BMGT 221 – MANAGERIAL ACCOUNTING

Chapter 1,2,3 - Manufacturing Overhead / Intro

Manufacturing Costs = DM + DL + MOH || Prime Costs = DM + DL || Conversion Costs = DL + MOH
POHR = Est. Total Manufacturing Costs / Est. Total Units in the allocation base
MOH Applied =POHR * Act. Base
Overapplied (Underapplied) MOH = MOH Applied - Act. Base
Var. Cost per Unit = Change in Total Cost / Change in Units

Direct Cost - Costs traced to a unit of productions (DL & DM)
Indirect Costs - Costs that can't be easily traced (MOH)
Examples of MOH: Dep., Utilities, and Property Costs
Non-manufacturing costs: Selling and Admin.

Schedule of Cost of Goods Sold	
Beginning Finished Goods Inventory	xxx
Cost of Goods Manufactured (+)	xxx
Cost of Goods available for Sale	xxx
Ending Finished Goods Inventory (-)	xxx
Unadjusted Cost of Goods Sold	xxx
Overapplied/ Underapplied Overhead (-/+)	xxx
Adjusted Cost of Goods Sold	xxx

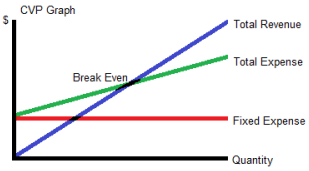
Schedule of Cost of Goods Manufactured		
Direct Materials:		
Beginning Raw Materials Inventory	xxx	
Raw Materials Purchased (+)	xxx	
Raw Materials available for Production	xxx	
Ending Raw Material Inventory (-)	xxx	
Total Raw Materials Used		xxx
Direct Labor		xxx
Manufacturing Overhead Applied		xxx
Total Manufacturing Costs		xxx
Beginning Work-in-Process Inventory (+)		xxx
Total Work-in-Process		xxx
Ending Work-in-Process Inventory (-)		xxx
Cost of Goods Manufactured		xxx

Acronym Key:
Act: Actual
Admin: Administrative
CM: Contribution Margin
Dep: Depreciation
DL: Direct Labor
DM: Direct Materials
Est: Estimated
Exp: Expenses
Fxd: Fixed
Inc. Income
MOH: Manufacturing Overhead
Oper: Operating
POHR: Predetermined Overhead Rate
Var: Variable

Chapter 5 - CVP Analysis

CM = Total Sales - Var. Exp. || CM Per Unit = Sale Price per Unit - Exp. per Unit || CM% = CM / Total Sales
Break Even: Profit = 0 || Dollar Sales to Break Even = Fxd. Exp. / CM%
Dollar Sales to Reach Target Profit = (Fxd. Exp. + Target Profit) / CM%
Margin of Safety in Dollars = Total Sales - Dollar Sales to Break Even
Margin of Safety% =Margin of Safety in Dollars / Total Sales
Degree of Oper. Leverage = CM / Net Oper. Inc.
Change% in Net Inc. = Degree of Oper. Leverage * %Change in Sales

Contribution Format Inc. Statement	
Sales	xxx
Variable Expenses	xxx
Contribution Margin	xxx
Fixed Expenses	xxx
Net Oper. Inc. (Loss)	xxx



Chapter 6 - Variable Costing

Traceable Fxd. Costs - A fxd. cost incurred by a specific business segment. Is eliminated if the segment is eliminated.
Common Fixed Costs - A fxd. cost that supports more than one business segment. Cannot be eliminated
Segment Margin - A segment's CM - Traceable Fxd. Costs. (Segment's net inc. (loss))

Var. Costing Inc. Statement		
Sales	xxx	
Var. Exp.		
Var. COGS		xxx
Var. S/A Exp.		xxx
Total Var. Exp.	xxx	
CM	xxx	
Fxd. Exp.:		
Fxd. MOH		xxx
Fxd. S/A Exp.		xxx
Total Fxd. Exp.	xxx	
Net Oper. Inc.	xxx	

Absorption Costing Income Statement	
Sales	xxx
COGS	xxx
Gross Margin	xxx
S/A Exp.	xxx
Net Oper. Inc.	xxx

:D

Variable Costing		Absorption Costing
Product Costs	Direct Materials	Product Costs
	Direct Labor	
	Variable Manufacturing Overhead	
Period Costs	Fixed Manufacturing Overhead	
	Variable Selling / Administrative Costs	Period Costs
	Fixed Selling / Administrative Costs	

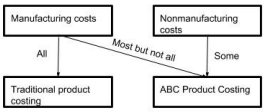
Reconciliation of Absorption and Variable Costing:

Relation between production and sales	Effect on Inventory	Relation Between Variable and Absorption Income	How To Reconcile
Units Produced = Units Sold	No Change	Absorption = Variable	No need to reconcile as incomes are the same.
Units Produced > Units Sold	Increase in Inventory	Absorption > Variable	Add Fixed Manufacturing Overhead Cost deferred in inventory under absorption costing.*
Units Produced < Units Sold	Decrease in Inventory	Absorption < Variable	Less Fixed Manufacturing Overhead Cost Released from inventory under absorption costing.*

Difference between the two net incomes or to calculate: (Fixed MOH / Units produced)(| Units Manufactured - Units Produced |)

Chapter 7 - Activity Based Costing

Activity Based Costing - SUPPLEMENT to other information for decision making. Very expensive to do.
Activity - An event that causes the consumption of resources (Travelling to customers)
Activity Measure - An allocation base in an activity based costing system (Miles driven)
Five levels of activity - Unit, Batch, Product, Customer, Organization Sustaining. (Least - Most Specific)



Example Cost Allocation
A firm has expenses:

Wages	$10,000
Supplies	$4,000
Depreciation	$2,000
Car Exp.	$8,000
CEO Salary	$8,000
Total Costs	$32,000

Distribution of Resources

	Doing the Job	Travel	Support	Other	Total
Wages	70%	20%	0%	10%	100%
upplies	100%	0%	0%	0%	100%
Depreciation	80%	0%	0%	20%	100%
Car Exp.	0%	60%	0%	40%	100%
CEO Salary	0%	0%	40%	60%	100%

First Stage Allocation of Costs

	Doing the Job	Travel	Support	Other	Total
Wages	$7,000	$2,000	$0	$1,000	$10,000
Supplies	$4,000	$0	$0	$0	$4,000
Depreciation	$1,600	$0	$0	$400	$2,000
Car Exp.	$0	$4,800	$0	$3,200	$8,000
CEO Salary	$0	$0	$3,200	$4,800	$8,000
Total	$12,600	$6,800	$3,200	$9,000	$32,000

Second Stage Allocation of Costs

Activity Cost Pool	Total Cost	Activity	Rate
Doing the Job	$12,600	100 Customers	$126 per Customer
Travel	$6,800	50 Trips	$136 per Trip
Support	$3,200	1,000 DL Hours	$3.2 per DL Hour
Other	$9,400	NA	NA
Total	$32,000		

Chapter 8 - Budgeting

Planning - Developing objectives and preparing various budgets to achieve them
Control - Management actions to achieve those objectives

Sales Budget:
Budgeted Sales in Units
Selling Price Per Unit
Total Budgeted Sales

Selling/Administrative Expense Budget:
Budgeted Sales
Variable S&A Rate
Variable Expenses
Fixed S&A Expenses
Total S&A Expenses
Less: Noncash Expenses
Cash S&A Disbursements

Production Budget:
Budgeted Sales in Units
Add: Desired Ending Inv.
Total Needs
Less: Beginning Inv.
Required Production

Direct Labor Budget:
Production
Labor Per Unit
Labor Hours Required
Guaranteed Labor Hours
Labor Hours Paid
Hourly Wage Rate
Total Direct Labor Costs

Manufacturing Overhead Budget:
Budgeted DLH
Variable MOH Rate
Variable MOH Costs
Fixed MOH Costs
Total MOH Costs
Less: Non Cash Costs
Cash Disbursements

Direct Materials Budget:
Production
Materials Per Unit
Production Needs
Add: Desired Ending Mat.
Total Needed
Less: Beginning Inv.
Materials to be Purch

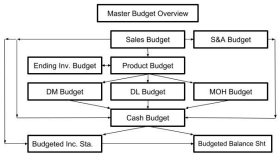
Cash Budget:
Beginning Cash Balance
Add: Cash Collections
Total Cash Available
Less: Cash Disbursements
Materials
Direct Labor
MOH
Selling & Admin
Equipment Purchase
Dividend
Total Disbursements
Excess (Deficiency)
Financing:
Borrowing
Repayments
Interest
Total Financing
Ending Cash Balance

Budgeted Balance Sheet:
Assets:
Cash
Accounts Receivable
Raw Materials Inv.
Finished Goods Inv.
Land
Total Assets
Liabilities and Equity
Accounts Payable
Common Stock
Retained Earnings
Total Liabilities and Equity

Budgeted Income Statement:
Sales (100,000@$10)
COGS (100,000@$4.99)
Gross Margin
Selling & Admin Exp.
Operating Income
Interest Expense
Net income

Ending Finished Goods Inventory Budget:

Production Costs Per Unit	Quantity	Cost	Total
Direct Materials	5 lbs	$.4	$2
Direct Labor	.05 hrs	$10	$.5
Manufacturing Overhead	.05 hrs	$49.7	$2.49
Unit Product Cost			$4.99
Budgeted Finished Goods Inv.			
Ending Inventory in Units			5,000
Unit Product Cost			$4.99
Ending Finished Goods Inv.			$24,950



Expected Cash Collections:
Accounts Receivable
Jan Sales
%70*$200,000
%25*$200,000
Feb Sales
%70*$500,000
%25*$500,000
March Sales
%70*$300,000
Total

Chapter 9 - Flexible Budgeting

Flexible Budget - A with the original per unit costs but with the actual quantity
Leverage Effect - %Changes in income are usually less than % changes in revenue
Activity Variance = Planning Budget - Flexible Budget
(+): Favorable || (-): Unfavorable

Flexible Budget Performance Report:

	Actual	Revenue/Spending Variances		Flexible Budget	Activity Variances		Planning Budget
Units	48			48			50
Price	$320			$320			$320
Revenue	$13,650	$1,710	U	$15,360	$640	U	$16,000
Expenses:							
Wages	$8,430	$494	U	$7,936	$164	F	$8,100
Fuel	$1,260	$156	U	$1,104	$46	F	$1,150
Fees	$2,350	$124	F	$2,474	$76F	F	$2,550
Deprec.	$336	$0	N	$336	$14	F	$350
Other	$460	$174	U	$286	$4	F	$290
Total Exp.	$12,836	$700	U	$12,136	$304	F	$12,440
Net Income	$814	$2,410	U	$3,224	$336	U	$3,560

Chapter 10 - Standard Costs and Variances

Standards - Benchmarks for performance of price or quantity
Price Standards - How much should have spent on each unit of input
Quantity Standards - The amount of input that should have been used

General Model for Variance Analysis

Actual Quantity of Input at Actual Price	Actual Quantity of Input at Standard Price	Standard Quantity Allowed for Actual Output at Standard Price
(AQ*AP)	(AQ*SP)	(SQ*SP)

Price Variance (AQ*SP)-(AQ*AP) or AQ(SP-AP)	Quantity/Efficiency Variance (SQ*SP)-(AQ*SP) or SP(SQ-AQ)
Spending Variance (SQ*SP)-(AQ*AP) or	

AQ =Actual Quantity; AP = Actual Price
SQ = Standard Quantity; SP = Standard Price

A General Model for Fixed Analysis

Actual Fixed Overhead	Budgeted Fixed Overhead	Fixed Overhead Applied
(Should be raw number)	(DH*FPOHR)	(SH*FPOHR)

Budget Variance (Budgeted Fixed OH - Actual Fixed OH)	Volume Variance (SH *FPOHR)-(DH*FPOHR) or FPOHR(SH-DH)

DH = Denominator Hours; SH = Standard Hours
FPOHR = Fixed portion of Predetermined Overhead Rate

****NOTE: Positive value means it is Favorable, Negative is Unfavorable

Chapter 11 - Performance Measurement in Decentralized Organizations
Return on Investment (ROI) = Margin * Turnover = (Net Oper. Inc. / Sales) * (Sales / Assets)
Margin = Net Oper. Inc / Sales || Turnover = Sales / Assets
Residual Inc. = Net Inc. - (Assets * Required ROI)
Throughput (Manufacturing Cycle) Time = Process (Value Added)+ Inspection + Move + Queue
Delivery Cycle Time = Throughput Time + Wait
Manufacturing Cycle Efficiency = Process / Throughput Time

Decentralized Organizations - Decisions are commonly made at the lower levels of management
Residual Income is a better motivator for managers than ROI since with ROI a manager may not accept a project that would have been good for the company since the ROI might be below the managers ROI.

Responsibility Center	Responsibilities
Cost Center	Expenses
Profit Center	Expenses and Rev
Investment Center	ROI Residual Inc.

Chapter 12 - Differential Analysis
Relevant Cost - Cost that differs between alternative || Relevant Benefit - Benefit that differs between alternatives
Avoidable Cost - Cost that can be eliminated by choosing one alternative over another
Irrelevant Costs - Sunk costs and future cost that doesn't differ between the options
Avoidable / Differential are used interchangeably
Opportunity Cost only applies only if the resources freed up by choice A can be used by choice B
Bottleneck - A limiting resource on the quantity produced. This causes the need to factor in opportunity cost.
Joint Costs - Common costs between two products which is not factored into the decision process

Two Step Process
1. Eliminate costs and benefits that do not differ between options
2. Use Remaining Costs and benefits that differ to make decision (The costs that remain are differential or avoidable)

Example:

	Option A (Keep)	Option B (Drop)	Difference (B-A)
Sales	$400,000	$0	$(400,000)
Variable Expenses	$200,000	$0	$200,000
Contribution Margin	$200,000	$0	$(200,000)
Fixed Expenses:			
Factory Overhead	$90,000	$90,000	$0
Salary of Manager	$100,000	$0	$100,000
Depreciation	$80,000	$80,000	$0
Total Fixed Expenses	$270,000	$170,000	$90,000
Net Income	$(70,000)	$(170,000)	$(100,000)

*Note: Although this product line technically is operating at a loss, dropping it would cause the firm to lose even more.

Chapter 13 - Present Value
Present Value of $1 = Cash Flow * (1/[(1+r)^n]) = Cash Flow * (Multiplier on Chart) || n - number of periods, r - discount rate
Present Value of an Annuity of $1 in Arrears = (1/r) * (1 - [1/([1+r]^n)]) = Periodic Cash Flow * (Multiplier in chart)
Simple rate of return = (Annual Incremental Net Oper. Inc.) / (Initial Investment)
Payback Period = (Investment Required) / (Annual Net Cash Inflow)
Factor of IRR = (Investment Required) / (Annual Net Cash Inflow) || Use this value to plug back into the chart, knowing the #of period to find the rate
Working Cost of Capital= (Current Assets) - (Current Liabilities)
Net Present Value = (Sum of Present Value Cash Inflows) - (Sum of Present Value Cash Outflows)

REMEMBER, DEPRECIATION IS NOT A CASH OUTFLOW
Cash Outflows/ inflows - Any cash that the investment moves (Initial investments, equipment, working capital, revenues, but NOT DEPRECIATION)
Payback method - IGNORES TIME VALUE, describes exclusively the cash flows to get to cover the initial investments, good for screening
Net Present Value - All cash flows including any time value
Choosing a Discount rate - minimum required return

	Accounting or Cash Flow	Time Value	Discount Rate
Net Present Value	Cash Flow	Yes	Need Upfront
IRR	Cash Flow	Yes	Compare After (If IRR>r accept) (If IRR< r deny)
Payback Period	Cash Flow	No	Don't Need
Simple Rate of Return	Accounting	No	Don't Need

Net present Value Example: A company has a new 5 year investment it is pursuing,
- It requires $125,000 Equipment that has a salvage value of $10,000 at the end of the 5 year investment and depreciates based on a straight line
- It requires a working capital of $100,000 which will be released at the end of the 5 years
- It has a Net Cash Inflow of $50,000 each year
- It has a special event cost that occurs on the 3rd year of $20,000
- The discount rate is 10%

Net Present Value:

Event	Year(s)	Cash Flow	10% Factor	Present Value
Equipment	Now	$(125,000)	1*	$(125,000)
Working Capital	Now	$(100,000)	1	$(100,000)
Annual Cash Flows	1-5	$50,000	3.791**	$189,550
Special Event	3	$(20,000)	.751***	$(15,020)
Salvage Value of Equipment	5	$10,000	.621	$6,210
Release of Working Capital	5	$100,000	.621	$62,100
Net Present Value				$17,840

*Since this is an initial investment
** Present Value of an Annuity of $1 in Arrears Chart (n=5, r=10%)
***Present Value of $1 Chart (n=3, r=10%)

BMGT 340 – INTRO TO FINANCE

Chapter 1 - Intro to Finance

	# of Owners	Liability For Owners	Owners Manage Firm	Ease of Forming	Ease of Raising Capital	Ownership change dissolves firm	Taxation
Sole Proprietorship	One	Yes	Yes	Easy	Hard	Yes	Personal
Partnership	Unlimited	Yes; For each partner	Yes	Easy	Hard	Yes	Personal
LLP	>1 GP No Limit LP	GP - Yes LP - No	GP - Yes LP - No	Hard	Easy	GP - Yes LP - No	Personal
LLC	Unlimited	No	Yes	Hard	Easy	No	Personal
S corp	<=100	No	No	Hard	Easy	No	Personal
C corp	Unlimited	No	No	Hard	Easy	No	Double

Income Statement
Sales
Less: COGS
Less: Fixed Op Costs
EBITDA
Less: Dep & Amort
EBIT
Less: Interest
EBT
Less: Taxes
Earnings
Used for EPS

Financial Manager's Roles - Investments (Most important), Financing, Cash Management
Financial Manager's objective - Maximize Shareholder Wealth
Agency Conflict - The agent is supposed to act in the principal's interest but has incentives to work in their own interest
Primary Market - A company's initially sale of shares to the market
Secondary Market - Trading between Investors
Accounting Equation: Assets = Liabilities + Equity
Arbitrage - Being able to buy/sell something for a differential price at the EXACT same time
Corporate Decision process - Shareholders elect Board of Directors who pick the CEO

Equations:
ROE = (Net Inc. / Sales)*(Sales/Total Assets)*(Total Assets/Total Equity)
[Margin] [Turnover] [Equity Multiplier]
Remaining Dividends = Earnings Before Taxes * (1-Corporate Tax%) * Paid as Dividends% * (1- Personal Tax%)

Chapter 3

Competitive Market - A Market in which a good can be bought and sold at the same price
Valuation Principle - The value of an asset is determined by its competitive market price. Decisions where benefits outweigh the cost will increase firm value
Law of One Price - A goods price on one market is the same as another
Arbitrage - Buying and selling goods between markets
Years to Double - 72/IR

Equations
PV = C / ([1+r]^n)
FV = C * ([1+r]^n)

Chapter 4

Perpetuity - Regular cash flow indefinitely
Annuity - Fixed number of regular cash flows

Equations
PV (Perpetuity) = C / r NOTE: The first cash flow is in a year
PV (Annuity) = $C * (\frac{1}{r}) * (1 - \frac{1}{(1+r)^n})$
PV (Growing Perpetuity) = C / (r-g)
PV (Growing Annuity) = $C * (\frac{1}{r-g}) * (1 - [\frac{1+g}{1+r}]^n)$

Chapter 5 - Effective Rates

Effective Rates - The combined payment period rates for a specific amount of time
EAR - Effective Annual Rate, the effective rate for 1 year
Normal Yield Curve - Expectation for rising rates, shorter period bonds have a lower yield and longer period bonds have higher yield rates
Inverted Yield Curve - Expectation for falling rates, indicator of a potential recession,shorter period bonds have a higher yield whereas longer bonds have a lower yield

Equations
Equivalent nth-period discount rate = ([1+r]^n)-1
EAR (From an APR) = $(1 + \frac{APR}{m})^m - 1$
NomRate+1 = (1+RealRate)*(1+InflationRate)
Interest Portion of Loan Payment = rate*PV at the time of payment
Principal Portion of Loan Payment = payment-InterestPortion

Chapter 6 - Bonds

A bond has multiple different values: Coupon Payments (CPN) - An amount of money which is paid to the bondholder every year, usually a certain percentage of the face value | Face Value - The value of the bond which will be paid at the expiration of the Bond | Price - The amount of money by which the market has been evaluating this bond at
Changing market rates hurt both short and long term bonds. If market rates increase, then the price of the bonds go down and the reverse is true.
Long term bonds are more affected by the changes than short term bonds.
Sometimes bonds are able to be called at a certain price and time by the issuer. In which case a yield to call based on this call can be calculated.
Reinvestment Risk - The risk that exists when one invests in short term bonds. If rates increase, then it hurts companies that need to issue more bonds in the future and helps investors who will now make more
Zero Coupon Bond - A bond that has no interest payment
Zero Coupon Bonds
Yield to Maturity = (Face Value / Price)^(1/N)
Coupon Bonds
Coupon Payment(CPN) = (Coupon Rate * Face Value)/#Payments per year
PV = $CPN * ([\frac{1}{r}] * [1 - \frac{1}{(1+r)^N}]) + \frac{Face\ Value}{(1+r)^N}$
Current Yield = Annual CPN / Price
Yield to Maturity - Use the PV Formula, and solve for r

Chapter 7 - Stocks

They really over complicated this chapter in my opinion. In short: the present value of a hare of a company is just THE PRESENT VALUE OF EXPECTED DIVIDENDS
Retention Rate - The portion of earnings the company retains to continue growth (1-dividend payout rate)
Dividend Payout Rate - The portion of earnings the company pays out to shareholders (1-retention rate)
Higher Risk - When there is higher risk, investors will require a higher rate of return
Formulas
Time Dividend Discount Model
PV of uneven dividends: $P_0 = D_1 / ([1+ r]^1) + \dots D_N / ([1+r]^N)$
PV of Constant Growth = $D_1 / (r - g)$
g = Retention Rate * Returns on New Investments
Share Repurchase and Total Payout - P_0 = PV(Future Total Dividends and Repurchases) / Shares Outstanding

Chapter 8 - NPV and IRR

NPV - The present value of all future inflows and outflows. If NPV > 0 the project creates value for the firm; If NPV < 0 the project is a net negative value for a firm
IRR - The rate for an investment where the NPV is zero, a higher IRR is generally a good thing
Non Conventional Cash Flows - When your outflows occur later than the inflows
Modified IRR - (FV[inflows] / PV[outflows])^(1/N) - 1
Crossover Rate - the rate where two different investments will have the same NPV. To Solve, do an IRR calculation where each cash flow is the difference between each of the investments
Evaluating Based on Bottlenecks: Profitability Index = NPV / Bottleneck Cost (such as man hours, cash, or staff, or materials)

Method	When To Accept	When To Not Use	Evaluating Mutually Exclusive
NPV	>0	When other options might be better dependent on constraints (man hours)	Take the Highest NPV
IRR	>Discount Rate	Non-Conventional Cash Flows	Depends on Crossover Rate
MIRR	>Discount Rate	When you don't have the discount rate	Higher MIRR
Payback	<Arbitrary #	NEVER USE, IT DOES NOT ACCOUNT FOR TIME VALUE	Smaller Payback Period

Chapter 9 - Capital Budgeting

CapEx - Capital Expenditures
NWC - Net Working Capital = Current Assets - Current Liabilities = Cash + Inventory + Receivables - Payables
Incremental Earnings = (Incremental Revenues - Incremental Costs - Depreciation) * (1-Tax Rate)
Payback Period = |initial cash outflow| / |recurring cash inflow| = The amount of time till the initial payment is returned
Annual Straight line Depreciation = (Purchase Value - Salvage Value)/Years
After Tax Cash Flow from Asset Sale = Sale Price - (Tax Rate * Gain/Loss on Sale)
Gain/Loss on Sale = Sale Price - Book Value
Book Value = Purchase Value - Accumulated Depreciation = Purchase Value - (Years * Depreciation per Year)
Free Cash Flow = (Revenues - Costs - Depreciation) * (1-Tax Rate) + Depreciation - CapEx - Changes in NWC
EBIT = (Revenues - Costs - Depreciation)

Matters For Decision - Incremental	Doesn't Matter For Decision - Not Incremental
Opportunity Cost Capital Expenditures Product Cannibalization Sales, Costs, Depreciation Net Working Capital	Sunk Costs Research Costs

Chapter 10 - More Stock Evaluation

The value of a Company should be an accumulation of all of its projects
Firm Value (V_0)= PV(Future Free Cash Flows)
Terminal Value Constant Growth $V_N=FCF_{N+1}$ / (r - g)
$P_0 = (V_0 + Cash_0 - Debt_0)$ / Shares Outstanding
MV of Equity = MV of Firm - MV of Debt

Chapter 10 - More Stock Evaluation

These ratios are dependent on the market average for the firm in question. For example, Microsoft's PE would be compared to the average PE of companies in the tech industry
Characteristics of an efficient market: Factor in new information quickly, large volume of buyers and sellers, prices reflect true value
S&P, Dow Jones, NASDAQ, and Russell 2000 are good indicators

$P_0 = (V_0 + Cash_0 - Debt_0)$ / Shares Outstanding (From the last exam)
Multiples - Applicable for businesses relevant to other similar businesses
PE ratio = Share Price / Earnings Per Share = Market Cap / Earnings

Chapter 11 - Return and Return

Return from T0 and T+1: $R_{t+1} = ([Div_{t+1}] + [P_{t+1}] - [P_t]) / [P_t]$ = Dividend Yield + Capital Gain Yield
Dividend Yield = Div_{t+1} / P_t
Capital Gain Yield = $(P_{t+1} - P_t) / P_t$
Average Return = $1/T (R_1 + R_2 \dots + R_T)$
Realized/annualized return = $[1+R_1]*[1+R_2]*...*[1+R_t]$
Return Variance = $(1/[T-1]) * ([R_1 - (\text{Average Return})]^2 + [R_2 - (\text{Average Return})]^2 + \dots + [R_t - (\text{Average Return})]^2)$
Geometric average (CAGR) = $([1+R_1]*[1+R_2]*...*[1+R_t])^{1/t}$
Standard Deviation is the square root of the variance
95% certainty range = Average ± (2*Standard Deviation)

Chapter 12 - Cost of Capital

Risk = Standard Deviation
Weight of a holding in a portfolio (w) = Value of investment / Total Value of portfolio
Expected Return of a portfolio = $w_1*R_1 + w_2*R_2 + \dots$.
Variance of a Portfolio = $(w_1)^2*(\sigma_1)^2 + (w_2)^2*(\sigma_2)^2 + 2*w_1*w_2*(\rho*\sigma_1*\sigma_2)$
Can also be restated as $\sigma_{1,2}$ also known as the covariance
$\rho = \sigma_{1,2} / (\sigma_1*\sigma_2)$ also known as the correlation between two stocks (values is between -1 and 1 and any value that isn't 1 can create diversification) NOTE: Convert percentages to decimal; $\sigma_{1,2}$ is the covariance
CAPM expected rate = risk free rate + Beta * (market rate - risk free rate)

Chapter 13 - WACC

Wacc = $w_d*r_d*(1-t) + w_p*r_p + w_e r_e$
w_d = D/V = weight of debt — r_d = Yield to maturity of debt
w_p = P/V = weight of preferred stock — $r_p = Div_p/Price_p$
w_e = E/V = weight of equity — $r_e = Div_1/Price_0 + g$ = CAPM
V = D+P+E
D - Market Value Debt; P - Market Value of Preferred Stock; E - Market Value of equity aka common stock

Calculator Guide

TVM Solver	In short, this takes in the information that you would make with a timeline N-Number of Payments I%-Compounding Rate PER PAYMENT PERIOD PV - Present Value PMT - CONSISTENT cash flows over the life of the investment FV - Future Value END/BEGIN - Keep on END unless there's a time zero payment (Payment right at the start) Any of the above variables can then be solved using tvm_[THING]
Eff(	Returns Effective Rate Eff(APR,numberOfCompoundsInYear) Ex: APR on loan is 10% and it compounds moneth, what is the effective annual rate (EAR): Eff(10,12)=10.47
Nom(	Converts effective rate to nominal annual rate (APR) Nom(EAR,numberOfCompoundsInYear) Ex: EAR is 10% and it is compounded daily - Nom(10,365)=9.53
npv(	Calculating the present value of uneven cash flows npv(rate,initia cash flow, {cash flow 1,c2,c3}) Ex: You get a cash flow 100,150,250, at the end of year 1,2, and 3. IR:5% npv(5,0,{100,150,250}) = 447.25
irr(	Returns the Internal Rate of Return for a series of cash flows irr(initial cash flow,{CF1,CF2,CF3,...}) Ex: what is the irr of an initial investment of $2000 and returns $2000 and $500 irr(-2000,{2000,500}) = 20.71

BMGT 343 – FINANCIAL INSTRUMENTS

Chapter 0 - Math and Stat Review: Produced by John Iler

Expected Value $E[x] = \sum_{i=1}^{N} p_i x_i$ ||| Variance $\sigma_x^2 = Var[x] = E[(x-\mu_x)^2] = E[x^2] - \mu_x^2 = p_1(x_1-\mu_1) + p_2(x_2-\mu_2) + \ldots$

Skewness = $E\left[\left(\frac{x-\mu_x}{\sigma}\right)^3\right] = \frac{\sum_{i=1}^{N} p_i(x_i-\mu_x)^3}{\left[\sum_{i=1}^{N} p_i(x_i-\mu_x)^2\right]}$ 1.5 ||| Kurtosis = $E\left[\left(\frac{x-\mu_x}{\sigma}\right)^4\right] - 3 = \frac{\sum_{i=1}^{N} p_i(x_i-\mu_x)^4}{\left[\sum_{i=1}^{N} p_i(x_i-\mu_x)^2\right]}$ 2

Covariance = σ_{xy} = Cov[x,y] = E[(x-μ_x)(y-μ_y)] = $\sum_{i=1}^{N} p_1(x_i-\mu_x)(y_i-\mu_y)$ ||| Cov[b_1x,b_2y] = $b_1 b_2$Cov[x,y] ||| Cov[A+B+C,D+E] = Cov[A,D]+Cov[A,E]+Cov[B,D]+...

Correlation = $\rho_{xy} = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$

$y_1 = b_0 + b_1 x$ b_1 = cov(xy)/var(x) = stddev(y)* ρ_{xy} / stddev(x)

R = ρ

Chapter 1 - Bonds

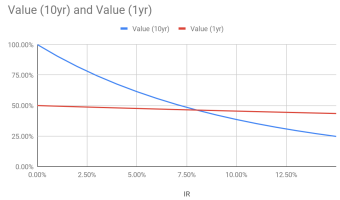
Yield = [(Face Value)/$price_0$]^(1/N)

Future rate F_n = Current price of n-1 zcb / current price of n zcb -1

Future rate F_n = $(1+y_n)^n / (1+y_{n-1})^{n-1} - 1$

Forward price=$S_0(1+y)^t$-FV(Div)

Bond Risk



Interest Rate Risk Immunization

The Goal is: $AModD_A = L\ ModD_L$ **OR** $AMacD_A = LMacD_L$ USE PRESENT VALUE FOR A AND L

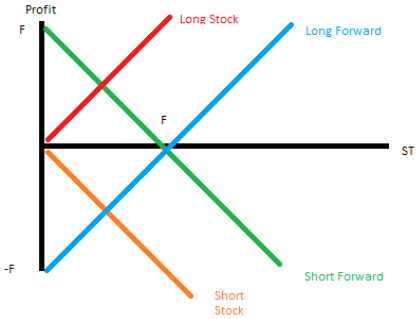
ModD = (-dp/dy)(1/p) **OR** (dp/p) = -(dy)ModD

ModD = (1/(1+y))MacD

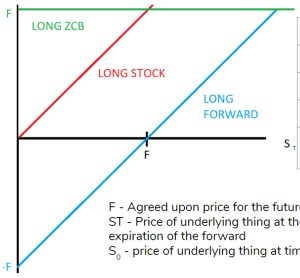
MacD = weighted average time to cash flow arrival, PV of cashflows used as weights

PV Perp = C/y ModD Perp = 1/y

Chapter 2 - Investments



Derivative Yields



Contract	Time 0	Time T
LONG ZCB	$F/(1+r)^T$	F
LONG FWD	0	ST - F
TOTAL	F/(1+r)	ST
LONG STOCK	S_0	ST

So..... $F/(1+r) = S_0$

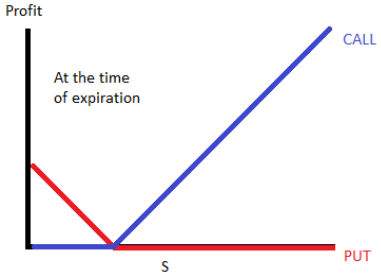
F - Agreed upon price for the future
ST - Price of underlying thing at the expiration of the forward
S_0 - price of underlying thing at time 0

Chapter 3 - Options

European - On the date of < American - any time between now and expiration

T - Expiration Date | S - Price Underlying | K - Exercise price | C - Value of Call Option | Value of Put option

$C_T = \max(0, S_T - K)$ | $P_T = \max(0, K - S_T)$



Combined Portfolios (Two methods)

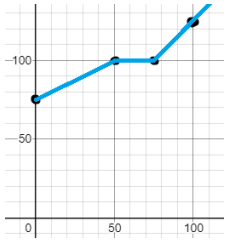
Connect the Dots:

1. Every time there may be a kink (whenever a option begins paying [when ST is above/below K for calls/puts])in the portfolio calculate the value of the portfolio as a whole once that point is reached. Put a point there
2. Pick one ST value to the right of the furthest kink to the right and add one more point there. Do the same for if ST is 0
3. Connect all the dots

Example

Portfolio has 1 ZCB @$100, short .5 put @$50, long 1 call @$75

1. Kinks at 50 and 75.
   Value @50 = 100+ .5min(K-ST,0) + max(ST-K,0) = 100+.5min(50-50,0)+max(75-100) = 100+0+0=100
   Value @75 = 100+.5min(75-50,0)+max(75-75,0)=100+0+0 = 100
2. Value @100 = 100+.5min(100-50,0)+max(100-75,0) = 100+0+25 = 125
   Value @0 = 100+.5min(0-50,0)+max(0-75,0) = 100-25+0 =50



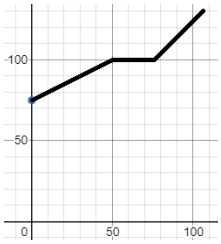
Slope Addition:

1. Find the value of the portfolio as a whole if ST is 0. This is your starting point.
2. Identify Each kink point on ST
3. Calculate the slope (how many of the derivative/or whatever you own) for each section of the graph.
4. In each of the sections between the kinks, find the total portfolio slope by adding the individual slopes
5. Starting at the starting point you found in step 1, draw at the corresponding slope through each section of ST

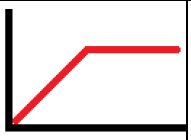
Example

Portfolio has 1 ZCB @$100, short .5 put @$50, long 1 call @$75

1. Value @0 = 100+.5min(0-50,0)+max(0-75,0) = 100-25+0 =50
2. 50&75
3. ZCB: slope is 0 always
   Short Put: .5 slope for 0-50, slope 0 for the rest
   Long call: 1 slope for everything past 75
4. 0-50: 0+.5+0 | 50-75: 0+0+0 | 75-Infinity and Beyond:0+0+1



Common Portfolios

Covered Call	Protective Put	Collar	Straddle	Strangle	Synthetic Forward
Long 1 Share Short 1 Call	Long 1 Share Long 1 Put	Long 1 Share Long 1 Put(K<ST) Short 1 Call(K>ST)	Long 1 Call Long 1 Put Both at the same K	Long 1 Call K>ST Long 1 Put K<ST	Long 1 Call Short 1 Put Same K
					

Valuing Options/Option Portfolios

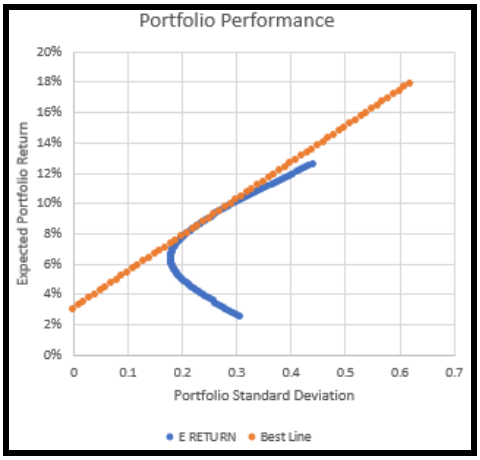
1. $U = e^{(\sigma\sqrt{h})}$ | $D = 1/U$
2. $S_U = S_0*U$ | $S_D = S_0*D$
3. V_U = The value of the portfolio at ST = S_U | V_D = The value of the portfolio at ST = S_D
4. $\Delta = (V_U-V_D)/(S_U-S_D)$
5. $V_U = \Delta*S_U+D(1+Y)^h$ Solve for D
6. $V_0 = \Delta * S_0 +D$

Chapter 4 - Risk Vs Return

γ - Our Preference For risk. Greater = more risk averse
$U[r_m]$- Our happiness with a given investment dependent on risk
$E[r_p]$ - Expected return from a risky asset

$U[r_m] = E[r_p] - \frac{1}{2}(\gamma*\sigma_p^2)$
$\sigma_P^2 = w_A^{2*}\sigma_A^2+w_B^{2*}\sigma_B^2+2w_Aw_B\sigma_{AB}$
$\sigma_{AB} = \sigma_A\sigma_B\rho_{AB}$
Sharpe Ratio = $(E[r_p]-rf)/\sigma$
Preferred Weight of Risky Asset = $(1/[\gamma*\sigma])$*Sharpe Ratio

$\check{r}$ = premium rate = r-rf
TANGENTAL EQUATION:
$W_B^{MVE} = ([\check{r}_B\sigma_A^2] - [\check{r}_A\sigma_{AB}]) / ([\check{r}_B\sigma_A^2] + [\check{r}_A\sigma_B^2] - [(\check{r}_A+\check{r}_B) * \sigma_{AB}])$



Chapter 5 - CAPM

The best MVE portfolio of the entire market is a portfolio where the weights of each company are the market cap of the company compared to the market: $w_{Company\ in\ MVE}$ = Market Cap of Company / Market Cap of World
i = the security in question | m = MVE portfolio | In some of these equations we may refer to m as a portfolio instead
$r_i = r_f + B_{i,m} * (r_m - r_f)$
$R^2_{i,m} = (B_{i,m}^2 * \sigma_m^2) / \sigma_i^2$
$B_{i,m} = \sigma_{i,m} / \sigma_m^2$ ---> simplifies to $B_{i,m} = \rho_{i,m} * \sigma_i / \sigma_m$