]	42.34%
Dividend Date [3]	Mar 27, 2019
Ex-Dividend Date [4]	Mar 12, 2019
Last Split Factor (new per old) [2]	2/3
Last Split Date [3]	Dec 30, 1999

Trading Information

Stock Price History

Beta (3Y Monthly)	1.22
52-Week Change [3]	16.69%
S&P500 52-Week Change [3]	8.63%
52 Week High [3]	215.43
52 Week Low [3]	158.09
50-Day Moving Average [3]	191.73
200-Day Moving Average [3]	183.38

Share Statistics

Avg Vol (3 month) [3]	4.38M
Avg Vol (10 day) [3]	3.2M
Shares Outstanding [5]	1.1B
Float	1.1B
% Held by Insiders [1]	0.11%
% Held by Institutions [1]	72.23%
Shares Short (Mar 28, 2019) [4]	9.61M
Short Ratio (Mar 28, 2019) [4]	2.05
Short % of Float (Mar 28, 2019) [4]	0.87%
Short % of Shares Outstanding (Mar 28, 2019) [4]	0.87%
Shares Short (prior month Feb 27, 2019) [4]	8.38M

Source: Yahoo Finance April 19, 2019

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Home Depot's Cost of Capital

1. Cost of Equity _ _ _ _ _ _ _ _ _ _ _ _ _
2. Cost of Debt _ _ _ _ _ _ _ _ _ _ _ _ _
3. Total Debt $ 29.2 billion
4. Market Value of Equity ----------
5. Total Value of the Firm (3 + 4)
6. Cost of Capital _ _ _ _ _ _ _ _ _ _ _ _ _

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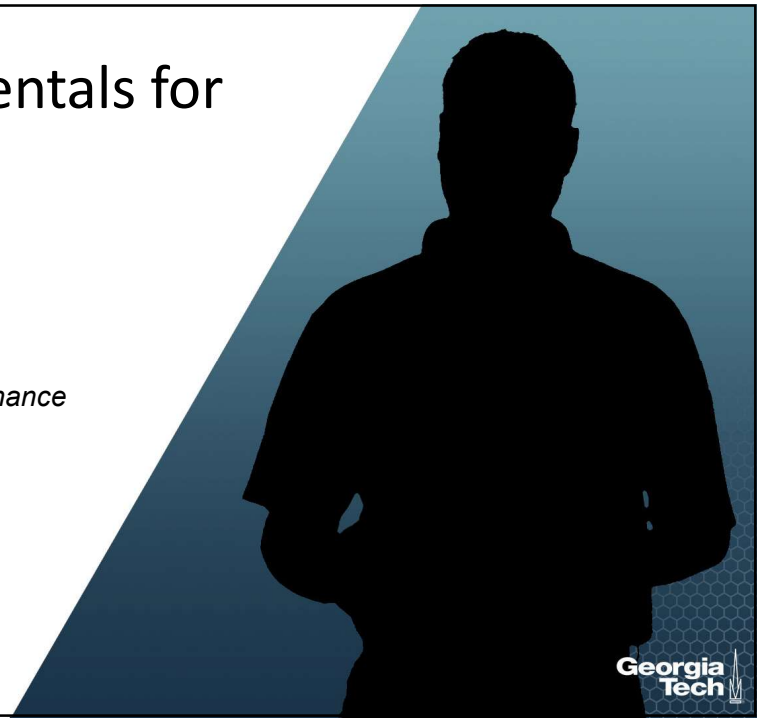
Firm Valuation- Part 1



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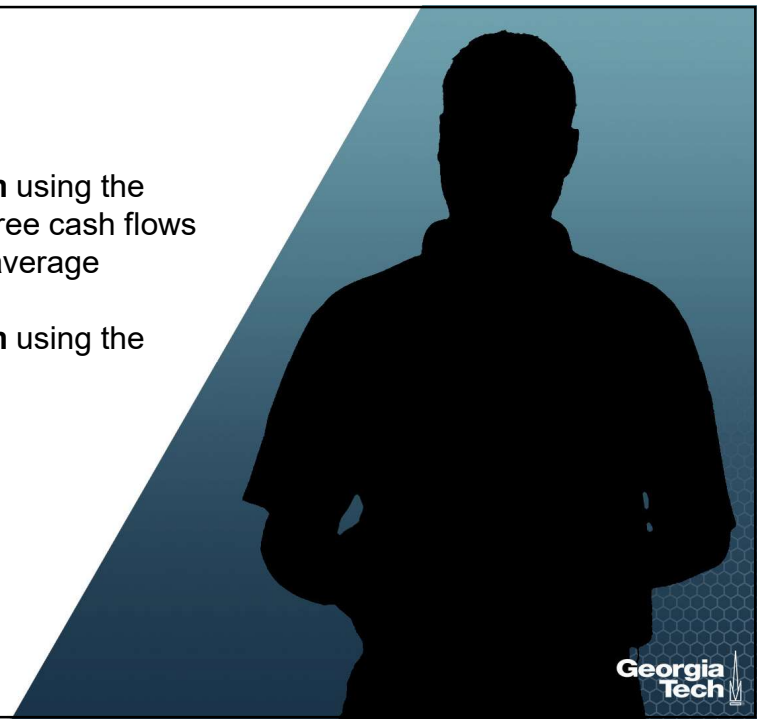
Learning Objectives

- Estimate the **value of a firm** using the present value of projected free cash flows discounted at its weighted average cost of capital.
- Estimate the **value of a firm** using the comparables method.



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Firm Valuation

- Underlying discipline for a wide variety of financial activities
- Structuring mergers and leveraged buyouts
- Security analysts and undervalued stocks
- Pricing Initial Public Offerings
- Corporate strategy and value based management
- Venture Capitalists' evaluation of new investment opportunities

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Firm Valuation Methods (Cont'd)

- Discounted Cash Flow (DCF) Method
- Comparables

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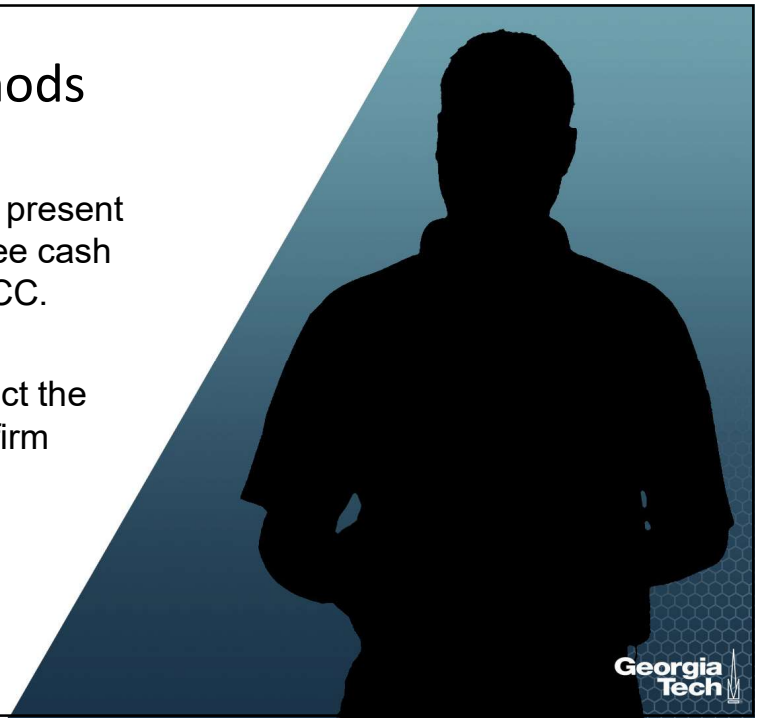
Firm Valuation Methods

- The value of the firm is the present value of expected future free cash flow discounted at the WACC.
- To find equity value, subtract the value of the debt from the firm value.



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Firm Valuation with the WACC

Now we are in a position to use the weighted average cost of capital, WACC to value both projects and entire firms.

One interpretation of WACC is that it is the overall expected return the firm must earn on its existing assets to maintain its value.

The WACC reflects the risk and the capital structure of the firm's existing assets.

As a result the WACC is an appropriate discount rate for the firm or for a project that is a replica of the firm.

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Discounted Cash Flow Method

$CF_t = EBIT_t * (1-T) + DEPR_t - CAPEX_t - \Delta NWC_t$

CF = Free Cash Flow
EBIT = Earnings Before Interest and Taxes
T = Corporate Tax Rate
DEPR = Depreciation
CAPEX= Capital Expenditures
ΔNWC = Increase in Net Working Capital

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Discounted Cash Flow Method (Cont'd)

$$TV_T = \frac{CF_T * (1+g)}{r - g}$$

$$NPV = \frac{CF_1}{1+r} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \cdots + \frac{CF_T + TV_T}{(1+r)^T}$$

r = (D/V) * Cost of Debt* (1-T) + (E/V) * Cost of Equity

Cost of Equity = Risk Free Rate +
Beta (Market Risk Premium)

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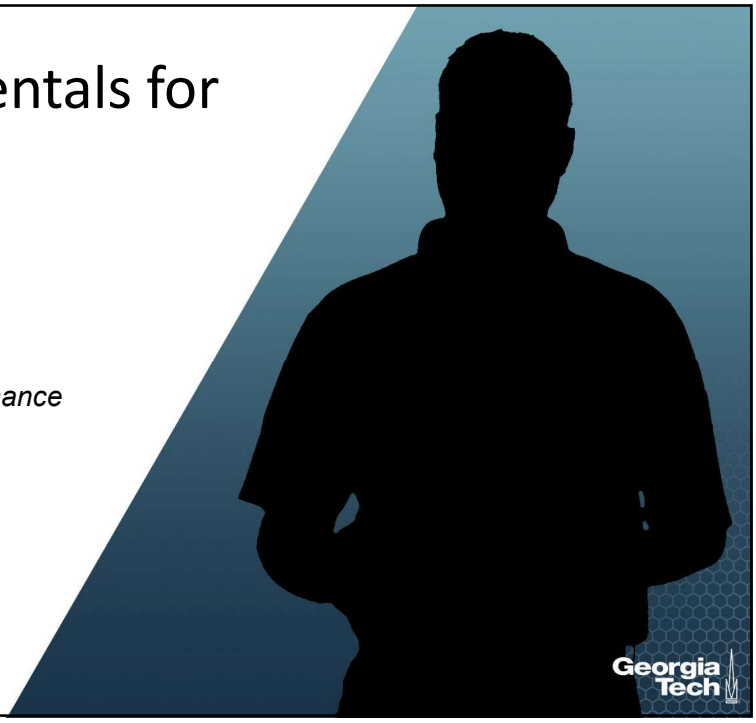

Firm Valuation- Part 2

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Firm Valuation: Good Food Corporation

Consider the Good Food Corporation, a public company headquartered in Barstow, California, that is currently a leading global food service retailer.

- It operates about 10,000 restaurants in 100 countries.
- Good Food servers a value-based menu focused on hamburgers and French fries.
- The company has $4 billion in market valued debt and $2 billion in market valued common stock.
- Its tax rate is 20 percent.
- Good Food has estimated its cost of debt as 5 percent and its cost of equity as 10 percent.

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Firm Valuation: Good Food Corporation

- Its weighted average cost of capital is equal to:

Financial Component	Market Values	Weights	Cost of Capital	Weight Average
Debt	$4 billion	2/3	5%(1-.2)=4%	2/3 X 4%
Equity	$2 billion	1/3	10%	1/3 X 10%
	$6 billion			6% WACC

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Firm Valuation: Good Food Corporation

- Good Food is seeking to grow by acquisition and the investment bankers of Good Food have identified a potential acquisition candidate, Happy Meals, Inc.
- Happy Meals is currently a private firm with no publicly tradable common stock but has the same product mix as Good Food and is a direct competitor to Good Food in many markets.
- It operates about 4,000 restaurants mostly in North America and Europe.
- Happy Meals has $1,318.8 million of debt outstanding with its market value the same as the book value.

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Firm Valuation: Good Food Corporation (Cont'd)

- It has 12.5 million shares outstanding.
- Since Happy Meals is a private firm, we have no stock market price to rely on for our valuation.
- Happy Meals expects its EBIT to grow 10 percent a year for the next five years.
- Increases in net working capital and capital spending are both expected to be 24 percent of EBIT.
- Depreciation will be 8 percent of EBIT.
- The perpetual growth rate in cash flow after five years is estimated to be 2 percent.

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Firm Valuation

If Good Food acquires Happy Meals, Good Food analysts estimate the net cash flows from Happy Meals (in $ millions) would be (round to one decimal):

Year	1	2	3	4	5
Earnings before Interest and Taxes (EBIT)	150	165	181.5	199.7	219.6
- Taxes (20%)	30	33	36.3	39.9	43.9
= Earnings After Taxes	120	132	145.2	159.8	175.7
+ Depreciation	12	13.2	14.5	16	17.6
- Capital Spending	36	39.6	43.6	47.9	52.7
- Increase in Net Work Capital	36	39.6	43.6	47.9	52.7
= Net Cash Flows (CF)	60	66	72.6	79.9	87.8

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Firm Valuation

We start our calculations by computing a terminal value of Happy Meal as:

$$TV_5 = \frac{\$87.8 * 1.02}{.06 - 0.2} = \$2{,}238.9$$

Next, we compute the present value of Happy Meals to be:

$$PV_6 = \frac{\$60}{1.06} + \frac{\$66}{(1.06)^2} + \frac{\$72.6}{(1.06)^3} + \frac{\$79.9}{(1.06)^4} + \frac{\$87.8}{(1.06)^5} + \frac{\$2{,}238.9}{(1.06)^5} = \$1{,}978.2$$

The present value of net cash flows in years 1 to 5 is $305.2, and the present value of the terminal value is:

$$\$2{,}238.9 * \left(\frac{1}{1.06}\right)^5 = \$1{,}673.0$$

So the total value of the company is **$305.2+$1,673.0=$1,978.2**

To find the value of equity, we subtract the value of the debt which gives us $1,978.2-$1,318.8=$659.4. To find the equity value per share, we decide the value of equity by the number of shares outstanding: $659.2/12.5=$52.8. Good Food will find Happy Meals an attractive acquisition candidate at a price of less than $52.8 per share (the less the better).

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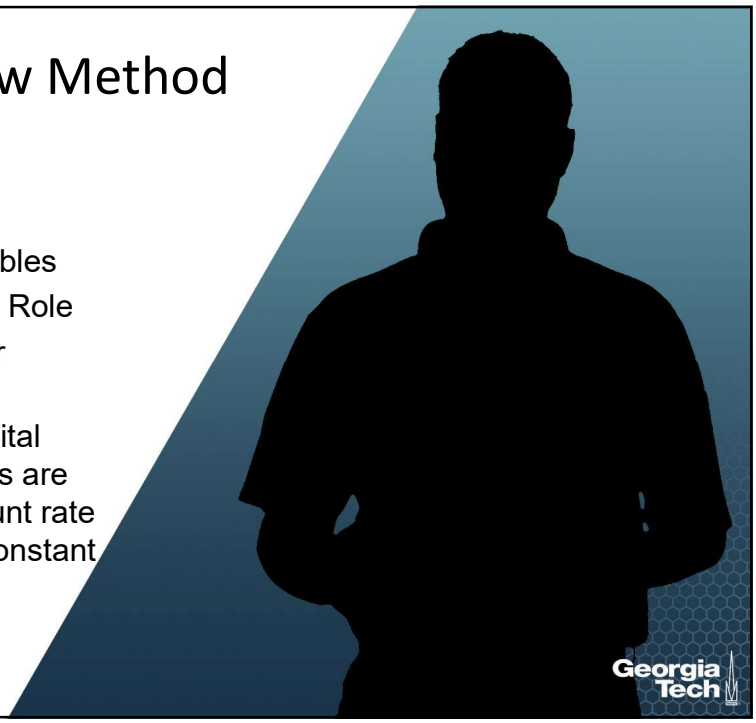
Discounted Cash Flow Method

- Weaknesses
- Point Estimate
- Beta Estimation from comparables
- Terminal Values Play a Crucial Role
- Changing Capital Structures or Effective Tax Rates
- DCF method assumes the capital structure and effective tax rates are both incorporated in the discount rate (WACC) and assumed to be constant



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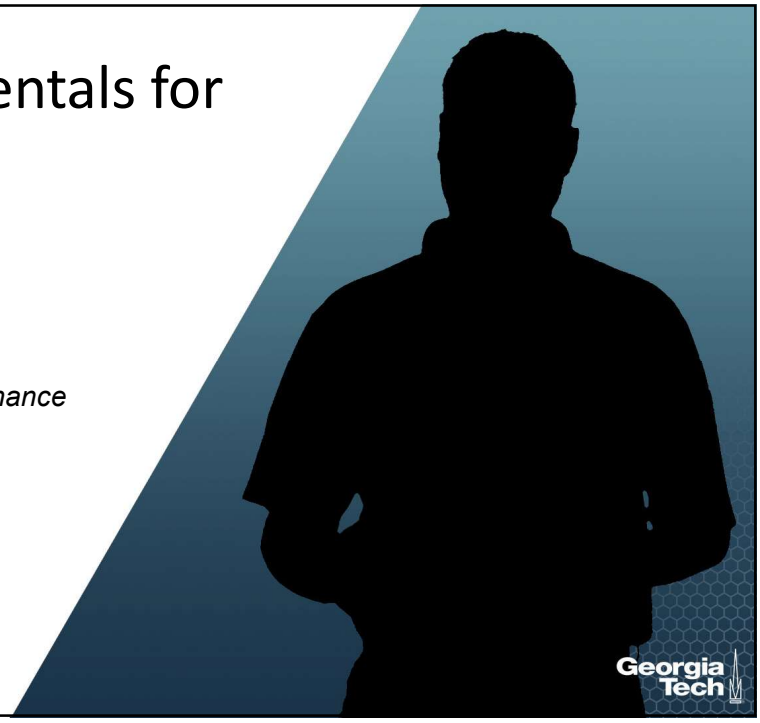
Firm Valuation- Part 3



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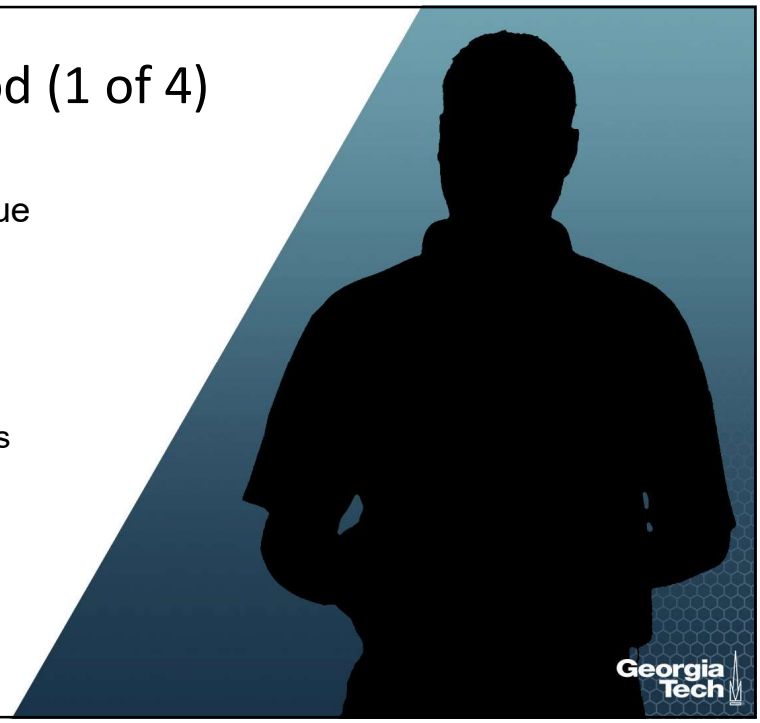
Comparables Method (1 of 4)

Choose firms with Similar Value Characteristics

- Risk
- Growth Rate
- Capital Structure
- Size and Timing of Cash Flows



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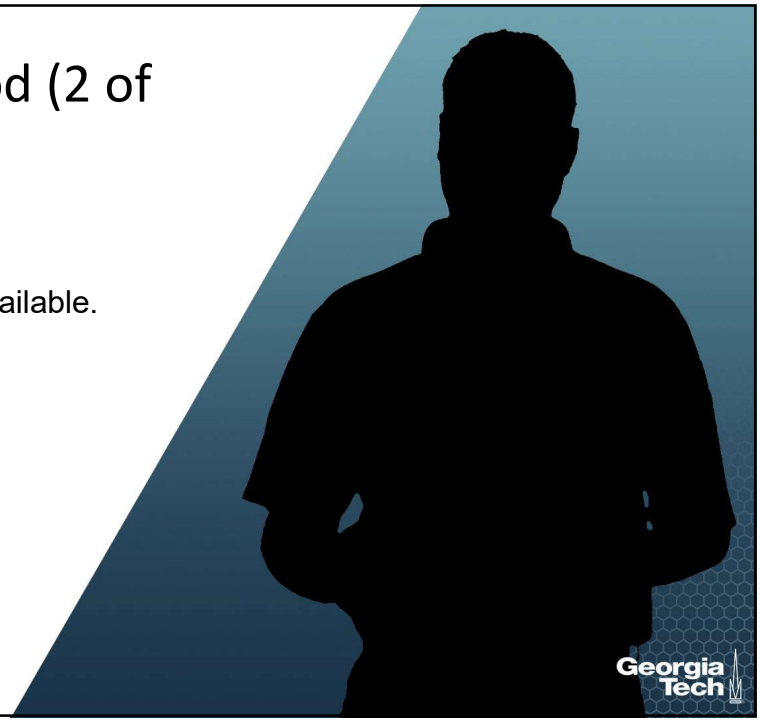
Comparables Method (2 of 4)

Weaknesses

- Valuation of Private Firms
- Financial Information often unavailable.
- Valuations may be misguided.



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Comparables Method (3 of 4)

Public Firms

Price/Earnings Ratio

Price/EBIT as an alternative

Enterprise Value/Sales

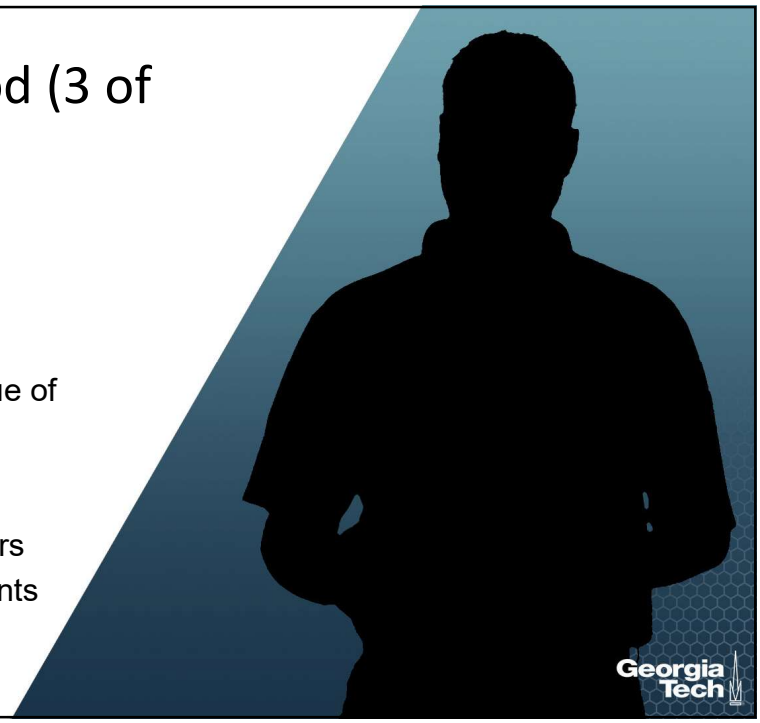
Market Value of Equity/Book Value of Equity

Private Firms

Internet -- Number of Subscribers

Biotechnology -- Number of Patents

Industry Specific Multiples More Explanatory Power



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Comparables Method (4 of 4)

Use of Public Market Comparables to Value Private Companies

Use Discount for Liquidity - 20 to 25 %

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Comparables Example

	Private Health	Happy Healthcare	Community Health
		($MM)	
Balance Sheet			
Assets	160	300	380
Long-Term Debt	5	100	0
Net Worth	80	120	175
Income Statement			
Revenues	350	420	850
EBITDA	45	55	130
Net Income	30	20.0	75.0
Market Data			
Earnings per Share ($/share)	3.00	0.67	2.14
Price-Earnings Ratio (times)	n/a	21.0	14.5
Shares Outstanding (m)	10	30	35
Number of Members	500,000	600,000	1,100,000

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Computation Details for Valuation

	Happy Healthcare	Community Health		
Market Value = EPS * P/E* Number of shares	.67*21*30=420m	2.14*14.5*35=1,086		
Enterprise Value = Market Value + Long term debt	420 +100= 520 m	1,086+0=1,086		
Enterprise Value/Sales	520/420=1.24	1,086/850=1.28		
Enterprise Value/EBITDA	520/55= 9.49	1086/130=8.35		
Enterprise Value/Member	520,000,000/600,000 =870	1,086,000,000/1,100,000 =987		

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Comparables Example

	Happy Healthcare	Community Health	Average	Private Health Implied Value ($M)
Price-Earnings Ratio	21.0	14.5	17.8	533
Enterprise Value/EBITDA	9.49	8.35	8.92	397
Enterprise Value/Sales	1.24	1.28	1.26	436
Market Value/Book Value of Equity	3.52	6.21	4.86	389
Enterprise Value/Member	870	987	929	459

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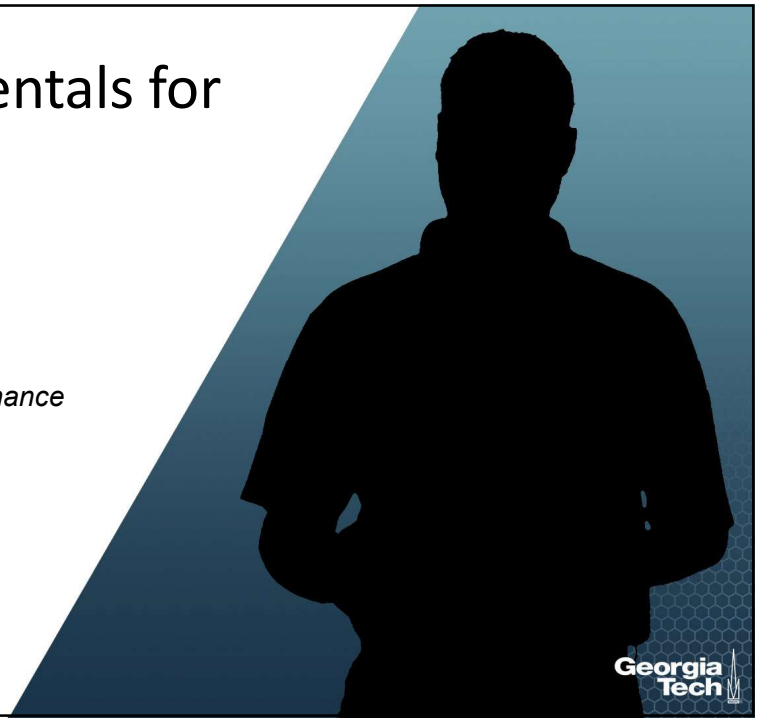
Firm Valuation- Part 4



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Firm Valuation Problem 1: Schultz Industries

Schultz Industries is considering the purchase of Arras Manufacturing. Arras is currently a supplier for Schultz, and the acquisition would allow Schultz to better control its material supply. The current cash flow from assets for Arras is $6.8 million. The cash flows are expected to grow at 8 percent for the next five years before leveling off to 4 percent for the indefinite future. The cost of capital for Schultz and Arras is 12 percent and 10 percent, respectively. Arras currently has 2.5 million shares of stock outstanding and $30 million in debt outstanding.

What is the maximum price per share Schultz should pay for Arras?

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Solution: Schultz Industries

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Firm Valuation Problem 2: Happy Times, Inc.

Happy Times, Inc. wants to expand its party stores into the Southeast. In order to establish an immediate presence in the area, the company is considering the purchase of the privately held Joe's Party Supply. Happy Times currently has debt outstanding with a market value of $115 million and a YTM of 6 percent. The company's market capitalization is $360 million, and the required return on equity is 11 percent. Joe's currently has debt outstanding with a market value of $45 million. The EBIT for Joe's next year is projected to be $17.3 million. EBIT is expected to grow at 10 percent per year for the next five years before slowing to 3 percent in perpetuity. Net working capital, capital spending, and depreciation as a percentage of EBIT are expected to be 9 percent, 15 percent, and 8 percent, respectively. Joe's has 1.95 million shares outstanding and the tax rate for both companies is 21 percent.

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Firm Valuation Problem 2: Happy Times, Inc. (Cont'd)

a. Based on these estimates, what is the maximum share price that Happy Times should be willing to pay for Joe's?
b. After examining your analysis, the CFO of Happy Times is uncomfortable using the perpetual growth rate in cash flows. Instead, she feels that the terminal value should be estimated using the EV/EBITDA multiple. If the appropriate EV/EBITDA multiple is 9, what is your new estimate of the maximum share price for the purchase?

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Solution: Happy Times, Inc.

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Strengths and Weaknesses of Different Valuation Methods

	Strengths	Weaknesses
Comparable	Quick to use Simple to understand Commonly used Market based	Private companies comparable difficult to find If public company comparables use liquidity discount
Discounted Cash Flow	Theoretically Sound	Cash flows difficult to estimate WACC assumes constant capital structure Sensitive to terminal growth assumptions

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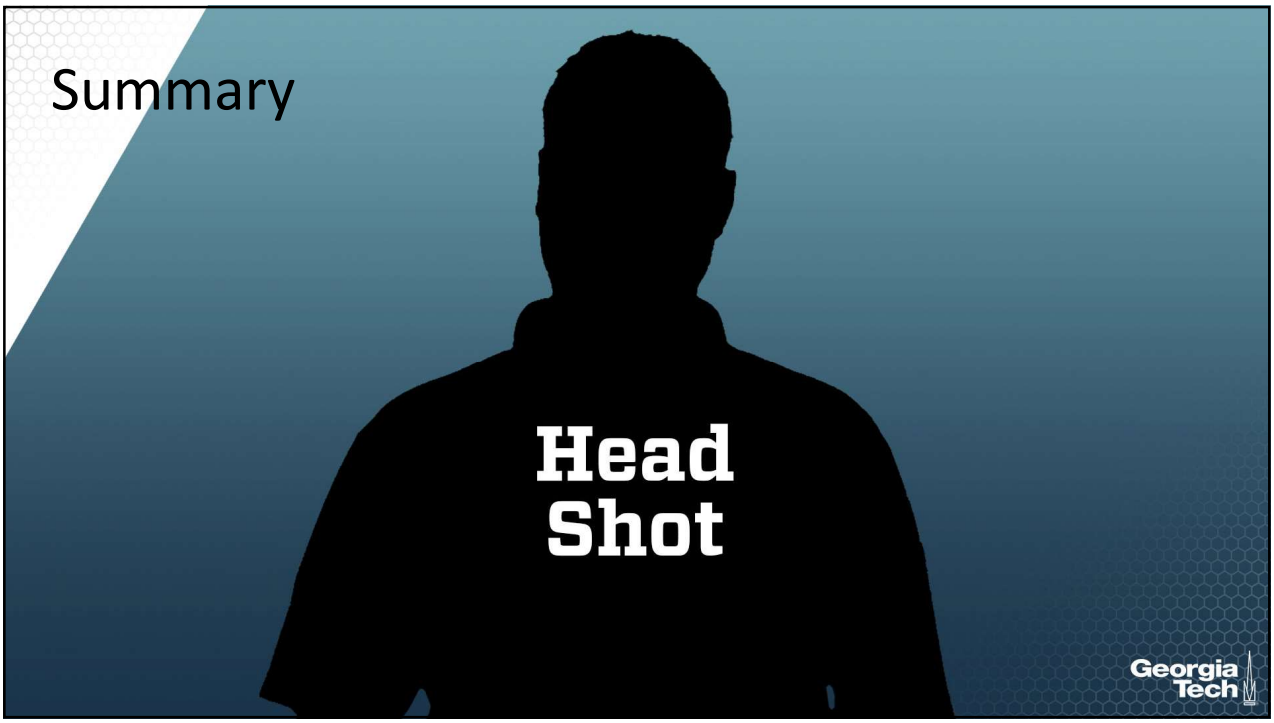

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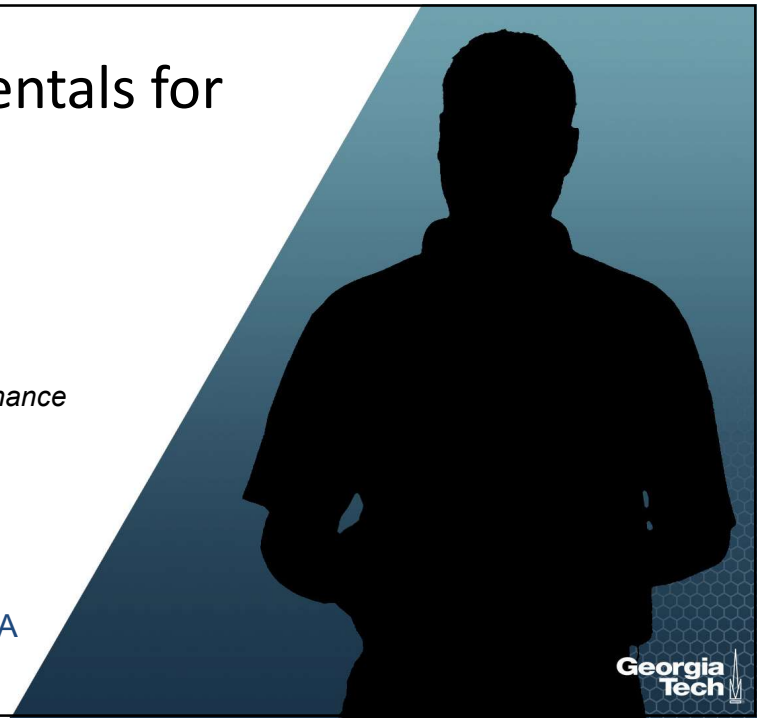
Managing for Value Creation: EVA and MVA- Part 1



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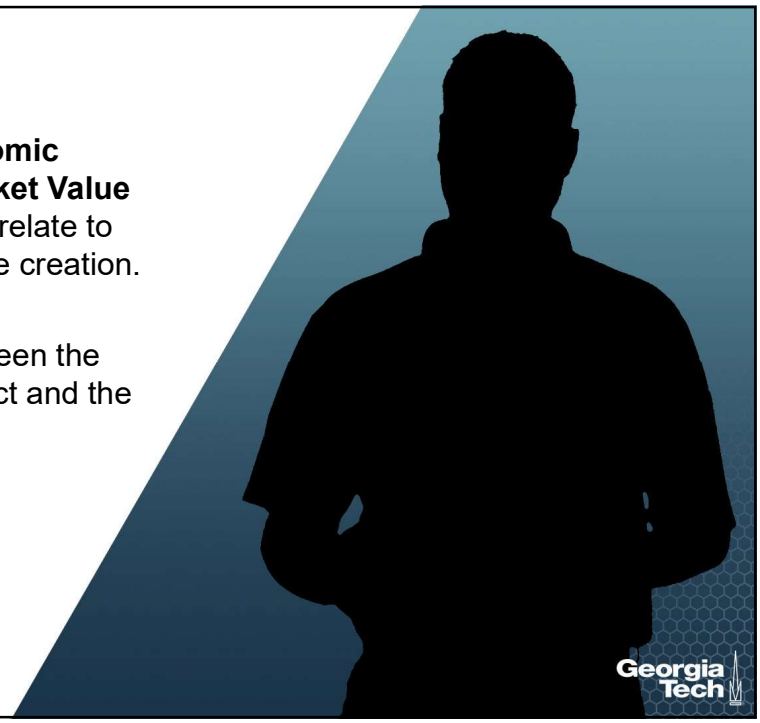
Learning Objectives

- Define the concepts of **Economic Value Added (EVA)** and **Market Value Added** and explain how they relate to the goal of managing for value creation.
- Explain the equivalence between the **Net Present Value** of a project and the **EVA** generated by a project.



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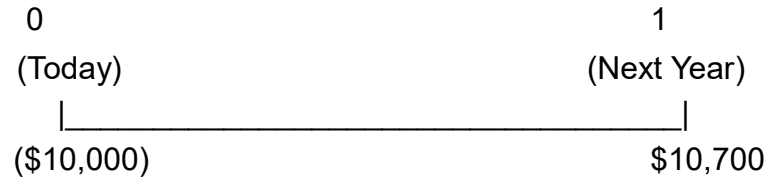

Suppose you have an opportunity to invest $10,000 in an investment project that guarantees you a payment of $10,700 at the end of one year.

Does this investment create economic value for you? Would you make the investment?

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Opportunity Cost of Capital

To answer you need to know your opportunity cost of capital.

The opportunity cost of capital is the rate of return you can earn on securities in the capital markets with the same risk as your investment project.

Opportunity Cost= Rate of Return on Securities of capital with the Same Risk

Since your investment is guaranteed, what would be your opportunity cost of capital?

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Accounting vs. Economic Profits

The accounting profits and economic profits are calculated below for an opportunity cost of capital of r = 6% and r = 8%.

	r= 6%	r=8%
Total Capital (TC)	$10,000	$10,000
X Return on TC (r*)	7%	7%
Accounting Profits	$700	$700
- Capital Charge (rxTC)	-600	-800
Economic Profits	$ 100	-$100

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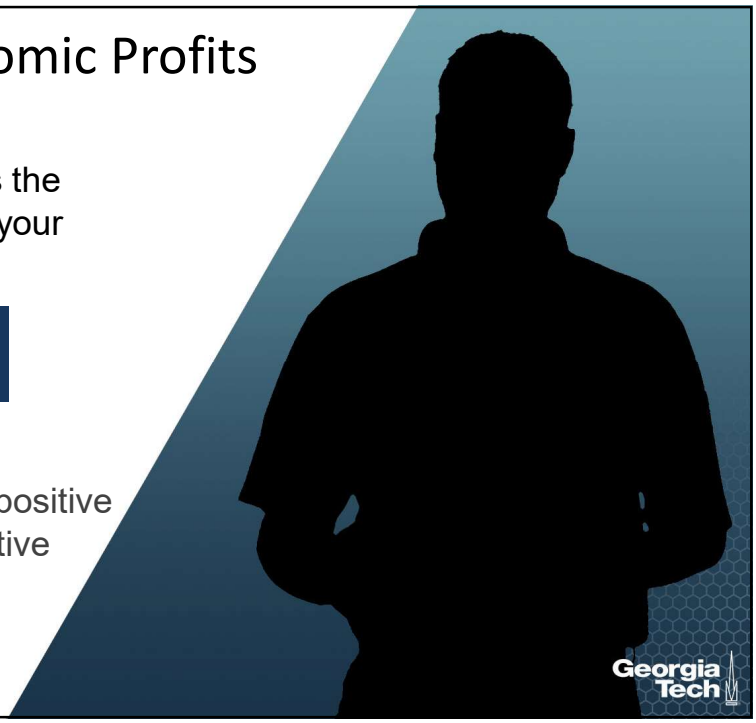
Accounting vs. Economic Profits

The Capital Charge measures the opportunity cost of money for your investment project:

Capital Charge = r x TC

To create economic value, the investment project must earn positive economic profits, not just positive accounting profits.



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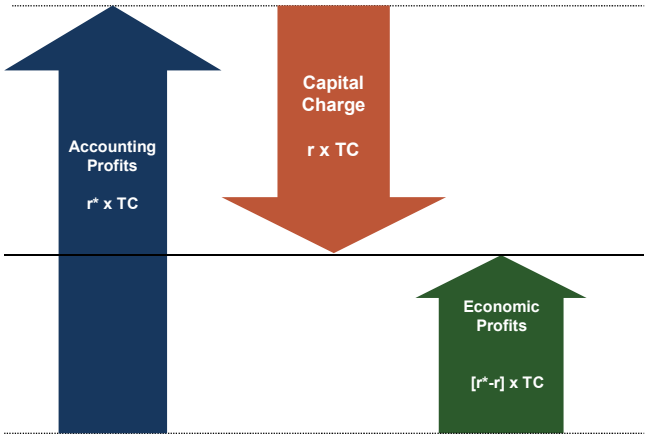
Economic Profits



r* = Return on total capital; r=Cost of capital

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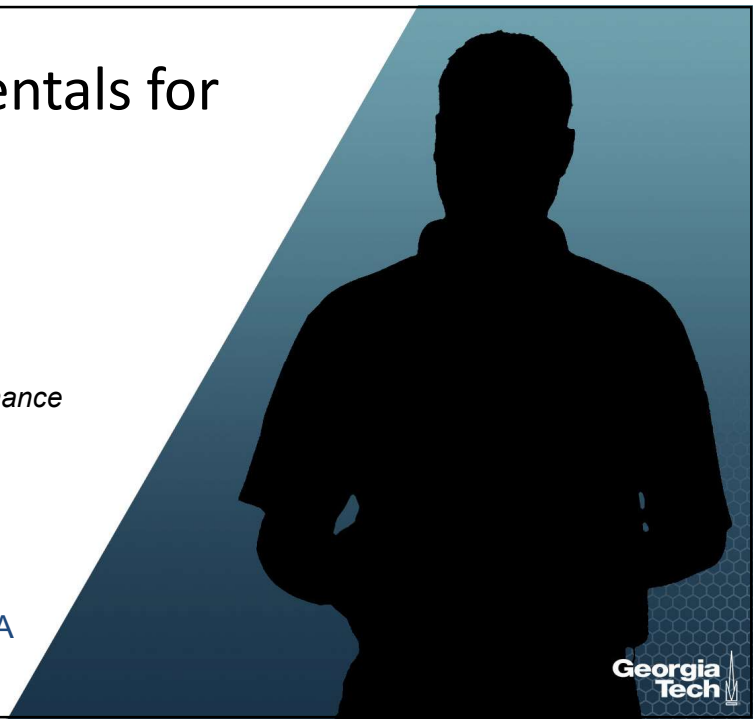

Managing for Value Creation: EVA and MVA- Part 2

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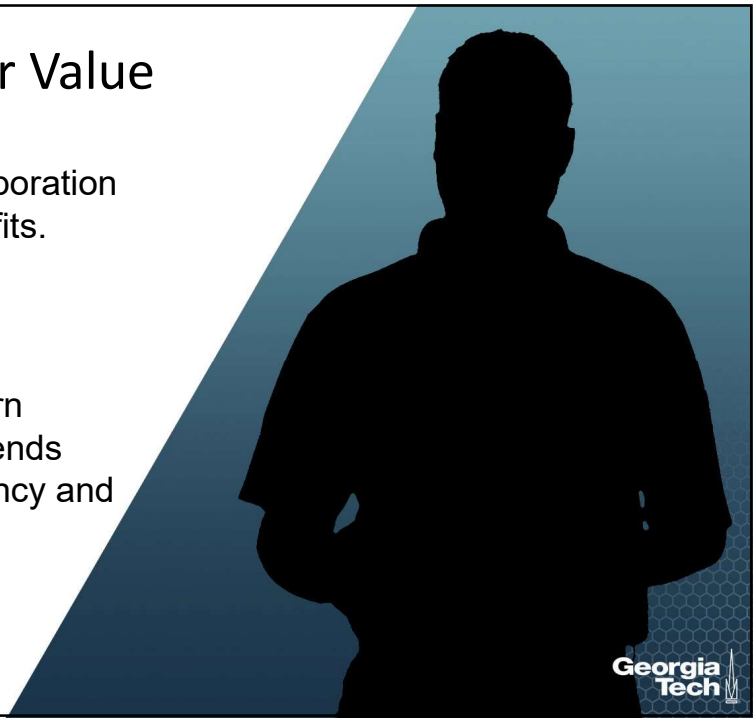
Creating Shareholder Value

Creating economic value for shareholders requires the corporation to earn positive economic profits.

Economic Profit ====>

The corporation's ability to earn positive economic profits depends upon both its operating efficiency and its capital efficiency.



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Measuring Financial Performance

Income Statements		
	Company A	Company B
Sales	$100,000	$100, 000
- Cost of Goods Sold	- 70,000	- 65,000
- Selling, General, and Adm.	- 8,000	- 10,000
- Other Expenses	- 2,000	- 1,000
Operating Profit (EBIT)	$20,000	$24,000
- Taxes (35%)	- 7,000	- 8,400
Net Operating Profit (After-Tax)	$ 13,000	$ 15,600
Return on Sales (ROS)	13.0 %	15.6 %

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Measuring Financial Performance

One common measure of operating efficiency is the company's Return on Sales (ROS). ROS tells us the fraction of each dollar sales that flows through to the bottom line.

$$ROS = \frac{NOPAT}{Sales}$$

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Measuring Financial Performance

Balance Sheets		
	Company A	Company B
Net Working Capital	$10,000	$15,000
Net Fixed Assets	98,000	147,000
Other Assets	2,000	3,000
Net Assets	$110,000	$165,000
Long-Term Debt	$40,000	$40,000
Stockholders' Equity	$70,000	$125,000
Total Capital	$110,000	$165,000

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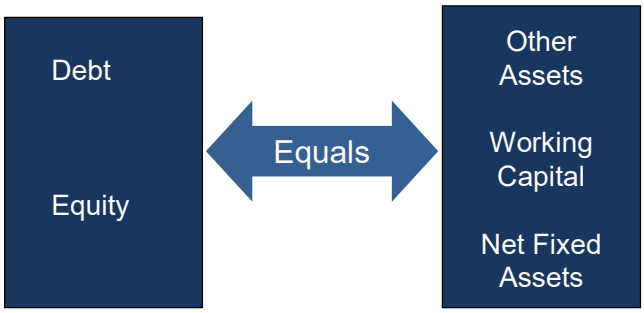
Total Capital and Net Assets

- Total Capital is equal to the total amount of money contributed to the firm by both bondholders and stockholders
- Because sources of funds must equal uses of funds, Total Capital is equal to Net Assets.



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Measuring Financial Performance

One common measure of capital efficiency is the company's Capital Turnover (CT). CT measures the amount of sales that are generated for each dollar invested in the business.

$$CT = \frac{\text{Sales}}{\text{Total Capital}}$$

	Company A	Company B
Sales	$100,000	$100,000
Total Capital	110,000	165,000
Capital Turnover (CT)	90.9%	60.6%

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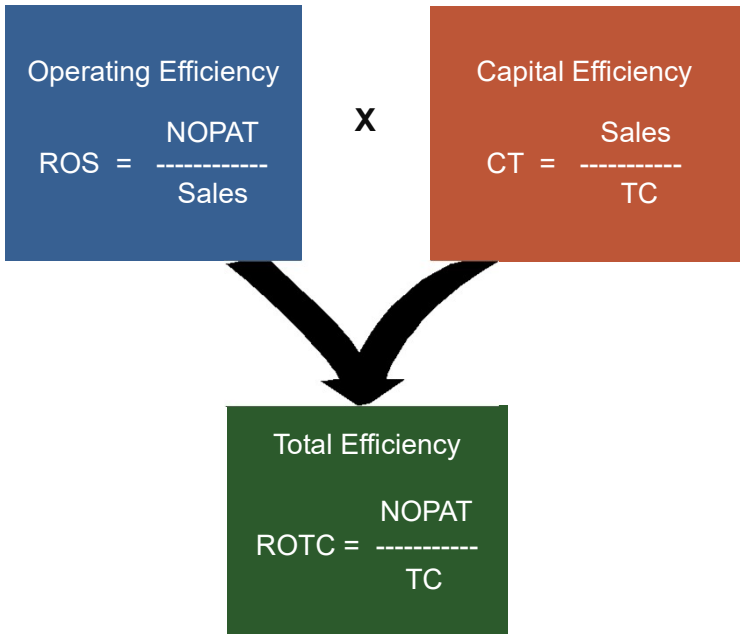

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Measuring Financial Performance

The table below summarizes the comparisons of companies A and B.

	Company A	Company B
Sales	$100,000	$100,000
NOPAT	13,000	15,600
Total Capital	110,000	165,000
ROS= NOPAT/Sales	13.0%	15.6%
CT=Sales/TC	90.0%	60.6%
ROTC= NOPAT/TC	11.82%	9.45%

What are the underlying “value drivers” ?

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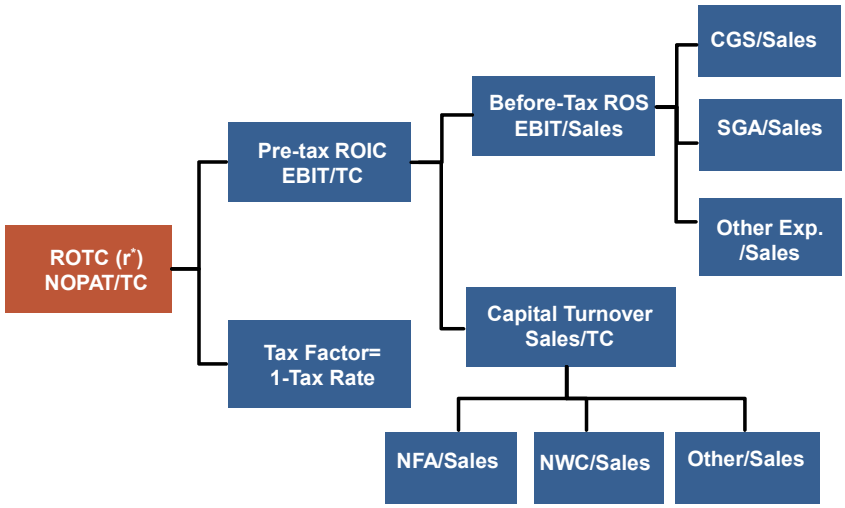
Return on Total Capital



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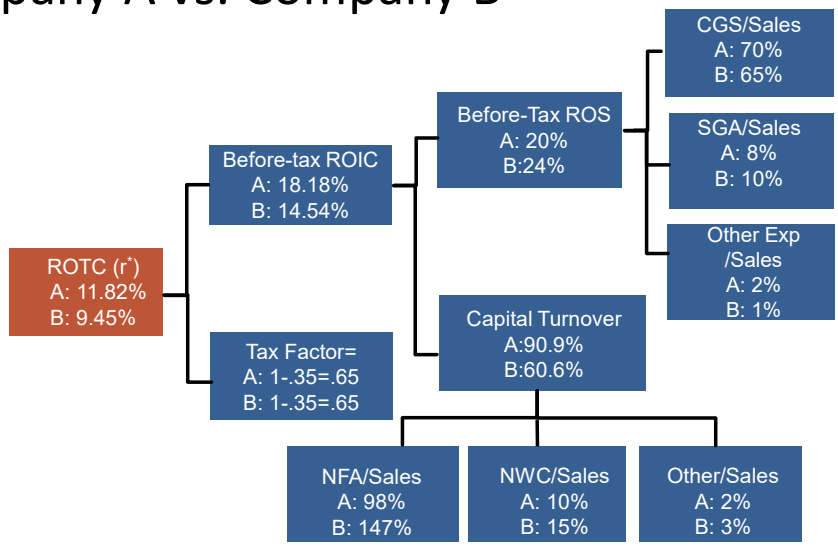
Company A vs. Company B



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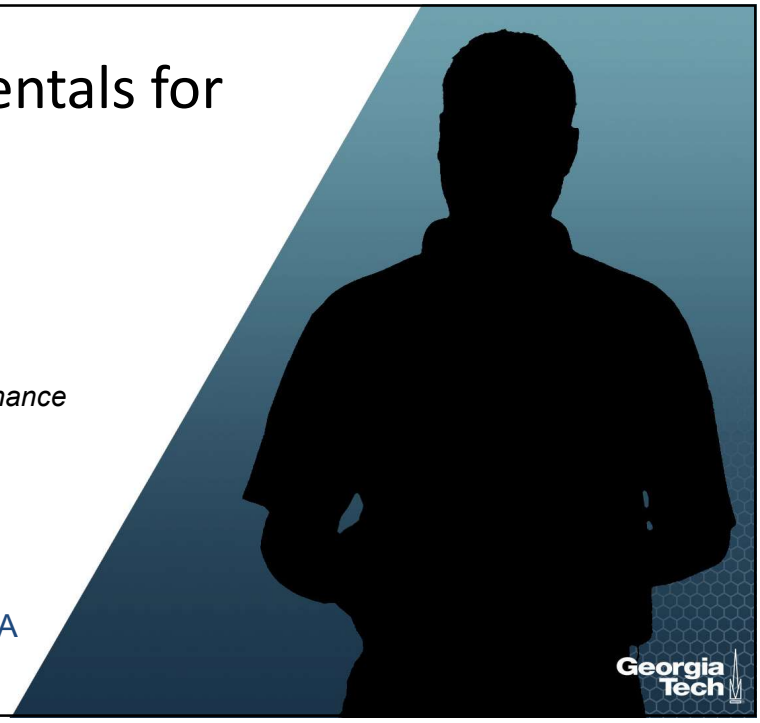

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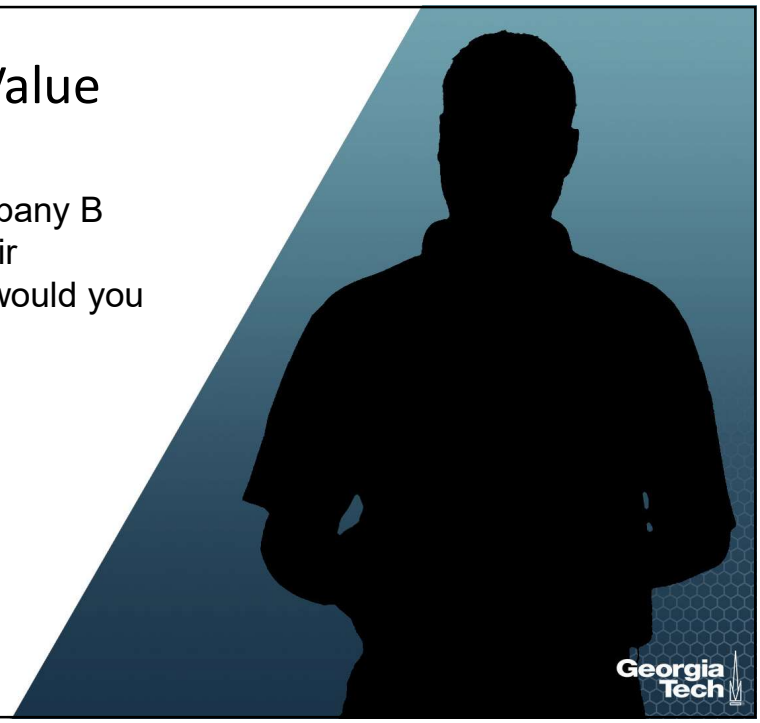
Creating Economic Value

Do either Company A or Company B create economic value for their shareholders? What criteria would you use to decide?



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Creating Economic Value

To determine whether Companies A and B are creating economic value for their shareholders we need to compute their economic profits.

Recall that economic profits are equal to the difference between accounting profits and a charge for the cost of capital:

Economic Profit = Accounting Profit - Capital Charge
= NOPAT - [r x TC]
= [r* - r] x TC

Suppose the cost of capital for both of these companies is r = 10%. What are their economic profits?

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Economic Profits for Companies A and B

	Co. A	Co. B
Method 1:		
Total Capital		
x Cost of Capital (r=10%)	x 10 %	x 10 %
Capital Charge		
NOPAT		
- Capital Charge		
Economic Profits		

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Economic Profits for Companies A and B

	Co. A	Co. B
Method 2:		
ROTC (r^*)		
- Cost of Capital (r=10%)	-10 %	- 10 %
Spread = [r^* - r]		
x Total Capital		
Economic Profits		

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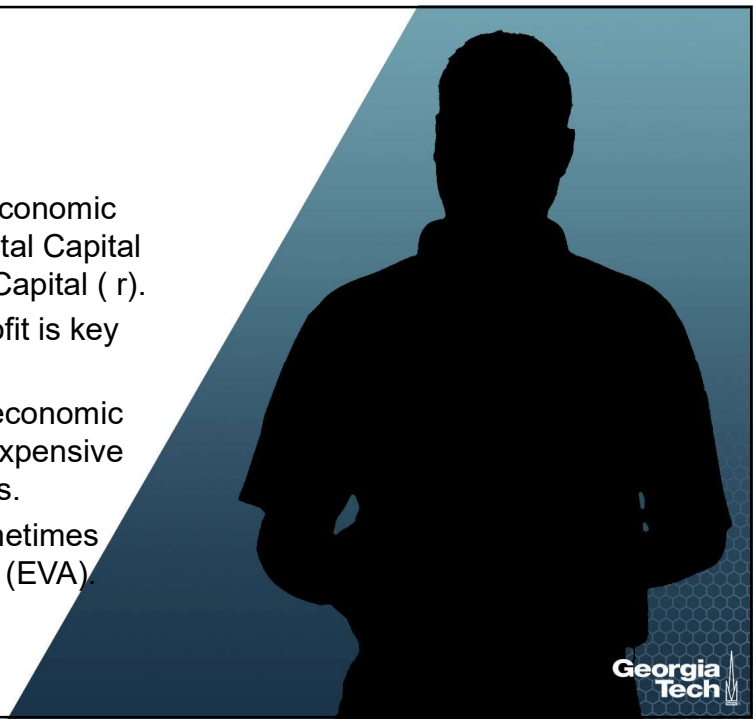
Economic Profits

- Companies earns a positive economic profits only if the Return on Total Capital (r^*) is greater than its Cost of Capital (r).
- Earning positive economic profit is key to financial success.
- Companies that cannot earn economic profits will find it difficult and expensive to attract capital from investors.
- Economic profits are also sometimes called Economic Value Added (EVA).



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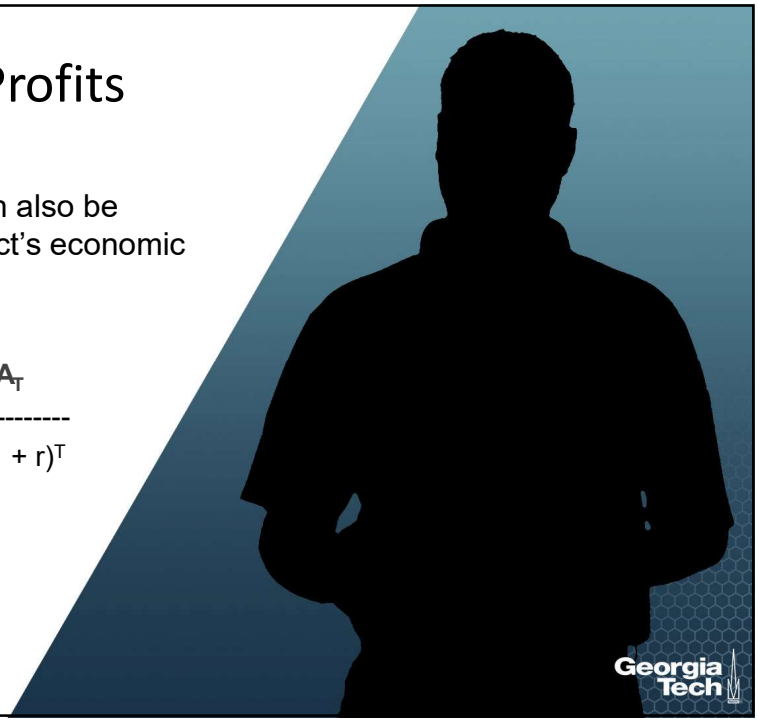
NPV and Economic Profits

The Net Present Value (NPV) can also be calculated by discounting a project's economic profits (EVA) over its life.

$$NPV = \frac{EVA_1}{1 + r} + \frac{EVA_2}{(1 + r)^2} + \cdots + \frac{EVA_T}{(1 + r)^T}$$



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Discounting an investment's Annual EVA Stream is equivalent to calculating the investment's NPV.

(a) Standard NPV Analysis

	Year				
	0	1	2	3	4
Initial investment	$(100.00)				
Revenue		$80.00	$80.00	$80.00	$80.00
Cash Expense		13.33	13.33	13.33	13.33
Depreciation		25.00	25.00	25.00	25.00
Income before tax		41.67	41.67	41.67	41.67
Tax at 40%		16.67	16.67	16.67	16.67
Income aftertax		25.00	25.00	25.00	25.00
Depreciation		25.00	25.00	25.00	25.00
Aftertax cash flow	$(100.00)	$50.00	$50.00	$50.00	$50.00
NPV at 10%	$ 58.50				

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Discounting an investment's Annual EVA Stream is equivalent to calculating the investment's NPV.

(b) Discounted EVA Analysis

	Year				
	0	**1**	**2**	**3**	**4**
Capital employed		$ 100.00	$ 75.00	$ 50.00	$ 25.00
r		0.10	0.10	0.10	0.10
r x Capital		10.00	7.50	5.00	2.50
EBIT(1 - *t*)		25.00	25.00	25.00	25.00
- *r* x Capital		10.00	7.50	5.00	2.50
EVA		$ 15.00	$ 17.50	$ 20.00	$ 22.50
EVA discounted at 10%	$ 58.50				

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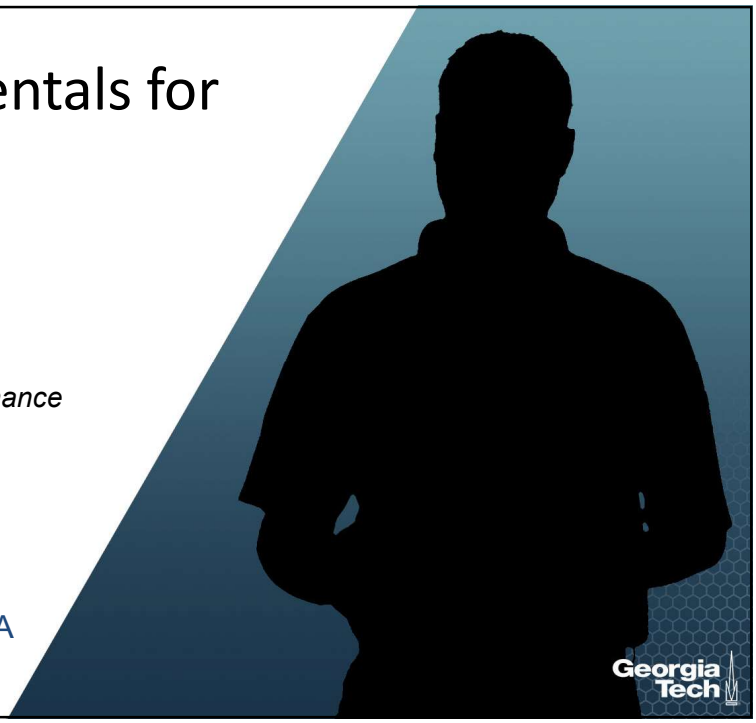

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Economic Profits and Stock Prices

There is a high correlation between economic profits (EVA) and stock prices.

Market Value Added (MVA) is the difference between the market value and book value of the company's equity.

MVA = Market Value of Equity - Book Value of Equity

MVA measures the total wealth created for shareholders by the corporation.

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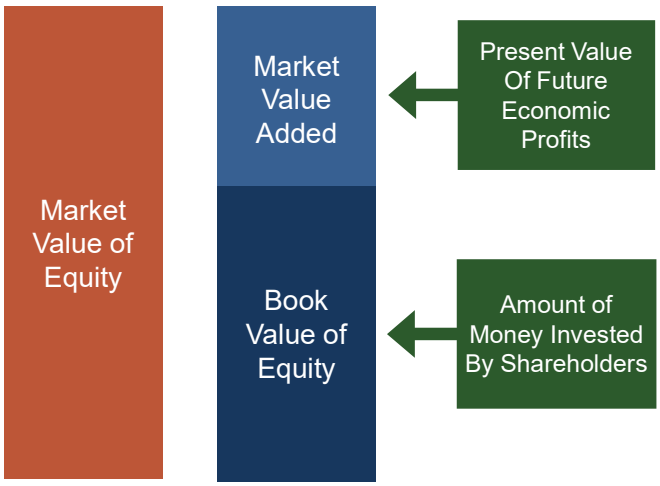
MVA and Economic Profits



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Market Value Added (MVA) for Home Depot

Recent information is given for Home Depot in the following page. Use this information to calculate Home Depot's MVA.

Stock Price per share _____
- Book Value per share _____
= Market Value Added per Share _____
X Number of Shares Outstanding _____
= Market Value Added (MVA) _____

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The Home Depot, Inc. (HD)
NYSE - NYSE Delayed Price. Currency in USD

Add to watchlist

205.66 -0.89 (-0.43%)
At close: April 18 4:00PM EDT

Buy

Summary | Chart | Conversations | Statistics | Historical Data

Valuation Measures

Market Cap (intraday) [5]	226.79B
Enterprise Value [3]	253.14B
Trailing P/E	21.14
Forward P/E [1]	18.63
PEG Ratio (5 yr expected) [1]	1.90
Price/Sales (ttm)	2.10
Price/Book (mrq)	N/A
Enterprise Value/Revenue [3]	2.34
Enterprise Value/EBITDA [6]	14.12

Source: Yahoo Finance April 19, 2019

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Fiscal Year	
Fiscal Year Ends	Feb 2, 2019
Most Recent Quarter (mrq)	Feb 2, 2019
Profitability	
Profit Margin	10.28%
Operating Margin (ttm)	14.58%
Management Effectiveness	
Return on Assets (ttm)	22.28%
Return on Equity (ttm)	N/A
Income Statement	
Revenue (ttm)	108.2B
Revenue Per Share (ttm)	95.17
Quarterly Revenue Growth (yoy)	10.90%
Gross Profit (ttm)	37.16B
EBITDA	17.93B
Net Income Avi to Common (ttm)	11.12B
Diluted EPS (ttm)	9.73
Quarterly Earnings Growth (yoy)	31.80%

Balance Sheet	
Total Cash (mrq)	1.78B
Total Cash Per Share (mrq)	1.61
Total Debt (mrq)	29.2B
Total Debt/Equity (mrq)	N/A
Current Ratio (mrq)	1.11
Book Value Per Share (mrq)	-1.70
Cash Flow Statement	
Operating Cash Flow (ttm)	13.04B
Levered Free Cash Flow (ttm)	8.67B
Dividends & Splits	
Forward Annual Dividend Rate [4]	5.44
Forward Annual Dividend Yield [4]	2.83%
Trailing Annual Dividend Rate [3]	4.45
Trailing Annual Dividend Yield [3]	2.15%
5 Year Average Dividend Yield [4]	1.98
Payout Ratio [4]	42.34%
Dividend Date [3]	Mar 27, 2019
Ex-Dividend Date [4]	Mar 12, 2019
Last Split Factor (new per old) [2]	2/3
Last Split Date [3]	Dec 30, 1999

Trading Information

Stock Price History	
Beta (3Y Monthly)	1.22
52-Week Change [3]	16.69%
S&P500 52-Week Change [3]	8.63%
52 Week High [3]	215.43
52 Week Low [3]	158.09
50-Day Moving Average [3]	191.73
200-Day Moving Average [3]	183.38
Share Statistics	
Avg Vol (3 month) [3]	4.38M
Avg Vol (10 day) [3]	3.2M
Shares Outstanding [5]	1.1B
Float	1.1B
% Held by Insiders [1]	0.11%
% Held by Institutions [1]	72.23%
Shares Short (Mar 28, 2019) [4]	9.61M
Short Ratio (Mar 28, 2019) [4]	2.05
Short % of Float (Mar 28, 2019) [4]	0.87%
Short % of Shares Outstanding (Mar 28, 2019) [4]	0.87%
Shares Short (prior month Feb 27, 2019) [4]	8.38M

Source: Yahoo Finance April 19, 2019

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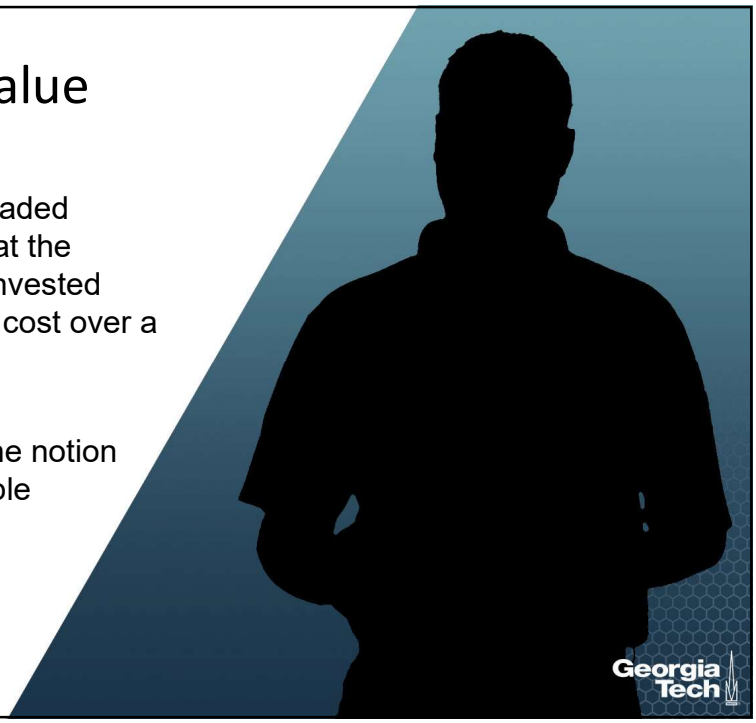
MVA vs. Economic Value

A large positive MVA of publicly traded company represents the belief that the company can achieve return on invested capital which exceeds the capital cost over a sustained period in future.

This expectation is based upon the notion that the company has a sustainable competitive advantage.



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Sources of Competitive Advantage

Markets	GE
Brand	Coca-Cola, Altria
Product Development	Apple
Cost Leadership	Walmart, Home Depot

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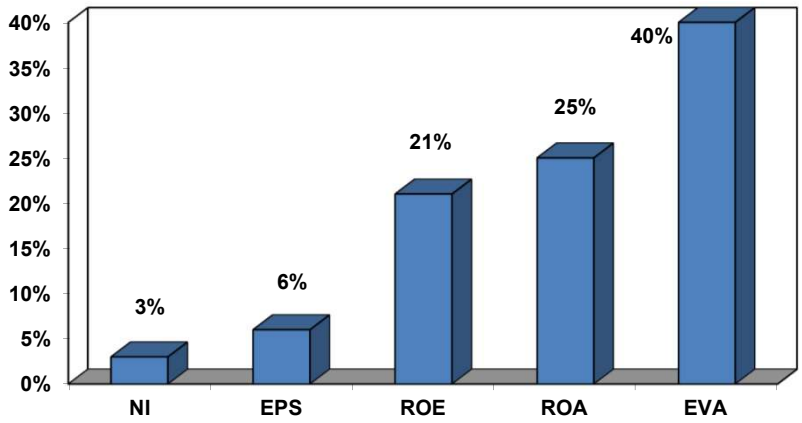
What is a Good Predictor of ΔMVA?



NI=Net Income; Earnings per share; Return on Equity; Return on Assets

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Creating Economic Value

Investors value companies based upon their ability to produce economic profits.

There are basically three ways a company can improve its economic profits and increase its stock price:

- **Manage**: Increase efficiency of existing operations and thus improve the spread between r^* and r.
- **Build**: Invest in businesses and projects with positive spreads between r^* and r.
- **Harvest**: Withdraw capital from operations or activities where r^* is less than r.

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Incentive-Based Compensation and Economic Profits

Many companies use economic profits (EVA) to determine performance-based compensation.

Advantages of economic profits as a measure of performance:

- Rewards managers for what shareholders value the most economic profits.
- Accounts for all the costs associated with running a business, including the cost of capital.
- Gives managers the incentive to improve both operating efficiency and capital efficiency.
- Provides a clear-cut benchmark for evaluating performance.

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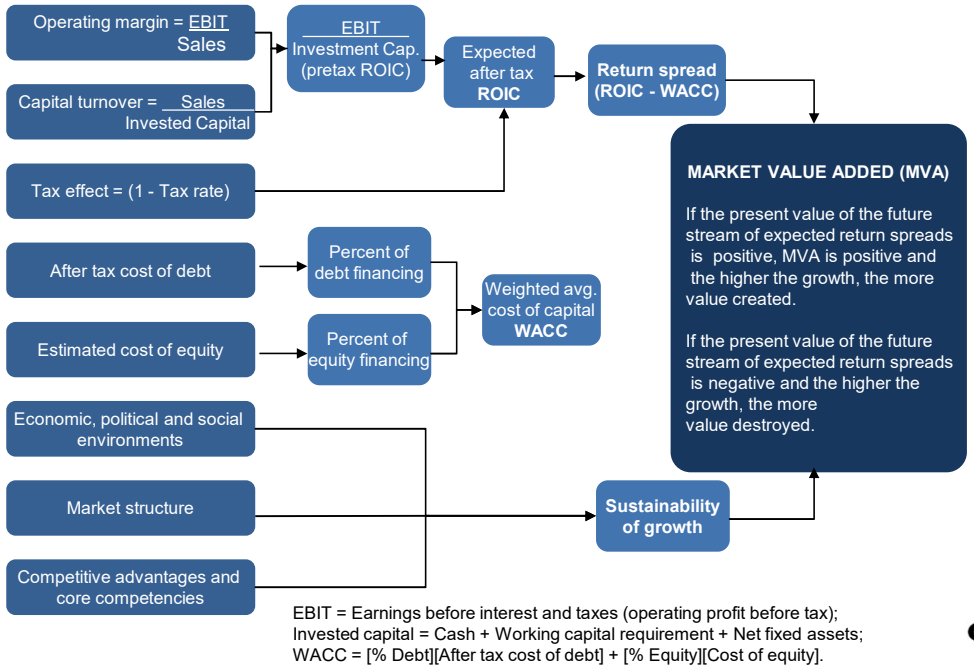

EBIT = Earnings before interest and taxes (operating profit before tax);
Invested capital = Cash + Working capital requirement + Net fixed assets;
WACC = [% Debt][After tax cost of debt] + [% Equity][Cost of equity].

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Summary (1 of 3)

- The economic value created by the long-lived investment projects is measured by the Net Present Value (NPV).
- To create value for shareholders, invest in projects with positive NPV.
- Stocks are valued as the present value of all future expected dividends.
- The cost of equity depends upon (I) the current level of interest rates and (ii) the risk of the stock.
- Risk is measured by the stock's beta.
- The Capital Asset Pricing Model (CAPM) provides a practical method for estimating the cost of equity based upon the stock's beta.

Cost of Equity = Treasury Bond Rate + (Market Risk Premium) x Beta

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Summary (2 of 3)

- The cost of capital is the rate of return the corporation must earn on its invested capital in order to compensate for the time value of money and risk.
- The cost of capital is a weighted-average of the cost of debt and the cost of equity. This is called the Weighted Average Cost of Capital (WACC).

WACC = Cost of Debt x (1-Tax Rate) x (Debt/(Debt+Equity))
+ Cost of Equity x (Equity/(Debt+Equity))

- The value of a firm is the present value of projected free cash flows discounted at its weighted average cost of capital.

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Summary (3 of 3)

- Economic Profits measure the value created for shareholders in a given year. Earning positive economic profits is the key to financial success for any business.

Economic Profits = NOPAT - [r x Total Capital]
= [r* - r] x Total Capital

- Stock Prices are highly correlated with changes in the company's economic profits.
- Market Value Added (MVA) measures the total wealth created for shareholders by management. It reflects investors' confidence in the company's ability to create economic profits in the future.

MVA = Market Value of Equity - Book Value of Equity

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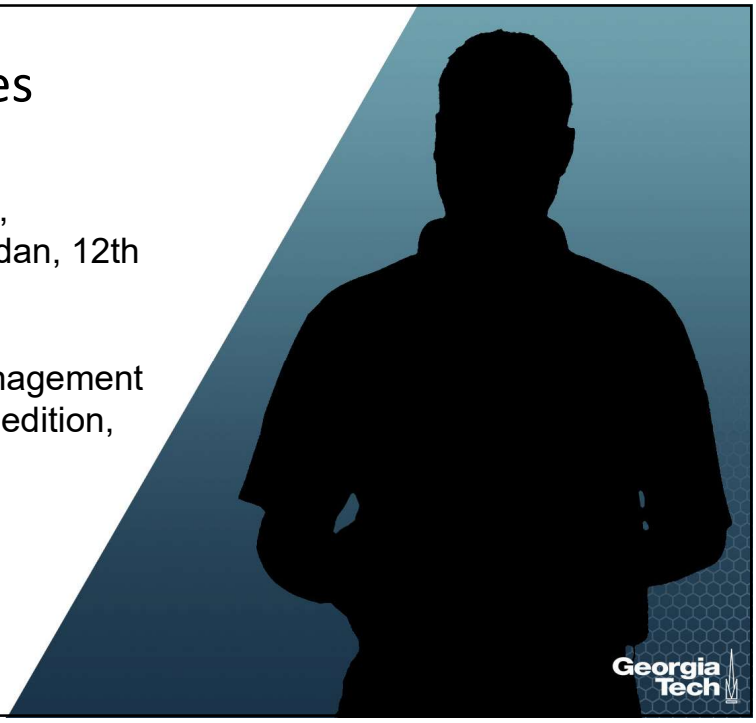
Additional References

1. Corporate Finance - Ross, Westerfield, Jaffe and Jordan, 12th edition, Irwin/McGraw Hill.

2. Analysis for Financial Management - Robert Higgins, 12th edition, Irwin/McGraw Hill.



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Glossary

Beta - A measure of market risk of a stock i.e. risk that cannot be diversified away.

Compounding - The growth of a sum of money over time through the reinvestment of interest earned to earn more interest.

Cost of equity - Return equity investors expect to earn by holding shares in a company. The expected return foregone by equity investors in the next best equal-risk opportunity.

Discounting - Process of finding the present value of future cash flows.

Economic Value Added - A business's or a business unit's operating income after tax less a charge for the opportunity cost of capital employed. It is computed by taking the spread between the return on capital and the cost of capital, and multiplied by the capital outstanding at the beginning of the year.

Internal rate of return - Discount rate at which the which the project's net present value equals zero.

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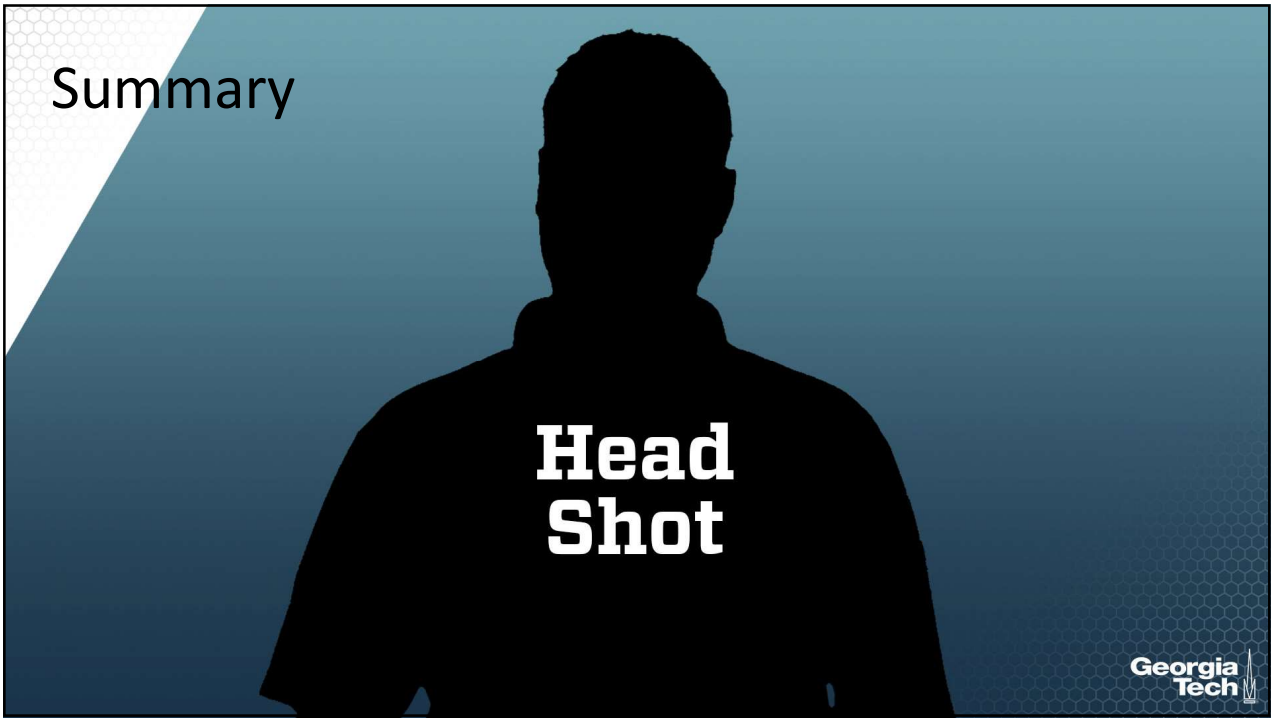

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