

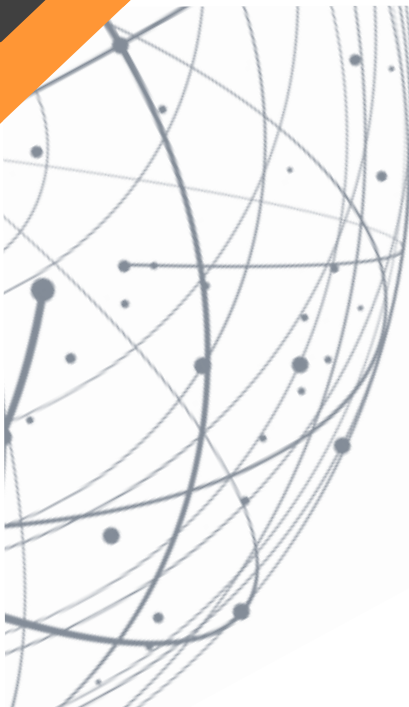
# **COMM 370 – Corporate Finance**

## **MIDTERM REVIEW SESSION**

Jason Van – October 19, 2020



# Agenda



0	AC Introduction & Midterm Exam Info	5 mins
1	Topic 1 – Financial Analysis (Cash cycles, working capital)	20 mins
2	Topic 2 – Finance Planning, Forecasting and EFN	30 mins
3	Break – 10 minute break	
4	Topic 3 – Valuation & Capital Budgeting (APV, WACC, CFTE)	45 mins
5	Topic 4/5 – Raising Capital & Corporate Governance	15 mins
6	Break – 10 minute break	
7	Practice Mid-term Questions & Walk through	Remainder of time





# Information about the Midterm Exam 2020

**Exam Date:** Saturday, October 24, 2020

**Exam Time:** 7:00 pm PDT\* The exam will be 2 hours long.

*\*Start the exam as close to 7pm as possible, because UBC exam policy requires all students to start their exam within 30 minutes of the official start time. After 30 minutes, students will be locked out of the exam.*

**Exam Location:** Online Canvas exam written remotely and proctored online by Proctorio. Due to the online and offsite nature of the exam, students will be required to do an academic integrity pledge as part of the exam.

**Exam content:**

- Students are responsible for all the material contained in lecture notes, recordings, problem sets, class discussions and assignments for Topics 1 through 5.
- Students are responsible for the key concepts illustrated in the Clarkson Lumber Case and discussed in class.

**The following items are permitted:**

- A formula sheet will be provided in a link on the exam. A copy of this formula sheet is also posted on Canvas in the Midterm Exam Information module and may be printed out in advance of the exam.
- Calculators are essential, but must NOT have graphing, text display, or wireless communication capabilities. Only non-graphing calculators are allowed.
- Scrap paper may be used during the exam for calculations, but all answers must be entered directly in the Canvas exam as indicated. Students will \*not\* be required to upload any work



# Introductory Poll



**Question 1: How is everyone feeling for the 370 midterm? (Single choice)**

- A) Confident – I've studied a lot and done most of the practice problems
- B) Good – I've reviewed the lectures and done some practice problems
- C) Okay – I've reviewed some notes but have NOT done any practice problems
- D) Bad – I haven't even started reviewing the notes
- E) Really bad – I don't even know what I'm doing

**Question 2: What are you looking to get most out of this session? (Multi choice)**

- A) Answers for the practice midterm
- B) Basic memory refresher of core concepts
- C) I need to learn the entire course in the next 3 hours
- D) Tips and tricks to do well on the exam
- E) Just here for a good time, not a long time
- F) Step-by-step guidance to answering questions
- G) All of the above (Don't select any other ones if you choose this option)





1

## Topic 1 – Financial Analysis

*Ratios, Bankruptcy Prediction, Operating & Cash Cycles*





# Learning objectives

1

Why do we need financial ratios?

2

5 Types of financial ratios (Leverage Ratios, Liquidity Ratios, Profitability Ratios, Efficiency Ratios, Market Value Ratios)

3

Using Z-Score as an indicator of bankruptcy

4

Operating Cycle, Cash Cycle, Sources & Uses of Cash



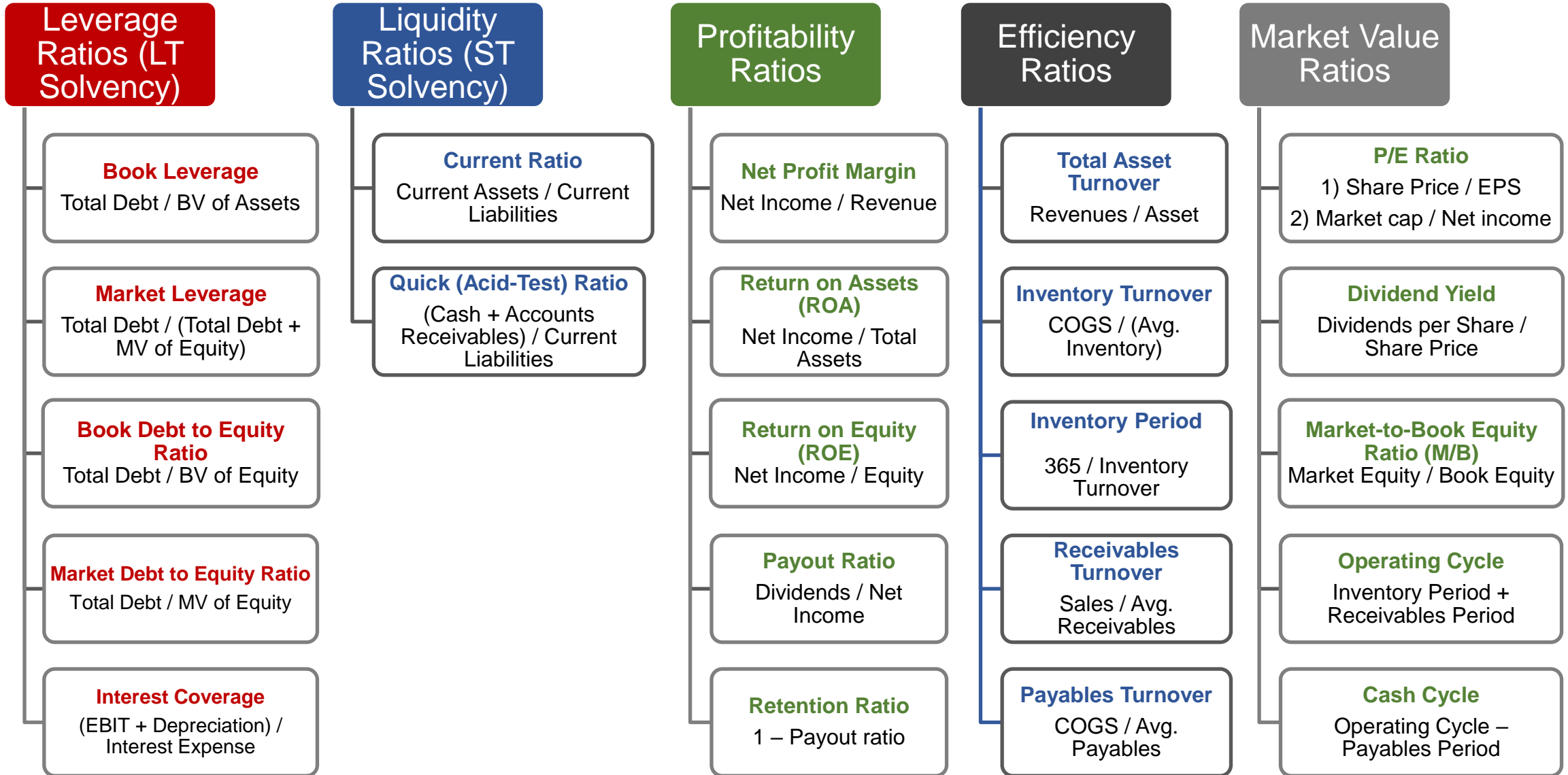


# Why do we need financial ratios?

## Financial Ratios

- Financial ratios help describe a firms CURRENT and PAST financial situations
- Tools are useful in the real world! Financial analysts look at ratios and compare it all the time
- Helps investors monitor a firms activities
- Sources & uses of cash can be derived from accounting data

# 5 types of financial ratios





# Exam tip! Label your formula sheet and outline the categories

## Ratios and Financial Analysis:

Book Leverage = Total Debt / BV of A  
 Market Leverage = Total Debt / (Total Debt + MV of E)  
 Book Debt to Equity = Total Debt / BV of E  
 Market Debt to Equity = Total Debt / MV of E  
 Interest Coverage = (EBIT + Depreciation) / Interest Expense

Current Ratio = CA / CL  
 Quick (Acid-Test) Ratio = (Cash + Receivables) / CL

Net Profit Margin = NI / Revenues  
 Total Asset Turnover = Revenues / A  
 ROA = NI / A (or Net profit margin x Total Asset Turnover)  
 ROE = NI / E (or Net profit margin x Total Asset Turnover x Assets/Equity)  
 Payout Ratio = Dividends / NI  
 Retention Ratio = 1 – Payout Ratio

P/E Ratio = Share Price / EPS  
 Dividend Yield = Dividend per Share / Share Price  
 Market-to-Book Equity = MV of E / BV of E

Inventory Turnover = COGS / Avg. Inventory  
 Inventory Period = 365 / Inventory Turnover  
 Receivables Turnover = Revenues / Avg. Receivables  
 Receivables Period = 365 / Receivables Turnover  
 Payables Turnover = COGS / Avg. Payables  
 Payables Period = 365 / Payables Turnover  
 Operating Cycle = Inventory Period + Receivables Period  
 Cash Cycle = Operating Cycle – Payables Period

Leverage Ratios

Liquidity Ratios

Profitability Ratios

Market Value Ratios

Efficiency Ratios

# Altman's Z-Score Model for Bankruptcy Prediction

## Altman's Z-Score Model

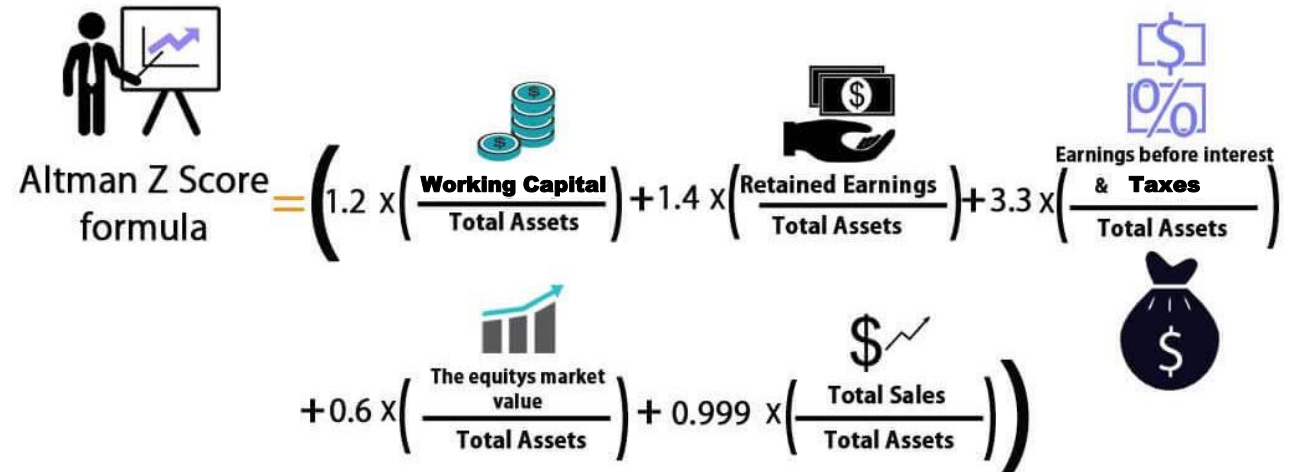
$$\text{Z-Score Formula} = 1.2 (A) + 1.4 (B) + 3.3 (C) + 0.6 (D) + 1.0 (E)$$

### Where:

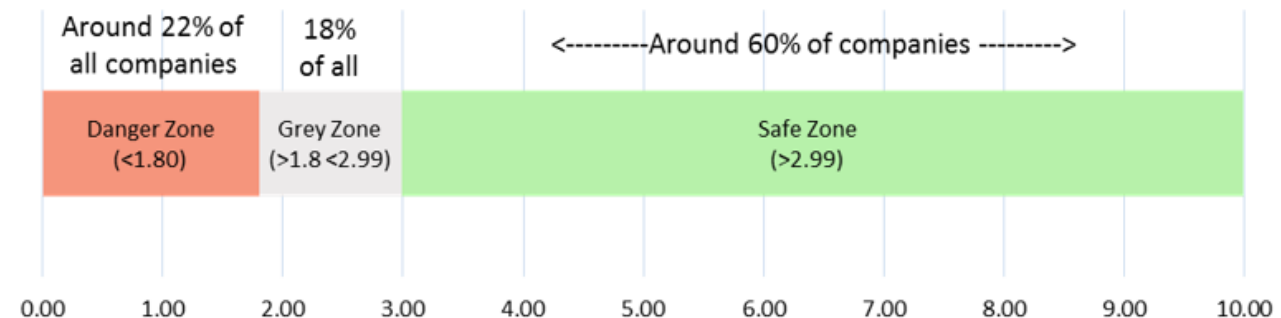
- (A) = Net Working Capital / Total Assets
- (B) = Retained Earnings / Total Assets
- (C) = EBIT / Total Assets
- (D) = Market Value of Equity / Book Value of Total Liabilities
- (E) = Total Sales / Total Assets

### Also known as:

- (A) = Net Working Capital / Total Assets
- (B) = Retained Earnings / Total Assets
- (C) = EBIT / Total Assets
- (D) = Market Capitalization / Book Value of Total Liabilities
- (E) = Revenue / Total Assets



$$\text{Altman Z Score formula} = \left( 1.2 \times \left( \frac{\text{Working Capital}}{\text{Total Assets}} \right) + 1.4 \times \left( \frac{\text{Retained Earnings}}{\text{Total Assets}} \right) + 3.3 \times \left( \frac{\text{Earnings before interest \& Taxes}}{\text{Total Assets}} \right) + 0.6 \times \left( \frac{\text{The equity's market value}}{\text{Total Assets}} \right) + 0.999 \times \left( \frac{\text{Total Sales}}{\text{Total Assets}} \right) \right)$$



# Operating Cycle, Cash Cycle, Sources & Uses

## Formulas and Illustration

### Operating Cycle (OC)

Inventory Period (IP) + Avg. Receivables Period (ARP)

### Cash Cycle (CC)

OC – Avg. Payable Period (APP)  
= IP + ARP - APP

Cash cycle formula will determine need for short-term financing! Important to recognize.

### Cash Conversion Cycle Example

Operating Cycle			
Inventory Days = 90		Accounts Receivable Days = 60	
← Buy	Pay →	Sell →	Receive →
Accounts Payable Days = 30		Cash Conversion Cycle = 120	

## Sources & Uses of Cash

$$\Delta \text{Cash} = \text{Sources of cash} - \text{Uses of cash}$$

### Sources of cash:

Long-term debt issued  
New equity issued  
Increases in CL items  
Decreases in CA items (excl. cash)  
Decreases in fixed assets  
Operating Cash Flow

### Uses of cash:

Long-term debt reduced  
Equity retired  
Decreases in CL items  
Increases in CA items (excl. cash)  
Increases in fixed assets  
Dividends

Sources and uses of cash are **CHANGES** to operational balance sheet items for example, it is 'increases in CL items' instead of 'CL items'



# Learning Summary

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Why do we need financial ratios?

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5 Types of financial ratios (Leverage Ratios, Liquidity Ratios, Profitability Ratios, Efficiency Ratios, Market Value Ratios)

3

Using Z-Score as an indicator of bankruptcy

4

Operating Cycle, Cash Cycle, Sources & Uses of Cash





2

## Topic 2 – Financial Planning

*Forecasting, External Financing, Growth Rates*



## Learning objectives

- 1 Making assumptions for ratios, growth rates, and determining the external financing needed (EFN)
- 2 Identify the financial requirements of a business plan and evaluate different financing options
- 3 Internal Growth rate, sustainable growth rate, and the impact on debt to equity ratios
- 4 Clarkson lumber case – high level summary







# Forecasting assumptions and steps to forecasting

## Forecasting and assumptions

In addition to the forecast sales growth rate you need to use past ratios or industry information for the following:

- **Operating cost structure:** variable and fixed costs, gross margin, operating margin etc
- **Turnover ratios:** use credit terms given to customers / obtained from suppliers / inventory level required and historical ratios
- **Interest expense:** from loan agreements and o/s debt
- **Tax rate:** use effective tax rate from past
- **Capital asset requirements:** does sales growth lead to additional capacity requirements or not
- **Dividends:** consider dividend policy and past payout rate

### On the exam

- Growth rates and metrics are usually given
- Just forecast out each line item
- Be careful with your calculations!

## Steps to forecasting

- Step 1:** Write down all the assumptions (usually given) and solve for unknown variables
- Step 2:** Forecast the income statement
- Step 3:** Forecast the balance sheet
- Step 4:** Sum your Assets & Liabilities + Equity and determine the External Financing needed

## Example #1 – CMP Holdings

Suppose CMP Holdings wants to grow sales by 30% in 2021

### Assumptions for pro-forma income statement:

- Cost structure remains fixed: COGS is 60% of sales
- Operating expenses increases by 5%
- Interest expense is 5% of notes payable + long-term debt
- Tax rate is 40%
- Dividend policy is 1/3 of net income

### Assumptions for pro-forma balance sheet:

- All current assets grow by 25%
- Net fixed assets grow by 25%
- Accounts payable grows by 20%



# CMP Holdings Income Statement & Balance Sheet Example

## Example #1 – CMP Holdings

CMP Holdings Income Statement for 2020 (in thousands of dollars)	
	2020
Sales	7000
(-) COGS (60% of sales)	4200
(-) Operating Expenses	600
EBIT	2200
(-) Interest Expense	250
Taxable Income	1950
(-) Tax (40% tax rate)	780
Net income	1170
(-) Dividend (1/3 of NI)	390
Addition to retained earnings	780

CMP Holdings Balance Sheet as of Dec 2020	
Assets	2020
Cash	500
Accounts receivable	500
Inventory	600
Current Assets	1600
Net Fixed Assets	4150
<b>Total Assets</b>	<b>5750</b>

CMP Holdings Balance Sheet as of Dec 2020	
Liabilities & Equity	2020
Accounts payable (AP)	250
Notes payable	500
Current Liabilities	750
Long-term debt	2000
<b>Total Liabilities</b>	<b>2750</b>
Common Stock	1500
Retained Earnings	1500
<b>Total Equity</b>	<b>3000</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>



# Write down all your assumptions and forecast the income statement

**Step 1:** Write down all the assumptions (usually given) and solve for unknown variables

Suppose CMP Holdings wants to grow sales by 30% in 2021

**Assumptions for pro-forma income statement:**

- Cost structure remains fixed: COGS is 60% of sales
- Operating expenses increases by 5%
- Interest expense is 5% of beginning notes payable + long-term debt
- Tax rate is 40%
- Dividend policy is 1/3 of net income

Solve for interest expense figure

**Given:**

Notes Payable = \$500

LT Debt = \$2000

Total Interest-Bearing Debt = \$2500

**Solve:**

Interest Expense = \$2500 \* (0.05)

**Interest Expense = \$125**

CMP Holdings Balance Sheet as of Dec 2020	
Liabilities & Equity	2020
Accounts payable (AP)	250
Notes payable	500
Current Liabilities	750
Long-term debt	2000
<b>Total Liabilities</b>	<b>2750</b>
Common Stock	1500
Retained Earnings	1500
<b>Total Equity</b>	<b>3000</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>

**Step 2:** Forecast the income statement

**CMP Holdings  
Pro-Forma Income Statement for 2020**

(in thousands of dollars)	2020	2021	Calculation
Sales (+ 30%)	7000	9100	= 7000 * 1.30
(-) COGS (60% of sales)	4200	5460	= 9100 * 0.6
(-) Operating Expenses (+5%)	600	630	= 600 * 1.05
EBIT	2200	3010	= 9100-5460-630
(-) Interest Expense (5% of debt)	250	125	= (0.05)*(500+2500)
Taxable Income	1950	2885	= 3010-125
(-) Tax (40% tax rate)	780	1154	= 2885 * 0.40
Net income	1170	1731	= 2885-1154
(-) Dividend (1/3 of NI)	390	577	= 1731 * (1/3)
Addition to retained earnings	780	1154	= 1731-577



# Forecast the balance sheet and determine the EFN

## Step 3: Forecast the balance sheet

### Assumptions for pro-forma balance sheet:

- All current assets grow by 25%
- Net fixed assets grow by 25%
- Accounts payable grows by 20%

CMP Holdings Pro-Forma Balance Sheet (Assets) as of Dec 2020			
Assets	2020	2021	Change
Cash (+25%)	500	625	125
Accounts receivable (+25%)	500	625	125
Inventory (+25%)	600	750	150
Current Assets	1600	2000	400
Net Fixed Assets (+25%)	4150	5187.5	1037.5
<b>Total Assets</b>	<b>5750</b>	<b>7187.5</b>	<b>1437.5</b>

CMP Holdings Pro-Forma Balance Sheet (L+E) as of Dec 2020			
Liabilities & Equity	2020	2021	Change
Accounts payable (AP) (+20%)	250	300	50
Notes payable	500	500	-
Current Liabilities	750	800	50
Long-term debt (no change)	2000	2000	-
<b>Total Liabilities</b>	<b>2750</b>	<b>2800</b>	<b>50</b>
Common Stock (no change)	1500	1500	-
Retained Earnings	1500	2654	1,154
<b>Total Equity</b>	<b>3000</b>	<b>4154</b>	<b>1,154</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>	<b>6954</b>	<b>1,204</b>

2021 Assets (7187.5) DOES NOT equal 2021 Liabilities + Equity (6954)

Balance sheet needs to balance.  $A = L + E$ , remember to add 2020 RE to 2021 RE

## Step 4: Sum your Assets & Liabilities + Equity and determine the External Financing needed

### Last step:

Total Assets (2021) = 7187.5  
Total Liabilities + Equity (2021) = 6954

### External Financing Needed (EFN)

$$7187.5 - 6954 = 233.5$$

### Difference in the change

$$1437.50 - 1204 = 233.5$$

### CMP Holdings

#### Pro-Forma Balance Sheet (L+E) as of Dec 2020

Liabilities & Equity	2020	2021	Change
Accounts payable (AP) (+20%)	250	300	50
Notes payable	500	500	-
Current Liabilities	750	800	50
Long-term debt (debt financing)	2000	2233.5	234
<b>Total Liabilities</b>	<b>2750</b>	<b>3033.5</b>	<b>284</b>
Common Stock (no change)	1500	1500	-
Retained Earnings	1500	2654	1,154
<b>Total Equity</b>	<b>3000</b>	<b>4154</b>	<b>1,154</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>	<b>7187.5</b>	<b>1,437.5</b>

# 3 different ways to finance: debt, equity, and debt+equity

## Different ways to finance externally – financing the 233.5 needed

### 1) Issue Long-term debt

CMP Holdings (Debt Financing) Pro-Forma Balance Sheet (L+E) as of Dec 2020			
Liabilities & Equity	2020	2021	Change
Accounts payable (AP) (+20%)	250	300	50.0
Notes payable	500	500	-
Current Liabilities	750	800	50.0
Long-term debt (debt financing)	2000	2233.5	233.5
<b>Total Liabilities</b>	<b>2750</b>	<b>3033.5</b>	<b>283.5</b>
Common Stock (no change)	1500	1500	-
Retained Earnings	1500	2654	1,154.0
<b>Total Equity</b>	<b>3000</b>	<b>4154</b>	<b>1,154.0</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>	<b>7187.5</b>	<b>1,437.5</b>

### 2) Issue Equity

CMP Holdings (Equity Financing) Pro-Forma Balance Sheet (L+E) as of Dec 2020			
Liabilities & Equity	2020	2021	Change
Accounts payable (AP) (+20%)	250	300	50.0
Notes payable	500	500	-
Current Liabilities	750	800	50.0
Long-term debt (no change)	2000	2000	-
<b>Total Liabilities</b>	<b>2750</b>	<b>2800</b>	<b>50.0</b>
Common Stock (equity financing)	1500	1733.5	233.5
Retained Earnings	1500	2654	1,154.0
<b>Total Equity</b>	<b>3000</b>	<b>4387.5</b>	<b>1,387.5</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>	<b>7187.5</b>	<b>1,437.5</b>

### 3) Issue Debt + Equity

CMP Holdings (Debt + Equity Financing) Pro-Forma Balance Sheet (L+E) as of Dec 2020			
Liabilities & Equity	2020	2021	Change
Accounts payable (AP) (+20%)	250	300	50.0
Notes payable	500	500	-
Current Liabilities	750	800	50.0
Long-term debt (debt financing)	2000	2116.75	116.8
<b>Total Liabilities</b>	<b>2750</b>	<b>2916.75</b>	<b>166.8</b>
Common Stock (no change)	1500	1616.75	116.8
Retained Earnings	1500	2654	1,154.0
<b>Total Equity</b>	<b>3000</b>	<b>4270.75</b>	<b>1,270.8</b>
<b>Total Liabilities + Equity</b>	<b>5750</b>	<b>7187.5</b>	<b>1,437.5</b>

## Alternative scenarios to financing

1. Changing asset turnover ratios or days (ie. Increase AP period, reducing AR period, shortening inventory period) – **Think: sources of cash**
2. Adjust AP to take advantage of supplier discounts (reference to Clarkson Lumber), using 2/10 net 45, which basically means you get 2% off if you pay in 10 days



## Internal Growth Rates ( $G^i$ )

### Review

**Internal Growth Rate  $G^i$ :** Sales growth rate that can be supported internally with no EFN

$$G^i = ROA * r / (1 - ROA * r)$$

- Growth is financed with retained earnings only

**Where:**

**ROA** = Return on Assets

**r** = Retention rate =  $(1 - \text{Payout ratio})$ ;

**Payout ratio** = Dividend/Ni

Assumes:

Everything on income statement and assets grows at  $G^i$

### Drivers for Internal Growth Rate

- **Retention ratio (r) increasing** = money retained earnings = more funds to grow
- **Dividend payout ratio decreasing**
- **Increase in Total Asset Turnover**
- **Increase in profit margin**

### What happens to debt/equity ratio if we grow at $G^i$ ?

#### Question

- A) Debt to equity ratio remains the stay
- B) Debt to equity ratio decreases
- C) Debt to equity ratio increases

**Answer:** Debt to equity ratio **DECREASES** since DEBT remains unchanged and equity (retained earnings) keeps growing!

- **Reminder from topic 2 - we can determine external financing needed if we have a specific growth rate in mind.**
- **But we can also do the opposite: based on target EFN, we can determine the growth rate needed**





# Sustainable Growth Rate (G\*)

## Review

**Sustainable Growth Rate G\*:** The *Maximum* sales growth rate that be achieved by borrowing (debt)

$$G^* = ROE * r / (1 - ROE * r)$$

- Growth is financed with retained earnings and borrowing

**Where:**

**ROE** = Return on Equity

**r** = Retention rate = (1 – Payout ratio);

**Payout ratio** = Dividend/NI

**Assumes:**

- No external equity financing
- Borrowing an amount to maintain a constant debt/equity ratio

## Drivers for Sustainable Growth Rate

- Increasing D/E ratio (increasing leverage)
- Increase in Total Asset Turnover
- Increase in profit margin
- Increasing retention ratio by reducing dividends

**Question:**

- A) Debt to equity ratio remains the stay
- B) Debt to equity ratio decreases
- C) Debt to equity ratio increases

**Answer:** Debt to equity ratio Stays the same

## Summary & Takeaways

- Financial planning models are simple, but very useful to forecast a firm's external financial needs.
- They are useful to construct pro-forma financial statements, which lead to cash flow forecasts.
- Any assumptions can be built into the analysis if you use a spreadsheet.
- External financing needs increase with the speed of growth.



# Clarkson Lumber case

## Case Details / Summary

### Case Details

- Clarkson was growing at an unsustainable growth rate, external financing was needed to support poor cash cycle management
- Issues related to A/P management (trade discount) and A/R collection
- Clarkson is profitable, but not profitable enough to sustain growing at 21.6% with INTERNAL funds, it needs to raise EXTERNAL FINANCING
- For EFN, it has to be debt, since he does not want to issue equity (as illustrated by the buy out of another shareholder)
- Decisions made on the inputs on the cash conversion cycle (CCC) ultimately will put more pressure on EFN

## What you need to know

### Summary

- (1) Unsustainable sales growth rate of 21.6% together with (2) a long sales cycle (CCC) and
- (3) lack of uber-profitability that creates more pressure on EFN.
- (4) Exacerbating that issue is that any EFN would have to be debt (and not equity because he does not want to give up control)
- (5) Trade credit has expanded 35 to 54 days
- (6) A/R collection has slowed from 38 to 49 days

1. High level understanding of the case
2. Professor said don't worry, exam won't be as hard as the case
3. Understand how to calculate a supplier discount 2/10, net 45, etc.



## Learning Summary

1

Making assumptions for ratios, growth rates, and determining the external financing needed (EFN)

2

Identify the financial requirements of a business plan and evaluate different financing options

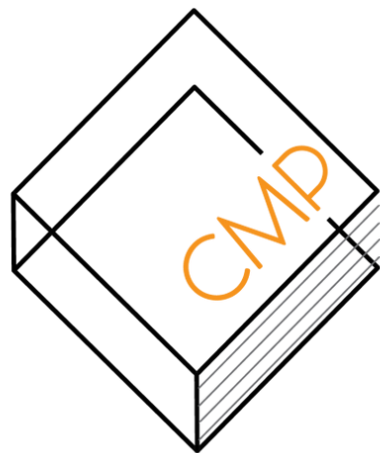
3

Internal Growth rate, sustainable growth rate, and the impact on debt to equity ratios

4

Clarkson lumber case – high level summary





# 10-min Break



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3

## Topic 3 – Valuation & Capital Budgeting

*APV, CFTE, & WACC Method, Tax Shields & More*



## Learning objectives

1 Value firms and projects financed solely with equity as well as those financed in part by debt

2 Determine when and how to use three standard valuation methods: cash flow to equity (CFTE), adjusted present value (APV), and weighted average cost of capital (WACC)

3 Discuss the discount rate used to value firms and projects (denominator of valuation formulas) and determine what cash flows should be used in valuation and why (numerator of valuation formula)

4 Explain how depreciation (capital cost allowance, CCA) is treated in Canada and use the “tax shield approach” to incorporate this in the valuation of Canadian businesses







## COMM/COEC 370 Midterm Formula Sheet continued

### Valuation and Capital Budgeting:

$$FCF = (S - C) \times (1 - \tau) + \tau \times \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

$$FCF = \text{EBIT} \times (1 - \tau) + \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

$$FCF = \text{NI} + \text{Interest} \times (1 - \tau) + \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

where:  $\text{EBIT} = S - C - \text{Dep}$

where:  $\text{NI} = (S - C - \text{Dep} - \text{Interest}) \times (1 - \tau)$

$$\text{FCFE} = \text{FCF} - \text{Interest} \times (1 - \tau) + \Delta \text{LTD}$$

$$\text{Present Value of an n-payment annuity of \$A} = A \left[ \frac{1 - (1 + r)^{-n}}{r} \right]$$

$$\text{Present Value of a perpetuity of \$A} = \frac{A}{r}$$

$$\text{Present Value of a growing perpetuity} = \frac{C_1}{r - g}$$

$$\text{PV of perpetual CCA tax shield} = \frac{Cd\tau}{(r + d)} \times \frac{[1 + .5(r)]}{(1 + r)}$$

$$\text{PV of CCA tax shield lost from salvage} = \frac{Sd\tau}{(r + d)} \times \frac{1}{(1 + r)^n}$$

$$\text{WACC: } r_{\text{WACC}} = \left[ \frac{E}{D + E} \right] \times r_E + \left[ \frac{D}{D + E} \right] \times r_D \times (1 - \tau)$$

$$\text{CAPM (SML equation): } r_E = r_f + \beta [E(r_M) - r_f]$$

$$\text{Operating Leverage: } \text{DOL} = \frac{\% \Delta \text{ in EBIT}}{\% \Delta \text{ in Sales}}$$

$$\text{APV: } V_L = V_U + \text{PV}(\text{ITS})$$

$$r_E = r_U + \frac{D}{E} (r_U - r_D) (1 - \tau)$$



## Valuation Methodology

### Valuation Methods

1. Cash Flow to Equity (CFTE)

2. Adjusted Present Value (APV)

$$V_L = V_U + PV(ITS)$$

3. Weighted Average Cost of Capital (WACC)

# Method 1: Cash flow to equity (CFTE) – valuation of all equity firm (no debt)

## 1) Review

Recall: Dividend Growth Model with zero growth, ( $g = 0$ )

### Gordon Growth Model Formula

$$\text{Value of Firm} = \frac{\text{Div}}{(r_a - g)}$$

Where:

Div = ex-dividend (dividend that has just been paid)

$r_A$  = discount rate,

$g$  = growth rate

- “A” in  $r_A$  stands for “assets”, it is also called  $r_U$  where U means “unlevered” because the firm has zero leverage (no debt)
- Since the firm is unlevered, assets and equity are the same so  $r_A$  is also the discount rate ( $r_E$ ):  $r_A = r_E$

## Example 1 – Valuation of all equity firm

### Income Statement for Firm CMP Holdings

(\$Million)	2019	2020	2021	2022	2023
Revenues	0	1000	1000	1000	1000
- Cost of goods sold	0	-800	-800	-800	-800
- Depreciation	0	-100	-100	-100	-100
EBIT	0	100	100	100	100
- Interest	0	0	0	0	0
Taxable Income	0	100	100	100	100
- Taxes @ 30%	0	-30	-30	-30	-30
Net Income	0	70	70	70	70
+ Depreciation	0	100	100	100	100
CF from Operations	0	170	170	170	170
- Capital Expenditures	0	-100	-100	-100	-100
+ Debt Issuance	0	0	0	0	0
<b>Dividends*</b>	<b>0</b>	<b>70</b>	<b>70</b>	<b>70</b>	<b>70</b>

Suppose the discount rate ( $r_A$  is 10%) calculate the value of the firm assuming no growth.

### Solution 1 – Valuation of all equity firm (CFTE)

**Step 1:**  $V_L = \text{Div} / (r_E - g)$

**Step 2:**  $V_L = \$70\text{M} / (0.10 - 0)$

**Answer:**  $V_L = \$70\text{M} / 0.10 = \$700\text{M}$

## Method 2: Adjusted Present Value (APV) - firm with perpetual debt

### Example 2 – Valuation of firm with perpetual debt

Assume CMP Holdings issues \$400M in perpetual debt at a 5% coupon rate. Calculate the value of the firm using

1) Adjusted Present Value (APV)

#### Income Statement for Firm CMP Holdings

(\$Million)	2019	2020	2021	2022	2023
Revenues	0	1000	1000	1000	1000
- Cost of goods sold	0	-800	-800	-800	-800
- Depreciation	0	-100	-100	-100	-100
EBIT	0	100	100	100	100
- Interest	0	-20	-20	-20	-20
Taxable Income	0	80	80	80	80
- Taxes @ 30%	0	-24	-24	-24	-24
Net Income	0	56	56	56	56
+ Depreciation	0	100	100	100	100
CF from Operations	0	156	156	156	156
- Capital Expenditures	0	-100	-100	-100	-100
+ Debt Issuance	400	0	0	0	0
<b>Dividends*</b>	<b>400</b>	<b>56</b>	<b>56</b>	<b>56</b>	<b>56</b>

### Solution 2 – Using APV Method

Recall:  $V_L = V_U + PV(ITS)$

$$V_L = V_U + PV(ITS) = \$700M + \underline{\hspace{2cm}} = \$\underline{\hspace{2cm}}$$

Where:

$V_L$  = Value of levered firm

$V_U$  = Value of unlevered firm

$PV(ITS)$  = Present value of Interest Tax Shields

$PV(ITS) = (\text{Interest on debt}) * (\text{Tax Rate})$

From our CFTE method

**Step 1:** From our last example we know that  $V_L = \$700M$

**Step 2:** We know that interest on debt (5% of 400M) is \$20M, so multiply this by the tax rate (30%) and we get the value of the interest tax shields \$6M

**Step 3:** In order to get the PV, we need to discount \$6M by a discount rate, in this case, the cost of debt (5%)

$PV(ITS) = \$6M / 0.05 = \$120M$

**Answer:** Value of firm =  $V_U + PV(ITS) = \$700M + \$120M = \$820M$



## Method 3: Weighted average cost of capital (WACC) – firm with perpetual debt

### Example 2 – Valuation of firm with perpetual debt

Assume CMP Holdings issues \$400M in perpetual debt at a 5% coupon rate. Calculate the value of the firm using

1) WACC

### Solution 2.1 – Using WACC Method

Recall:  $r_{WACC} = r_E \times W_E + (1 - \tau) \times r_D \times W_D$

Where:

**rWACC** = Weighted average cost of capital

**rE** = cost of equity

**wE** = proportion of equity in the capital structure ( $E/(E+D)$ )

**rD** = cost of debt

**wD** = proportion of debt in the capital structure ( $D/(D+E)$ )

**T** = Tax rate

**V** = Total Value of firm

### Solution 2.1 – Using WACC Method (continued)

**Step 1:** Calculate the cost of equity ( $r_E = 13.33\%$ )

Calculation for  $r_E$  will be covered in later topics, for now assume it is 13.33%

**Step 2:** Determine the proportion (weights of debt and equity)

$$w_E = 420 / (420 + 400) = 51.22\%$$

$$w_D = 400 / (400 + 420) = 48.78\%$$

**Step 3:** Identify  $r_E$  and  $r_D$

$$r_E = 13.33\%$$

$$r_D = 5\%$$

**Step 4:** Plug it into the formula  $r_{WACC} = r_E \times W_E + (1 - \tau) \times r_D \times W_D$

**Step 5:** Compute WACC

$$r_{WACC} = 0.1333 \times 0.5122 + (1 - 0.3) \times 0.05 \times 0.4878 = 8.53\%$$

**Step 6:** Calculate FCF ( $(\text{Rev} - \text{Cost} - \text{Depr}) \times (1 - T) + \text{Depr} - \text{CapEx} - (\text{Changes in NWC})$ ) = \$70M

**Answer:** Divide \$70M by the newly computed WACC 8.53% to get firm value

$$v_L = \text{FCF} / r_{WACC} = \$70\text{M} / (0.0853) = \$820\text{M}$$

Notice how all 3 methods get us the same firm value, \$820M

## Comparison of CFTE, APV and WACC method

### Inputs for valuation methods

1. To use the CFTE approach, we need:
  - the free cash flow to equity holders (FCFE)
    - if  $D=0$ , FCFE = all the firm's cash flow (= FCF)
    - If  $D>0$ , FCFE = cash flow after debt is paid ( $< \text{FCF}$ )
  - the cost of equity ( $r_E$ )
    - if  $D=0$ , it reflects the risk of the assets ( $r_E = r_A$ )
    - if  $D>0$ , it reflects the risk of the equity claim ( $r_E > r_A$ )
2. To use the APV approach (levered firm), we need:
  - The firm's free cash flow (FCF)
  - The all-equity cost of capital  $r_A$  and the cost of debt  $r_D$
3. To use the WACC approach (levered firm), we need:
  - The firm's free cash flow (FCF)
  - The weighted average cost of capital ( $r_{WACC}$ )

### Discussion: CFTE vs. APV vs. WACC

All three methods gave the same answer; however:

- To calculate CFTE we need  $r_E$ , which requires a complicated calculation that we haven't learned yet.
- To compute WACC we needed  $r_E$ ; also  $w_E$  and  $w_D$ , which we only computed after doing APV to calculate firm value.
- Computing APV seemed the simplest in this setting!

When used correctly, all 3 methods give the same answer in **any** situation. But APV is not always the simplest method:



- APV is best to use when debt is constant in dollar terms, or the debt schedule is known ahead of time (as in our example).
- WACC is best to use when the firm keeps its debt to value ratio constant – different from our example (more on this later).




# Calculating the cost of equity (Capital Asset Pricing Model)

## Cost of Equity

### Capital Asset Pricing Model Formula

$$R_e = R_f + \beta \times (R_m - R_f)$$


The **cost of equity stock ( $r_E$ )** is the expected return that shareholders require to hold the firm's stock.

Use the CAPM to estimate it:  $r_E = r_F + \beta \times [E(r_M) - r_F]$

where  $r_F$  is the risk-free rate,  $E(r_M)$  is the expected return on the stock market, and  $\beta$  is the systematic risk of the stock.

For  $E(r_M)$  take historical average of market index returns.

For  $r_F$  take yields on Government Bonds (e.g., 3 month).

For  $\beta$ , you can estimate it using a linear regression based on past stock returns and market returns.  $\beta$  is the key!

## Cost of Equity Example

CMP Holdings is based in Canada is trying to determine its cost of equity. CMP knows that the expected market return on the S&P 500 is ~9.7%. The current 10-year risk-free rate in Canada 1%, and the company has a beta of 0.86.

**Step 1:** Write out the formula for  $R_e$   $r_E = r_F + \beta \times [E(r_M) - r_F]$

**Step 2:** Determine the proportion (weights of debt and equity)

$$E(r_M) = 9.7\% = 0.097$$

$$R_f = 1.0\% = 0.01$$

$$\text{Beta} = 0.86$$

**Step 3:** Plug into CAPM formula and solve

$$R_e = (0.01) + (0.86) \times (0.097 - 0.01)$$

$$R_e = 0.08482$$

$$R_e = 8.48\%$$

**Bonus question:** Using the same scenario as above, PMC Enterprises is trying to determine what its beta is. They know that an identical competitor firm has a cost of equity of 9.5%. Given this, what is the implied beta for PMC Enterprise?

**Solution:** Re-arrange for beta, and solve

$$\text{Beta} = (R_e - R_f) / (R_m - R_f)$$

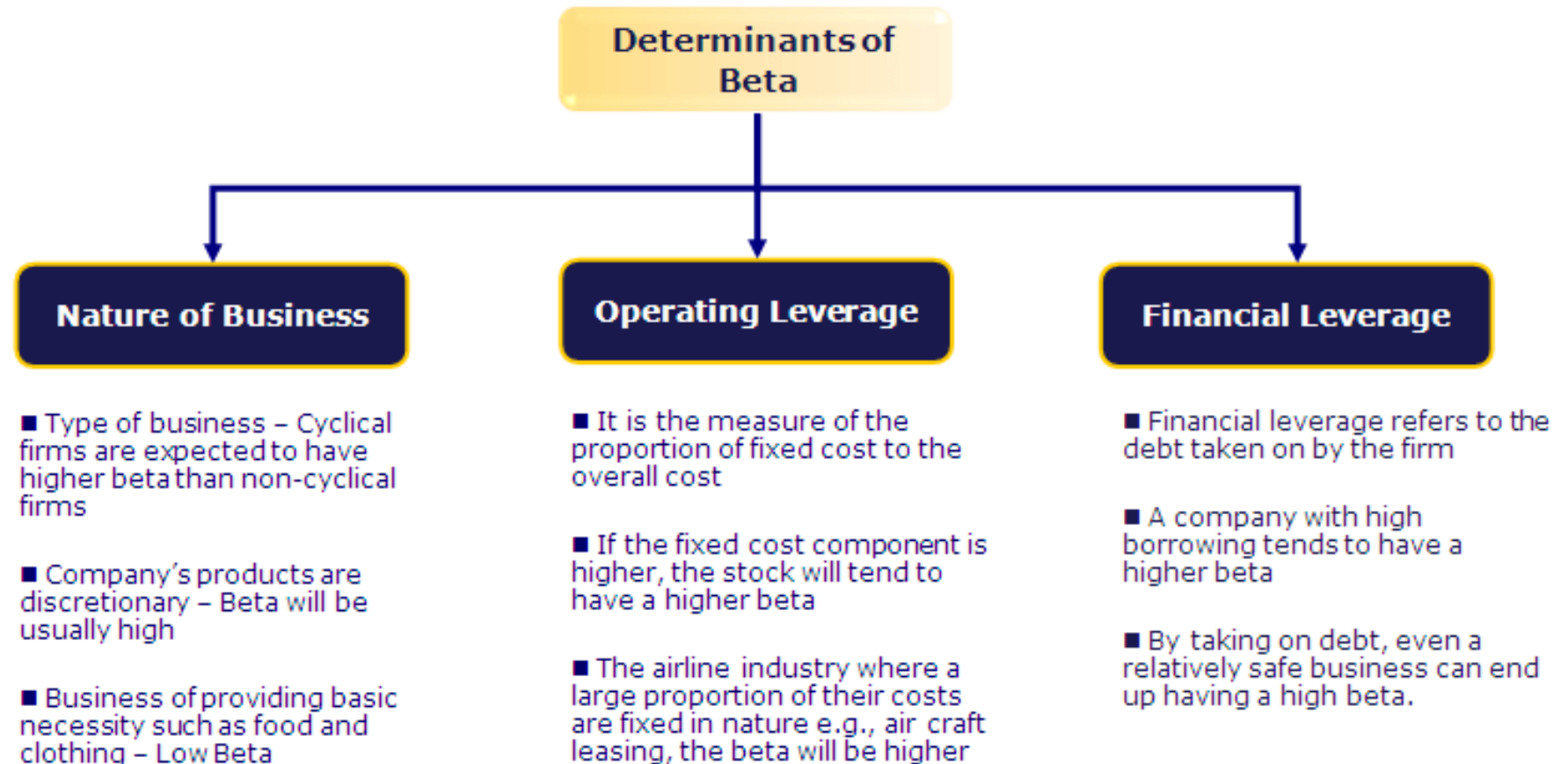
$$\text{Beta} = 0.095 - 0.01 / (0.097 - 0.01)$$

$$\text{Beta} = 0.977$$

## Determinants of Beta

### Beta 101

- Cost of equity depends only on its systematic risk
- Investors are compensated for the systematic risk they bear when they hold the firm's stock (measured by beta), but not for the idiosyncratic risk they can diversify away!
- Recall that “beta” is the covariance between a firm's stock return and the return on the market portfolio
- **Beta = 1, moves in line with market**
- **Beta > 1, more volatile (tech stocks)**
- **Beta < 1, less volatile (defensive/non-cyclical industries)**
- **Beta < 0, usually gold (and apparently Zoom)**



## Cost of debt & the Weighted Average Cost of Capital (WACC)

### Cost of debt



**Cost of Debt Formula (After-Tax)** =  $(R_d) \times (1 - \text{Tax Rate})$



Where  $R_d$  = interest rate on debt

The (before-tax) **cost of debt** ( $r_D$ ) is the expected return investors require to lend to the firm. How to determine it:

- If the firm's debt is publicly traded, we will use the yield to maturity on existing bonds.
- If debt is private, we will use the contractual interest rate on the loans or infer it from yields of similar debt.

Note: the **after-tax cost of debt** is  $r_D \times (1 - \tau)$ .

Example: Firm with tax rate of 40% borrows \$100 at 20%. Firm pays \$20 in interest, but saves \$8 =  $(.4 \times \$20)$  in taxes, so after-tax dollar interest cost is \$12 =  $(\$20 - \$8)$ .

### Weighted Average Cost of Capital

$$WACC = \frac{E}{D + E} (r_e) + \frac{D}{D + E} (r_d)(1 - t)$$

Where:

$E$  = market value of equity

$D$  = market value of debt

$r_e$  = cost of equity

$r_d$  = cost of debt

$t$  = corporate tax rate

The **weighted average cost of capital** ( $r_{WACC}$ ) is the average cost of all claims in the firm's capital structure, weighted by their market values.

For a firm whose debt has market value  $D$  and equity has market value  $E$ , then its total firm value is  $V = E + D$ .

The required "capital structure weights" are:  $E/V$  and  $D/V$

$$r_{WACC} = (E/V) \times r_E + (D/V) \times r_D \times (1 - \tau)$$

Weights should be based on markets values; estimate using book values if market values are not available.

## Computing Free Cash Flow Examples

### Formula Sheet

#### Valuation and Capital Budgeting:

$$FCF = (S - C) \times (1 - \tau) + \tau \times \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

$$FCF = \text{EBIT} \times (1 - \tau) + \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

$$FCF = \text{NI} + \text{Interest} \times (1 - \tau) + \text{Dep} - \text{CapEx} - \Delta \text{NWC}$$

$$\text{where: EBIT} = S - C - \text{Dep}$$

$$\text{where: NI} = (S - C - \text{Dep} - \text{Interest}) \times (1 - \tau)$$

$$\text{FCFE} = \text{FCF} - \text{Interest} \times (1 - \tau) + \Delta \text{LTD}$$

$$\text{Present Value of an n-payment annuity of \$A} = A \left[ \frac{1 - (1 + r)^{-n}}{r} \right]$$

$$\text{Present Value of a perpetuity of \$A} = \frac{A}{r}$$

$$\text{Present Value of a growing perpetuity} = \frac{C_1}{r - g}$$

$$\text{NPV} = -(\text{Initial Cost}) + \text{Value}$$

**Add this to your formula sheet so you don't forget**

### FCF Calculation Example

CMP Holdings Income Statement for 2020 (in thousands of dollars)	
	2020
Sales	7000
(-) COGS (60% of sales)	4200
(-) Operating Expenses	600
EBIT	2200
(-) Interest Expense	250
Taxable Income	1950
(-) Tax (40% tax rate)	780
Net income	1170
(-) Dividend (1/3 of NI)	390
Addition to retained earnings	780

CMP Holdings intends to spend \$1M on capital expenditures this year and has no depreciation expense.

Compute their FCF

#### Sales Revenue to FCF (Topline)

- 1)  $FCF = (S - C) \times (1 - T) + (T \times \text{Dep}) - \text{CapEx} - \text{NWC}$
- 2)  $FCF = (7000 - 4200 - 600) \times (1 - 0.40) + (0.40 \times 0) - 1000 - 0$
- 3)  $FCF = (2200) \times (0.60) - 1000$
- 4)  $FCF = 1320 - 1000$
- 5)  $FCF = 320$

#### Net Income to FCF (Bottom line)

- 1)  $FCF = \text{NI} + \text{Interest} \times (1 - T) + \text{Dep} - \text{CapEx} - \text{NWC}$
- 2)  $FCF = 1170 + (250) \times (1 - 0.40) + 0 - 1000 - 0$
- 3)  $FCF = 1170 + (250) \times (0.60) - 1000$
- 4)  $FCF = 1170 + 150 - 1000$
- 5)  $FCF = 1320 - 1000$
- 6)  $FCF = 320$

## Free Cash Flow (FCF) and FCFE

### Free Cash Flow

#### Free Cash Flow (FCF)

- The **free cash flow (FCF)** is the cash flow (dividend) that would accrue to shareholders if the firm had no debt.
- The free cash flow we need to forecast for each year is:
  - **$FCF = (S - C) \times (1 - \tau) + \tau \times Dep - \Delta NWC - CapEx$**
- *Recovering the FCF from pro-forma financial statements:*
  - **$FCF = EBIT \times (1 - \tau) + Dep - \Delta NWC - CapEx$**   
Recall that  $EBIT = S - C - Dep$
- **$FCF = NI + Interest \times (1 - \tau) + Dep - \Delta NWC - CapEx$**   
Recall that  $NI = (S - C - Dep - Interest) \times (1 - \tau)$

### Free Cash Flow to Equity (FCFE)

#### Free Cash Flow to Equity (FCFE)

- The **free cash flow to equity (FCFE)** is the cash flow (dividend) to the shareholders of a levered firm.
- The FCFE is the after-tax cash flow to equity holders (i) after making debt payments and (ii) counting interest tax shields.
- Relative to FCF, FCFE takes both debt payments and interest tax shields into account, so you can write FCFE as:
  - $FCFE = FCF - Interest + \Delta LTD + \tau \times Interest$  ;
- This gives:  **$FCFE = FCF - Interest \times (1 - \tau) + \Delta LTD$**
- Note: with perpetual debt the last term is zero (no change in principal amount of debt; only interest payments).



## Developing FCF Forecasts & CCA Tax Shield

### Developing FCF Forecasts

- Need the **incremental** FCF - the change in the firm's FCF if it undertakes the project relative to when it does not.
- Include all opportunity costs (e.g., forgone rent)
- Include externalities on other projects (e.g., cannibalization)
- Ignore sunk costs (e.g., prior exploration or R&D costs)
- Include only additional overhead expenses
- Accounting treatment of depreciation & related tax shields
- Corporate Taxes
- Changes in NWC (funds will be tied up)
- Required investment (can occur in multiple years)
- Salvage value of assets at end of life of the project

### CCA Tax Shield

- CCA is the depreciation charge against taxable income allowed by the Canada Revenue Agency (CRA). **CCA reduces taxes paid by  $\tau \times \text{CCA}$  (CCA tax shield).**
- Assets (except land or securities) are grouped into asset classes, each with different CCA rates set by the CRA, and all assets in a class are depreciated together.
- **$\text{CCA}_t = d \times \text{UCC}_{t-1}$**  ; where UCC is the Undepreciated Capital Cost of the class and  $d$  is the depreciation rate.
- The UCC decreases over time as the class depreciates:
- **$\text{UCC}_t = \text{UCC}_{t-1} - \text{CCA}_t$**
- It also increases when an asset is purchased and added to the class and decreases when an asset is sold.

## CCA Classes & Rates, and Tax Effects

### Common CCA Classes & Rates

Class	Rate	Assets
1	4%	Buildings acquired after 1987
3	5%	Buildings acquired before 1987
8	20%	Furniture, photocopiers
10	30%	Vans, trucks, tractors
12	100%	Computer software
13	Straight-line	Leasehold improvements
43	30%	Manufacturing equipment
50	55%	Computer hardware

### Tax Effects when Assets are Sold

- A firm is entitled to claim CCA deductions as long as it has at least one asset in the asset class.
- When an asset is sold, the lower of its sale price or initial cost is deducted from the asset class balance (UCC).
- If the sale results in a negative asset class balance, this amount is called **recaptured depreciation** and is added to taxable income in the year of the sale.
- If the sale leaves a positive balance and there are no other assets left, then this is called a **terminal loss** and is deducted from taxable income in the year of the sale.
- If sale price > initial cost, the difference is called a **capital gain**. Half of the capital gain is added to taxable income.



## PV of CCA Tax Shields & Formula

### Present Values of CCA Tax Shields

- An asset can still generate CCA tax shields for a firm even after it is sold as long as there are other assets remaining in its asset class.
- Since we only deduct a fraction of the remaining UCC balance, the CCA tax shield can last forever. Thus, we need to calculate the PV of a perpetual tax shield.
- Some notation:

**C** = Cost of an asset acquired in year 0  
**d** = CCA rate for the asset class of the asset  
**τ** = Corporate tax rate

### Formula

The PV of perpetual CCA tax shields **gained** when an asset is purchased for a cost C is:

$$\frac{Cd\tau}{(r+d)} \times \frac{[1+.5(r)]}{(1+r)}$$

When an asset is sold in Year  $n$  for  $S$ , the PV of perpetual CCA tax shields **lost** from salvage is:

$$\frac{Sd\tau}{(r+d)} \times \frac{1}{(1+r)^n}$$

## PV of CCA Tax Shields & Formula (Example)

### CCA Tax Shields Question

The following table presents forecast sales for a fad product. The unit price is \$40. The unit cost is \$25.

Year	1	2	3	4	thereafter
Unit Sales	22,000	30,000	14,000	5,000	0

It is expected that net working capital will amount to 25 percent of the following year's sales. For example, initial (Year 0) investment in working capital of  $.25 \times 22,000 \times \$40 = \$220,000$ . Equipment necessary to produce this product line will require an additional investment of \$200,000. This investment will be in an asset class with a CCA rate (d) of 20 percent. After 4 years, the equipment will be sold for \$40,000. The firm's tax rate is 36 percent and the WACC is 12 percent. What is the NPV of the project?

### Formula

The PV of perpetual CCA tax shields **gained** when an asset is purchased for a cost C is:

$$\frac{Cd\tau}{(r+d)} \times \frac{[1+.5(r)]}{(1+r)}$$

**C** = Cost of an asset acquired in year 0  
**d** = CCA rate for the asset class of the asset  
**τ** = Corporate tax rate

When an asset is sold in Year *n* for S, the PV of perpetual CCA tax shields **lost** from salvage is:

$$\frac{Sd\tau}{(r+d)} \times \frac{1}{(1+r)^n}$$

### Calculate the PV of Tax Shields gained and lost

**Step 1:** Identify all variables

C = \$200,000

d = 20%

T = 36%

r = 0.12

S = 40,000

n = 4

**Step 2:** Plug variables into CCA formulas and solve

$$\frac{Cd\tau}{(r+d)} \times \frac{[1+.5(r)]}{(1+r)} = \frac{(900,000) \times (0.30) \times (0.30)}{(0.12 + 0.30)} \times \frac{[1+0.5(0.12)]}{(1+0.12)}$$

$$\frac{14400}{0.42} \times \frac{1.06}{1.12}$$

$$= 192,857 \times 0.946429$$

**PV of CCA TS Gained = 182,525.5**

$$\frac{Sd\tau}{(r+d)} \times \frac{1}{(1+r)^n} = \frac{(45000) \times (0.30) \times (0.30)}{(0.12 + 0.30)} \times \frac{1}{(1+0.12)^{(6)}}$$

**PV of CCA TS Lost = 4885.372**

When computing the NPV, make sure to subtract this value as it is LOST



## Learning Summary

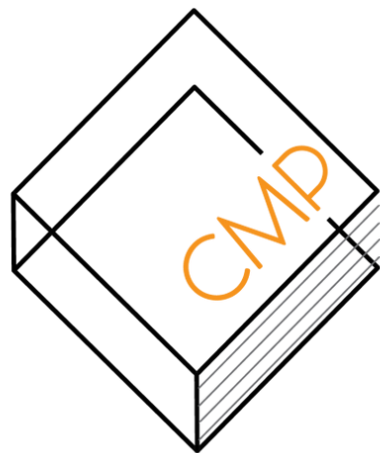
1 Value firms and projects financed solely with equity as well as those financed in part by debt

2 Determine when and how to use three standard valuation methods: cash flow to equity (CFTE), adjusted present value (APV), and weighted average cost of capital (WACC).

3 Discuss the discount rate used to value firms and projects (denominator of valuation formulas) and determine what cash flows should be used in valuation and why (numerator of valuation formula)

4 Explain how depreciation (capital cost allowance, CCA) is treated in Canada and use the “tax shield approach” to incorporate this in the valuation of Canadian businesses





# 10-min Break



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4

## Topic 4 – Raising Capital

*IPO, Shareholder Ownership, Share structure*



## Learning objectives

- 1 Describe the key differences between debt and equity securities (payoffs, priority, voting, taxes)
- 2 List the different types of debt and equity & illustrate the potential complexity of firms' capital structures
- 3 Describe the sources of private equity financing
- 4 Outline the process associated with an initial public offering (IPO) and identify the cost of issuing securities





## Types of external financing (Equity / Debt)

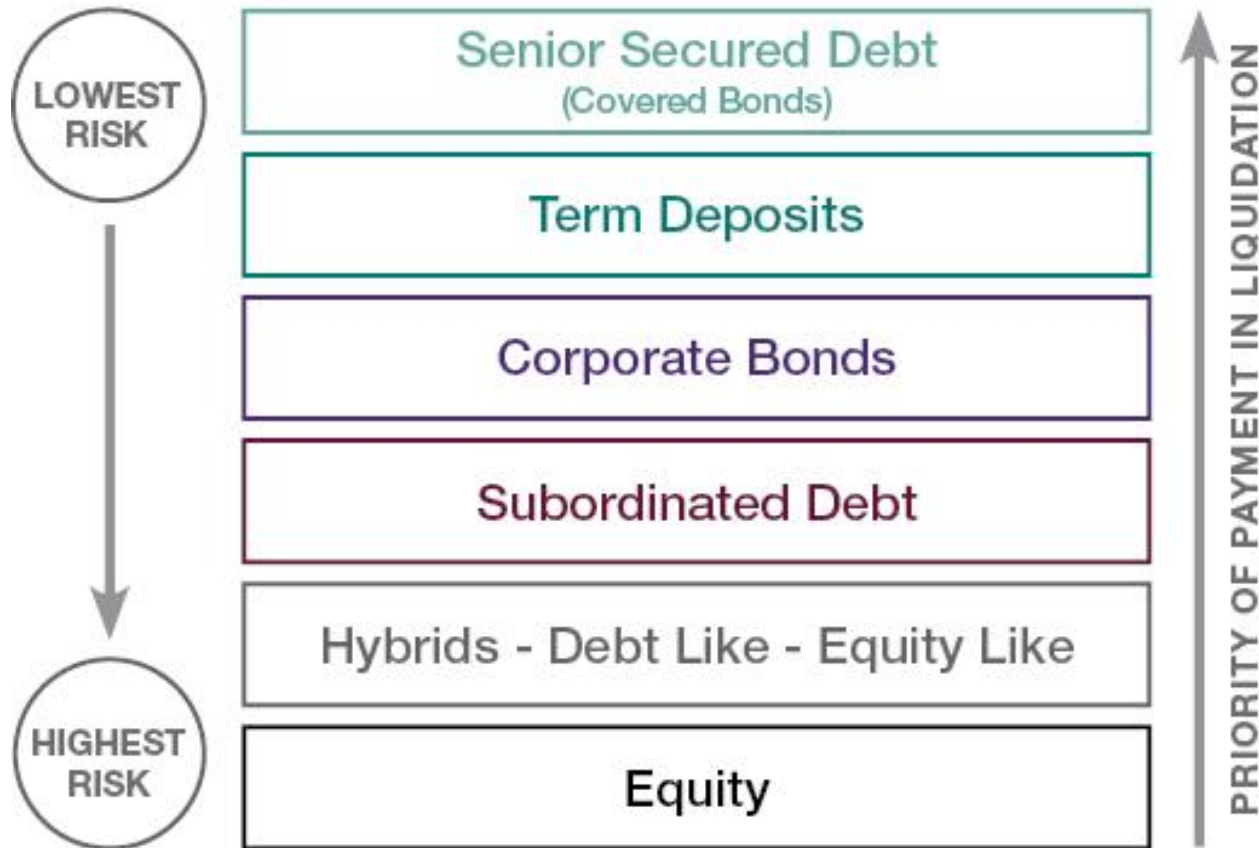
# Raising Capital: Overview

Internal financing	External financing: Raising Capital		
	Equity		Debt
Retained earning	Public Equity	Private Equity	
	Common Stock	Angel Investors	Bank Loans
	Preferred Stock	Venture Capital	Leases
	Warrant	Institutional Investors	Commercial Paper
		Sovereign Wealth Fund	Corporate Bonds
		Corporate Investors	



## Debt and capital structure

### Capital Structure of a Bank



### Debt

- **Debt is not an ownership interest in the firm:**
- Lenders do not usually vote, but they protect themselves through the loan contract (indenture).
- Failure to pay interest or principal leads to bankruptcy.
- Even a minor violation of a covenant triggers renegotiation.
- Lenders gain control in default and can force liquidation.
- Interest payments are a business expense and not taxed at the corporate level –they generate tax shields.
- **Key features:**
  - Principal or face value.
  - Maturity date.
  - Payment schedule & interest
  - Indenture & covenants

# Public Equity, Dual-Class Shares, Preferred Stock

## Public Equity (Common Stock & Warrants)

**Common stock** gives ownership in a corporation

- The holder shares proportionally in dividends paid.
- The holder can vote in the firm's affairs (e.g., directors)
- Shareholders have limited liability if the firm defaults

**Warrants** are long-term call options on a firm's stock but are issued by the company

- Bundle one share and one warrant (staged financing)
- Bundling a bond and a warrant (convertible debt)

### Preferred stock differs by:

- It is senior to common stock in liquidation.
- Its dividends have priority over those on common stock.
- It is a debt-like security; its dividend is fixed at the time of issuance; no direct effect on bond ratings.

## Dual-Class Shares

Some firms have two classes of stock, usually called **class A** and **class B**, which differ in terms of their votes per share.

- These firms were usually family-owned firms until they grew too large to be financed by the family alone.
- Families keep the super-voting shares (usually not traded) and raise capital by issuing shares with inferior voting power.
- Thus, they obtain capital but keep full control of the firm, since voting rights > cash-flow rights.
- Google IPO: class-B shares (reserved for insiders) carry 10 votes; class-A shares sold to the public carry just one vote.
- In Canada, see Canadian Tire, Bombardier, Magna International, Rogers Communications, and Celestica.

## Private Equity

**Private equity** is the main source of financing for small private businesses who lack resources to finance growth.

- **Angel investors** (e.g., owner's friends) provide some of the initial financing for start-ups.
- **Venture capital** firms are partnerships that specialize in raising money to invest in the private equity of young firms and in monitoring them.
- **Institutional investors** are large organizations such as banks, pension plans and insurance companies.
- **Sovereign wealth funds** are state-owned pools of money that are invested in businesses.
- **Corporate investors** (typically strategic partnerships)

# Initial Public Offerings (IPO) & IPO Underpricing

## Steps in an IPO

- Company appoints a managing **underwriter** and co-managers (underwriting syndicate) to market the IPO.
- Regulatory filings with the provincial securities commission (Canada), including the **registration statement** and the **preliminary prospectus**.
- Regulator (OSC) reviews preliminary prospectus and approves the issue to the general public.
- Establish initial price range, go on a **road show** to promote the issue, and gauge investor's interest (**book-building**).
- Further adjust the price and set the final price.
- Company files the final prospectus with all details, including number of shares and price.
- **SEOs** are similar, but easier as there is a price already.

**Remember these steps for your midterm!!**

## The offer price and IPO underpricing

An underwriter must set the offering price (difficult task!):

- if the offer price is too high, shares might not be sold and the issue will have to be withdrawn.
- if the offer price is too low, existing shareholders sell their shares for less than they are worth.
- Note: if the offer price is correct, the return on the first trading day (end of day price vs. offer price) should be zero.

The average return *in the first trading day in Canadian IPO* is about 8% and larger for other countries - **a big puzzle!**

- Underpricing occurs especially in small speculative issues.
- Underwriters benefit – lower risk of not selling the issue.
- Outside investors benefit – a large return in one day.
- Pre-IPO shareholders pay the cost – they sell stock for less they could get in the aftermarket.

# IPO Underpricing & Floatation Costs

## Why are IPO's underpriced?

### *Information asymmetry – winners' curse*

- Uninformed investors buy all IPOs; informed only buy underpriced.
- Uninformed get more shares of overpriced and less of underpriced IPOs, so would lose money on average and not buy IPOs.
- To raise funds, firms underprice enough for them to break even.

### *Underwriters may underprice IPOs due to agency problems:*

- it is easier for underwriters to sell underpriced shares.
- underpriced issues are less likely to trigger litigation by unhappy investors (lawsuits follow from negative returns).
- anecdotes suggest some allocate underpriced shares to CEOs in exchange for future business dealings (spinning) or to investors in exchange for trading commissions (kickbacks). Illegal of course.
- firms may let their underwriters underprice their shares in exchange for “optimistic” analyst coverage.

## Floatation Costs

### Components of flotation costs (costs of issuing securities)

- Spread (offer price – price to issuer) – underwriting fees
- Other direct expenses (filing fees, legal fees, and taxes)
- Indirect expenses (management time)
- Abnormal returns (announcement effects on SEOs)
- Underpricing (in IPOs)
- Overallotment option (underwriters can buy more shares at the offer price to cover excess demand)

### Key facts:

- Roughly, IPO flotation costs are about 14% of proceeds (about 6% are fees and 8% is underpricing)
- Flotation costs decrease in \$ issued – economies of scale.
- Costs are higher for IPOs than for SEOs.



## Learning Summary

1

Describe the key differences between debt and equity securities (payoffs, priority, voting, taxes)

2

List the different types of debt and equity & illustrate the potential complexity of firms' capital structures

3

Describe the sources of private equity financing.

4

Outline the process associated with an initial public offering (IPO) and identify the cost of issuing securities







4

## Topic 5 – Corporate Governance

*Moral Hazards, Fiduciary Duty, Corporate Governance Mechanisms*



## Learning Objectives

1

Describe the primary duty of financial managers

2

Explain how moral hazard / agency problems arise

3

Identify and describe key corporate governance mechanisms for all-equity and for levered firms







## Duty of managers and different types of moral hazards / agency costs

### Primary duty of managers

- Shareholders (owners) delegate decision making to managers
- Shareholders want managers to maximize firm value, but managers often have incentives to deviate from value maximization
- Shareholders are typically small, dispersed and uninformed, so their monitoring of managers is very difficult and costly

### Types of Managerial “Moral Hazard”

- **Insufficient Effort:** short hours, too little oversight, too lazy to switch to cheaper supplier, or lack of attention to detail.
- **Extravagant Investment:** “pet projects” & “empire building”
  - Heavy exploration in oil industry when it was cheaper just to buy oil
  - Typically negative stock market reactions to acquisitions (managers make seemingly negative NPV acquisitions to grow firm size)
- **Entrenchment:** CEOs secure their own position at the expense of investors
  - Example: Invest in “bad” industry which CEO is good at running
- **Self-Dealing:** Private benefits of control / perk consumption
  - Jets, nice offices, celebrity contacts, lavish parties

# Key corporate governance mechanisms

## 1. Incentive Contracts:

- Tie managers' pay to firm performance and value - performance stock units (PSUs), restricted stock units (RSUs), etc
- Commonly used with bonuses, stock ownership, and restricted stock/ option grants
- Incentive contracts CAN help, but they could lead to moral hazard issues because managers become risk averse or take super risky actions to influence certain performance measures to achieve their bonuses

## 2. Shareholder legal action

- Disgruntled shareholders can individually sue the firm / management
- This can be costly to smaller shareholders who may just “free ride” on their effort and reap the benefits

## 3. Voting

- Voting right is the most important shareholder right; shareholders can vote to appoint directors and on major proposals

## 4. Board of Directors

- Shareholders can elect directors to vote on their behalf
- Directors have a fiduciary duty to shareholders and are better informed and motivated than shareholders.

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- Shareholders can elect directors to vote on their behalf
- Directors have a fiduciary duty to shareholders and are better informed and motivated than shareholders.
- **Inside Directors:** have significant connection to the firm (usually the CEO, top executives, large shareholders). They know a lot about the firm's operations (experts); but may be biased in their recommendations.
- **Outside Directors:** Have no obvious connection to the firm (e.g., CEOs of other unrelated firms or business experts). They know less about company specifics, but provide unbiased, professional views on corporate matters.
- **Pressure for boards to make changes:**
  - Majority outside directors (now a requirement for listing on the NYSE)
  - Compensation Committee dominated by non-executive directors
- **Empirically:**
  - Boards tend to be passive except after extreme events.
  - Independent boards are more likely to replace bad managers.



## Key corporate governance mechanisms (con't)

### 5. Large Investors

- Large investors have more incentive to monitor the firm (no public good problem) and can more easily influence decisions
- Some firms have large family ownership stakes
- Large shareholders are associated with higher turnover of directors and managers after bad performance and increase the likelihood of takeovers

#### Problems with Large Investors:

- Large investors can create agency conflicts between majority shareholders and minority shareholders

### 6. Proxy Fights

- In a proxy fight, stockholders who oppose current management seek to gain control of the firm and install new management.
- Dissenting stockholders seek support from other shareholders to enact change at the firm
- Even if proxy fights are unsuccessful and management is not replaced, firms get the message that shareholders are unhappy

### 7. Takeovers

- Takeovers are an important and effective corporate governance mechanism
- In a “hostile takeover” a bidder makes a tender offer to shareholders of the target firm, if successful, poorly performance managers are replaced
- Logic: firm is undervalued, shareholders can unlock value by replacing bad managers
- Most important, takeovers are **a threat to poor management**, and this threat induces management to adhere to value maximization

### Summary

- Key mechanisms to ensure good governance include:
  - Managerial incentive contracts
  - Shareholder voting and class-action lawsuits
  - Delegation and monitoring through a board of directors
  - Concentration of ownership and control by few large investors
  - Proxy fights and hostile takeovers
  - Creditor influence through the debt contracts



## Governance of a levered firm

### Governance of levered firm

- In an all-equity firm the CEO's job is to maximize equity value. Equity of a poorly governed firm is worth less than with good governance.
- When a firm is financed with both debt and equity, should the CEO maximize equity value or firm value ?
- If the interests of shareholders and creditors always coincided, there would be no need for creditors to be involved in governance.
- Shareholders and creditors both suffer value losses when managers destroy cash flow that can service debt or dividend payments, so both creditors and shareholders benefit from tighter control of managers.

### How creditors are protected

- Creditors are legally protected by debt covenants and by bankruptcy law.
- Although creditors do not vote, they can gain control of the firm when the firm violates a debt covenant.
- In that case, managers and creditors must renegotiate the debt contract; creditors can impose their terms and influence corporate decisions.
- **Note:** creditors offer a much more credible threat of liquidation of bad firms since they benefit from it; this controls managers.



## Learning Summary

1

Describe the primary duty of financial managers

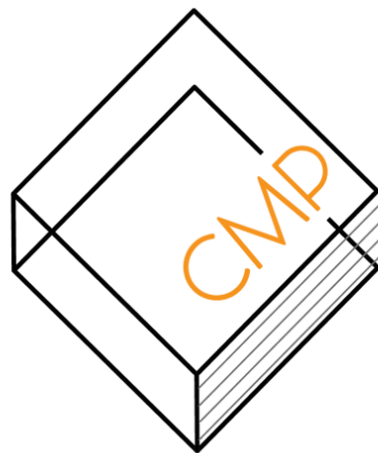
2

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# Practice Midterm Questions



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