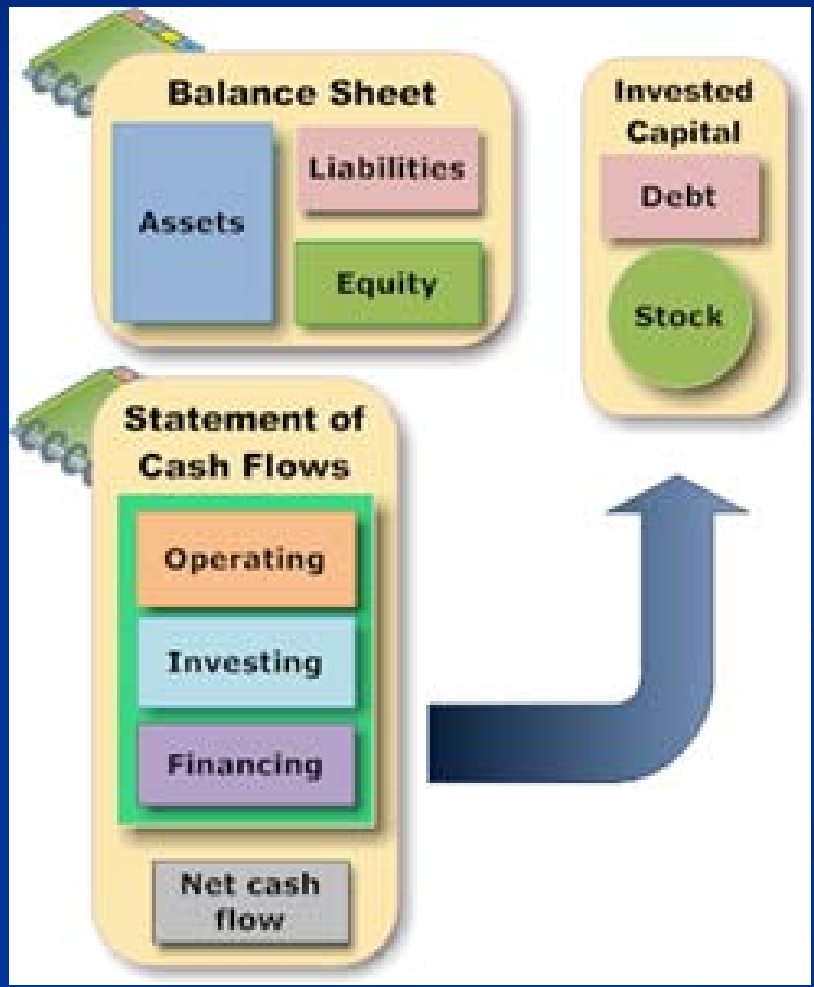
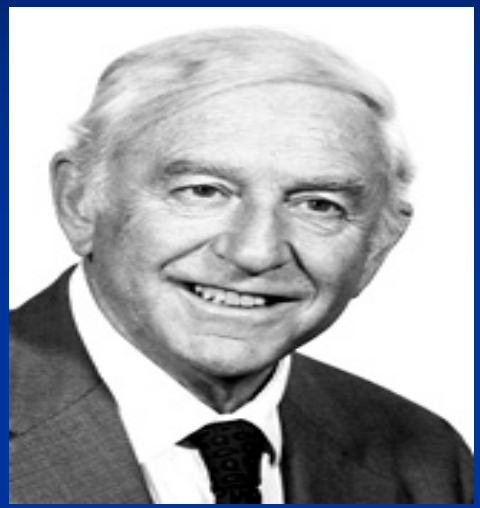
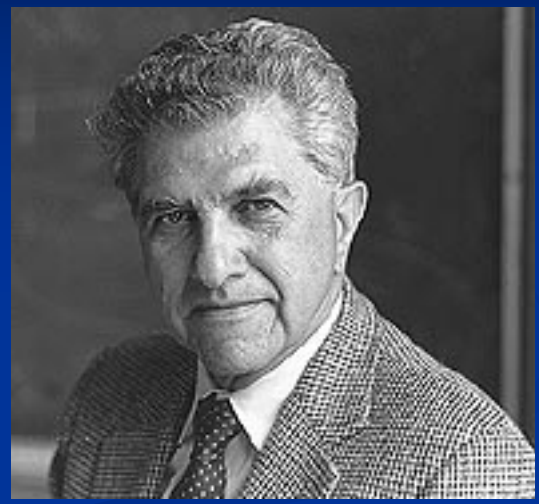
Discounted Free Cash Flow



M&M's: not just candy

M&M





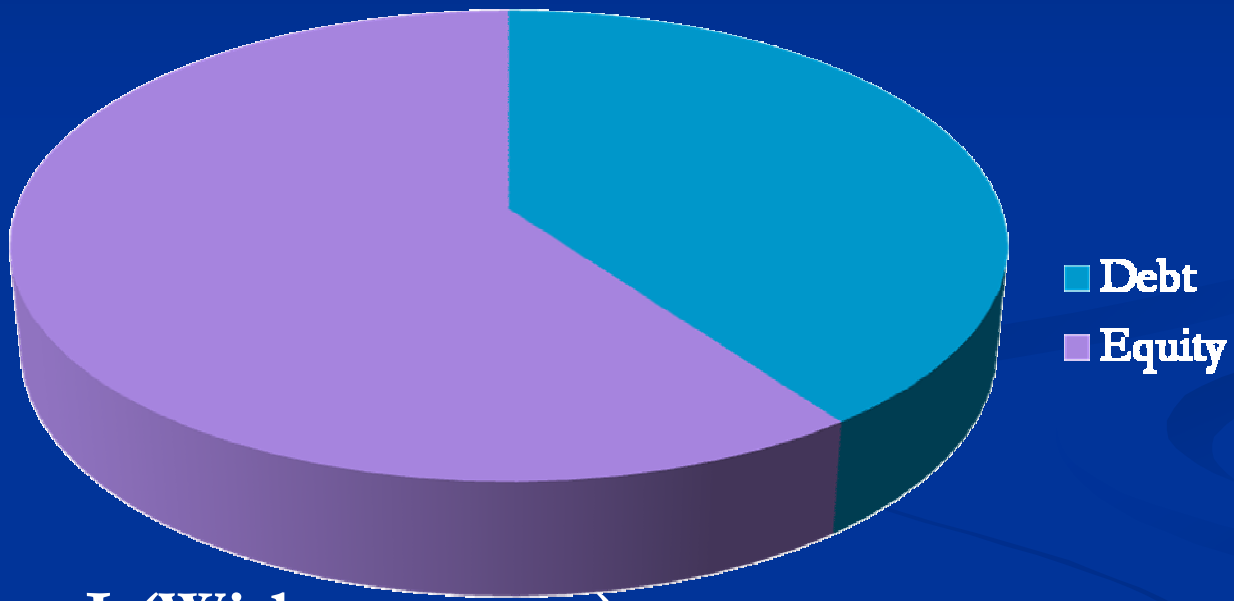
Franco Modigliani

Merton Miller

Noble Prize in Economics:
Modigliani in 1985, Miller in 1990

Value of a Firm

Value = Debt + Equity



Proposition I (Without taxes):
in a world without taxes, bankruptcy costs and asymmetric information; the value of a firm is unaffected by how the firm is financed

Value = Equity + Debt

Value = $300,000
20% Down payment
80% mortgage

$60,000 Equity
+$240,000 Debt

= $300,000 Value

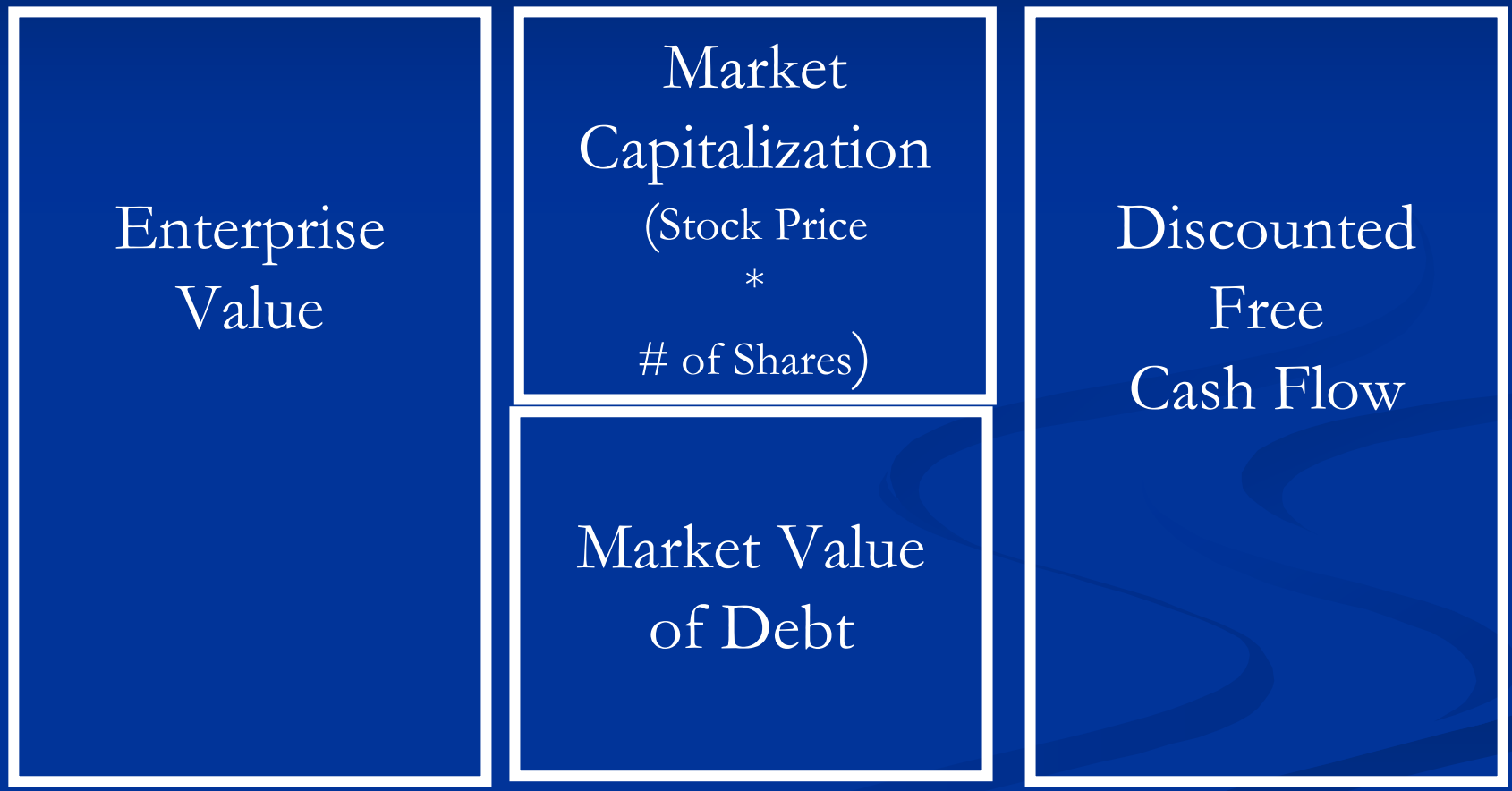
Value = Equity + Debt

Value = $10,000
20% Down payment
80% Car loan

$2,000 Equity
+$8,000 Debt

= $10,000 Value

Value = Equity + Debt



Value = Equity + Debt

Equity + Debt = Enterprise Value

Equity = Market Capitalization (Market Cap)

Stock Price x # of Shares = Market Cap

$$\frac{\text{Enterprise Value} - \text{Debt}}{\text{\# of Share outstanding}} = ?$$

Income Statement

XYZ Corporation Inc.
Income Statement
For the year ended December, 31 2003

	Notes	2003	2002
Revenue	20		
Sales		2,920,093	2,633,626
Services		955,214	725,458
Total Revenue		**3,875,307**	**3,359,084**
Cost of Goods Sold			
Materials		854,521	733,352
Labor & Subcontractors Costs		602,125	536,645
Other Cost of goods sold		384,521	350,241
Increase / Decrease in Inventories	21	-26,040	-30,254
Total Cost of Goods Sold		**1,815,127**	**1,589,984**
Gross Income		**2,060,180**	**1,769,100**
Operating Expenses			
Selling		480,161	441,256
General & Administrative	22	758,542	675,992
Other Operating Expense	23	275,541	260,887
Depreciation		59,312	50,221
Total Operating Expenses		**1,573,556**	**1,428,356**
Net Income before Operations		**486,624**	**340,744**
Operating Income (Loss)			
Other income (expense)	24	32,512	-2,521
Interest expense		75,421	62,584
Total Operating Income		**107,933**	**60,063**
Income (Loss) Before Income Taxes		378,691	280,681
Provision (benefit) for income taxes	25	149,523	133,251
Net Income (Loss) for the year		**229,168**	**147,430**
Retained Earnings beginning of the year	26	943,314	795,884
Retained Earnings		**1,172,482**	**943,314**

Balance Sheet

	Starting	Month 1	Month 2	Month 3
Assets				
Current				
Cash	$3,000	$1,699	$1,891	$787
Accounts Receivable	$0	$8,500	$17,567	$19,323
Inventory	$2,000	$4,750	$5,225	$5,748
Other Current Assets	$1,850	$1,850	$1,850	$1,850
Total Current Assets	$6,850	$16,799	$26,532	$27,708
Long-term				
Long-term Assets	$11,000	$11,000	$11,000	$11,000
Less depreciation	$0	$183	$367	$550
Total Long-term Assets	$11,000	$10,817	$10,633	$10,450
Total Assets	$17,850	$27,615	$37,166	$38,158

	Starting	Month 1	Month 2	Month 3
Liabilities and Capital		Month 1	Month 2	Month 3
Current Liabilities				
Accounts payable	$0	$9,202	$7,610	$8,441
Current Borrowing	$0	$0	$13,000	$12,500
Other Current Liabilities	$0	$0	$0	$0
Total Current Liabilities	$0	$9,202	$20,610	$20,941
Long-term Liabilities	$10,000	$9,864	$9,730	$9,597
Total Liabilities	$10,000	$19,065	$30,340	$30,538
Capital				
Paid-in Capital	$0	$0	$0	$0
Earnings	$0	$700	$1,476	$2,270
Retained Earnings	$7,850	$7,850	$7,850	$7,850
Total Capital	$7,850	$8,550	$9,326	$10,120
Total Liabilities and Capital	$17,850	$27,615	$39,666	$40,658
Net Worth	$7,850	$8,550	$6,826	$7,620

Statement of Cash Flow

Cash Flow Statement
For the month ended January 31, 2002

Operating Activities	
Net Income	$ 7,000
Plus Depreciation Expense	1,000
Less Gain on Sale of Stock	(500)
Less Increase in Accounts Rec.	(10,000)
Less Increase in Inventory	(5,000)
Plus Increase in Accounts Pay.	20,000
Plus Increase in Interest Pay.	500
Cash flow from operating activities	$ 13,000
Investing Activities	
Purchase of equipment	$(60,000)
Purchase of securities	(3,000)
Sale of securities	3,500
Cash flow from investing activities	$ (59,500)
Financing Activities	
Issuance of stock	$200,000
Increase in notes payable	50,000
Repurchase of treasury stock	(100)
Cash flow from financing activities	$ 249,900
Total cash flow	$ 203,400
Beginning cash	0
Ending cash	$ 203,400

Link between 3 statements

Net Income – Dividends = Change in Retained Earnings

Change in Cash = Cash Flow from Operations
+ Cash Flow from Financing
+Cash Flow from Investing

Free Cash Flow

Debt Holders
(loans + bonds)

Equity Holders
(stocks)

Discounted Free Cash Flow

- *Discounted* brought to present value to take into account time value of money
- Cash flow to *all* security holders, and debt holders

- *Free* cash flow generated by the firm that, in principle can be paid out without affecting the operations of the firm

- Free cash flow is a company's true operating cash flow. It is the total after-tax cash flow generated by the company that is available to all providers of the company's capital, both *creditors* and *shareholders*.
It can be thought as the after-tax cash flow that would be available to the company's shareholders if the company had no debt. Free cash flow is before financing and therefore not affected by the company's financial structure.

Discounted Free Cash Flow

- How is free cash flow different than net income?

Free Cash Flow

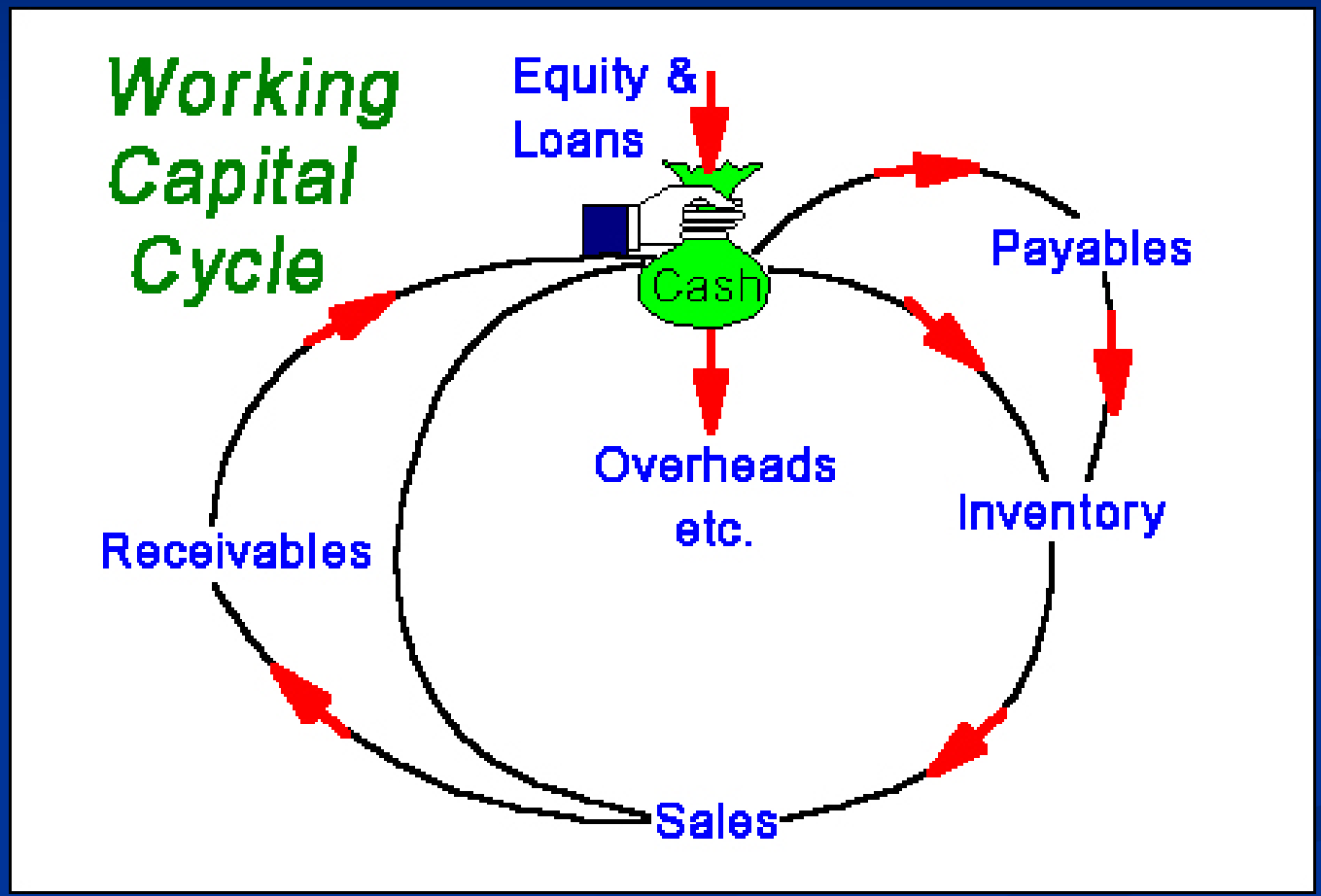
Sales	(I/S)
-Cost of Good Sold (COGS)	(I/S)
-General Expenses (SG&A)	(I/S)
-Depreciation	(I/S); Notes

=Pre-tax Profit (EBIT)	
-Income taxes	(I/S)

+Depreciation	
-Capital Expenditures	(C/F)
-Change in Net Working Capital	(B/S)

=Free Cash Flow	

Net Working Capital



Net Working Capital

Current Assets
-Current Liabilities

=Net Working Capital

Accounts Receivable
+Inventory

=Current Assets

Accounts Payable
+Taxes Payable

=Current Liabilities

Change in Net Working Capital

- Subtract increases in Current Assets (A/R; Inventory)
+Add increases in Current Liabilities (A/P)

=Change in Net Working Capital

- Increases in Accounts Receivables represents sales that have not been collected and therefore did not produce any cash
- Increases in Inventory has not been recognized as part of COGS, but was fully paid for
- Increases in Accounts Payable represents costs that have not yet been paid for

Collect Historic Data

	2002	2003	2004	2005	2006	2007
Sales		23,367	24,549	26,441	26,014	25,559
COGS		21,550	22,805	24,550	24,274	24,631
SG&A		446	404	422	463	454
Depreciation		431	427	458	465	481
CAPEX		433	402	486	571	531
PP&E		4,038	4,039	3,964	4,007	3,945
Accounts Receivable	1,199	1,101	1,280	1,280	1,214	1,183
Inventory	1,911	1,885	1,994	1,994	2,062	2,057
Accounts Payable	799	755	838	838	961	942

All figures are in 000's of USD

Calculate Historic %

	2002	2003	2004	2005	2006	2007	Avg
Sales	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	
COGS		92.22%	92.90%	92.85%	93.31%	96.37%	**93.53%**
SG&A		3.75%	3.39%	3.33%	3.57%	3.66%	**3.54%**
Depreciation		1.84%	1.74%	1.73%	1.79%	1.88%	**1.80%**
CAPEX							
PP&E		17.28%	16.45%	14.99%	15.40%	15.43%	**15.91%**
Accounts Receivable		5.10%	5.21%	4.84%	4.67%	4.63%	**4.89%**
Inventory		8.07%	8.12%	7.54%	7.93%	8.05%	**7.94%**
Accounts Payable		3.23%	3.41%	3.17%	3.69%	3.69%	**3.44%**

Project Sales

	2003	2004	2005	2006	2007	CAGR
Sales	23,367	24,549	26,441	26,014	25,559	**2.27%**

Project Free Cash Flow

		2007	2008E	2009E	2010E	2011E	2012E
	Sales	25,559	26,326	27,116	27,929	28,767	29,630
(-)	COGS		24,622	25,361	26,122	26,906	27,713
(-)	SG&A		458	472	486	501	516
(-)	Depreciation		473	487	502	517	532
=	Pre-tax profit		772	795	819	843	869
(-)	Taxes		270	278	287	295	304
(+)	Depreciation		473	487	502	517	532
(-)	Capital Expenditures		477	606	624	643	662
(-)	Increases in A/R		84	38	39	40	42
(-)	Increase in Inventory		34	63	65	67	69
(+)	Increases in A/P		(37)	27	28	29	30
=	Free Cash Flow		344	325	334	344	355

PP&E	3,945	3,949	4,067	4,189	4,315	4,444
Accounts Receivable	1,183	1,267	1,305	1,344	1,384	1,426
Inventory	2,057	2,091	2,153	2,218	2,284	2,353
Accounts Payable	942	905	932	960	989	1,019

Assumptions

- Sales growth = 3.00%
- COGS/ Sales = 93.53%
- SG&A / Sales = 1.74%
- Tax Rate = 35%
- Depreciation / Sales = 1.80%
- PP&E / Sales = 15%
- CAPEX = Change in PP&E + Depreciation
- Account Receivable / Sales = 4.81%
- Inventory / Sales = 7.94%
- Accounts Payable / Sales = 3.44%

Are we done?

Terminal Value

- Different Approaches:
  - Perpetuity — $P.V. = FCF_{(T)} / r$
  - Growing Perpetuity — $P.V. = FCF_{(T)} / (r - g)$
  - Exit Multiple — $P.V. = FCF_{(T)} * \text{Multiple}$
- To do this you need to calculate
  - r = company's cost of capital
  - g = company's long term growth
- Let's assume r = 6.5% and g = 1.5%

Terminal Value

- Perpetuity : P.V. = $FCF_{(T)}$ / r

$$P.V. = \frac{355}{6.5\%} = 5{,}459$$

- Growing Perpetuity : P.V. = $FCF_{(T)}$ / (r – g)

$$P.V. = \frac{355}{(6.5\% - 1.5\%)} = 7{,}097$$

- Exit Multiple: P.V. = $FCF_{(T)}$ * Multiple

$$P.V. = 355 * 15 = 6{,}032$$

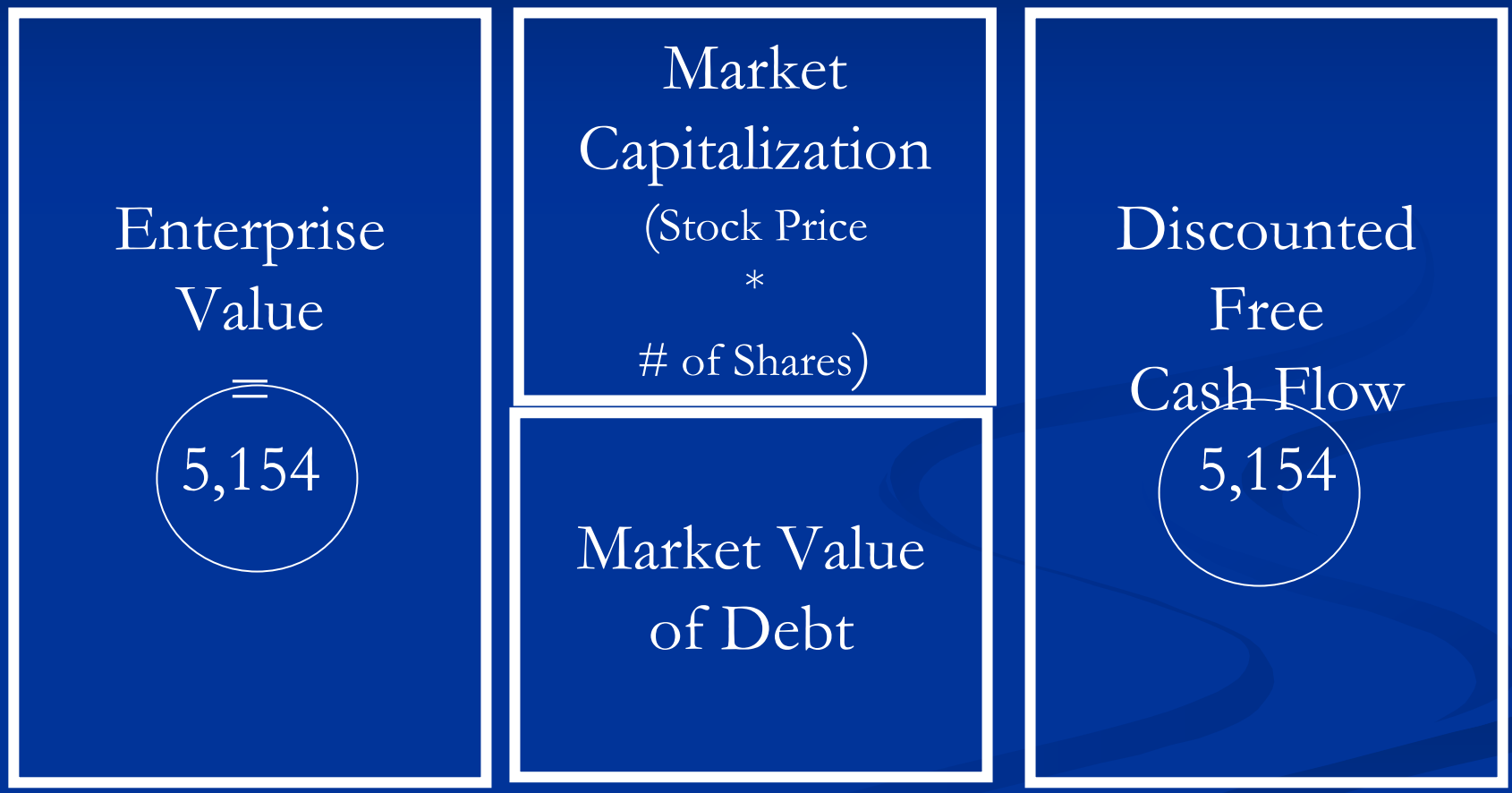
Value of the Firm

	2008E	2009E	2010E	2011E	2012E	Terminal Value
Free Cash Flow	**344**	**325**	**334**	**344**	**355**	**5,459**
Present Value	323	286	277	268	259	3,741
Value of Firm	**5,154**					

- **Note: Discounted using a weighted average cost of capital (WACC) of 6.5%**

Remember M&M?

Value = Equity + Debt



What is the company's stock price?

Assume the Company has 3,000 of Debt (Balance sheet)

Assume company has 165,000 shares outstanding (10K)

Lets calculate the stock price

What is the company's stock price?

		2008E	2009E	2010E	2011E	2012E	Terminal Value
=	Free Cash Flow	344	325	334	344	355	5,459
	Present Value	323	286	277	268	259	3,741
	Value of Firm	5,154					
-	Value of Debt	2,000					
=	Value of Equity	3,154					
	Shares outstanding	165,000					
	Stock Price	19.11					