

ETS Finance Review

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Time Value of Money

- Discounting (finding a PV) – moving back on the time line
- Compounding (finding a FV) – moving forward on the time line
- Sooner is better - \$5,000 received today is better than \$5,000 received one year from today
- Annuity (equal payments for a fixed period)
- Perpetuity (equal payments for an infinite period)

Compounding facts:

- The more frequent interest is compounded, the higher the future value
- The more frequent interest is compounded, the lower the present value
- Savers prefer more frequent compounding (receiving more in the future)
- Borrowers prefer less frequent compounding (pay less in the future)

Stock Valuation

1. Discounted Cash Flow (Constant Growth Model): Price of stock = $PV(\infty \text{ dividends})$
2. Relative Valuation Model: Price of stock is relative to some metric (P/E, P/Sales, P/customers,..)

Cable company with 100 customers

Metric = price/customer ratio = \$500/customer

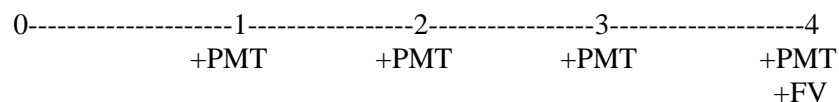
Value of Equity = [Price / customers] * # customers = \$500 * 100 = \$50,000

Common P/E (price-earnings ratio) range = 8x-27x

Stock facts:

- Ownership position - residual claim on assets and income (last in line)
- Limited liability
- Variable dividends
- Voting rights

Bond Valuation



PV = bond price

Bond facts:

- Creditor position – priority claim on assets and income (first in line)
- Interest only loan – coupon rate generally FIXED over life (PMT=coupon rate*par value)
- Required return CHANGES over life = f (economy, inflation, industry, company-specific risk)
- Inverse relationship between interest rate changes and price of bond
- No voting rights
- Some may have a call provision (allows the firm to call back the bond & refinance if rates fall)
- Some may have a sinking fund (requires firm to repay principle periodically)
- Some may be convertible into common stock at predetermined ratio (upside return potential)

Risk, Return, Diversification

Risk can be broken down into two components:

1. Market Risk (systematic, non-diversifiable)
 - Cannot be eliminated by holding a portfolio
 - Caused by general market (economic) movements, and since this affects all companies and their stock values similarly, it cannot be shed away.
 - Measured by Beta.
2. Unique Risk (non-systematic, diversifiable, firm-specific)
 - Caused by events specific to that firm.
 - Can be eliminated by holding a portfolio.
 - The more negatively correlated two assets are, the more risk can be shed
 - Need 20-30 stock portfolio for sufficient diversification

1 + 2 = Total Risk

If you hold a stock by itself, you are subject to both risks – you can measure a stock’s total risk by standard deviation. Standard deviation measures volatility, without regard to what caused the stock price to move. Since unique risk can be eliminated by simply holding a portfolio, the market does NOT compensate investors for bearing that risk. Only systematic risk matters. How do we measure systematic risk? Beta! The CAPM specifies the relationship between “relevant risk” – beta – and a stock or portfolios expected return.

Capital Asset Pricing Model

- Specifies relationship between a beta (risk) and return
- $K_i = K_{rf} + (K_M - K_{rf})B_i$
- SML = Security Market Line is graph of CAPM equation

Some facts about Beta

- Measures tendency of a security to move with the market → market risk!
- Compute by regression of historical company returns vs. historical “market” returns
- Regression produces Characteristic Line; slope of Characteristic Line = Beta
- Beta of a risk-free asset = 0
- Beta of the overall market = 1
- Beta of a portfolio (B_p) is simply a weighted average of individual security betas.

Working Capital Management

Balance Sheet

Cash & marketable securities	Accounts payable
Accounts receivable	Accruals
<u>Inventories</u>	<u>Notes payable</u>
Current assets	Current liabilities
Gross plant & equipment	Long-term debt
<u>-Accumulated depreciation</u>	Bonds
Net plant and equipment	
 	Preferred stock
 	Common stock
 	Retained earnings
<u>TOTAL ASSETS</u>	<u>TOTAL LIAB & EQUITY</u>

Net Working Capital = NWC = CA - CL

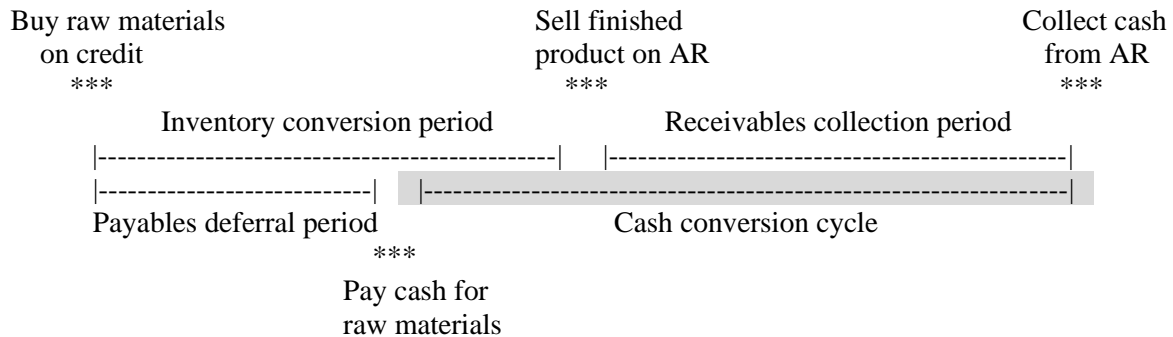
CA represent a USE of cash (you must pay for them)

CL represent a SOURCE of cash (you are borrowing)

Generally CA > CL, so NWC is + and is a USE of cash that must be funded

Cash conversion cycle: CCC = ICP + RCP - PDP

- CCC is the length of time between when the company makes cash payment for materials and labor and when it receives cash inflow from the sale (collects receivables).
- CCC is the average length of time a dollar is “tied up” – this must be financed!! The goal is to decrease the CCC without affecting sales (↓ ICP, ↓RCP, ↑PDP).



Capital Budgeting

Balance Sheet

Cash & marketable securities Accounts receivable <u>Inventories</u> Current assets Gross plant & equipment <u>-accumulated depreciation</u> Net plant and equipment <u>TOTAL ASSETS</u>	Accounts payable Accruals <u>Notes payable</u> Current liabilities Long-term debt Bonds Preferred stock Common stock Retained earnings <u>TOTAL LIAB & EQUITY</u>
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The goal is to come up with a time line of cash flows that you can apply NPV, IRR, etc. in order to determine whether the project (fixed assets – plant & equipment) should be accepted or rejected.

0-----1-----2-----3-----4					
	+OCF	+OCF	+OCF	+OCF	→ I.S.
-NCS				+ATSV	→ B.S.
-NWC				+NWC	→ B.S.

Relevant cash flows are future incremental after-tax cash flows or any and all changes in the cash flows that are a direct consequence of accepting the project.

Ignore:

1. Sunk costs: any expenses already paid or promised to be paid
2. Financing costs: dividends / interest expense – already included in WACC

Include:

1. Side effects: erosion / cannibalization– lost sales of existing products / synergies – increased sales of existing products
2. Opportunity costs -- most valuable alternative that is given up if the project is accepted

	<u>Independent</u>	<u>Mutually exclusive</u>
Payback = # years to recover project's cost	Accept if PB < prespecified cutoff	Accept project with fastest payback given PB < prespecified cutoff
NPV = PV cash inflows – PV cash outflows	Accept if NPV > 0	Accept project with largest NPV given NPV > 0
IRR - % rate of return project is earning	Accept if IRR > % required return	Accept project with largest IRR given IRR > % required return

Capital Structure

Balance Sheet

Cash & marketable securities	Accounts payable
Accounts receivable	Accruals
<u>Inventories</u>	<u>Notes payable</u>
Current assets	Current liabilities
Gross plant & equipment	Long-term loans
<u>-Accumulated depreciation</u>	Bonds
Net plant and equipment	
 	Common stock
 	Retained earnings
<u>TOTAL ASSETS</u>	<u>TOTAL LIAB & EQUITY</u>

Capital structure refers to the mix of debt and equity (e.g. 30% debt, 70% equity). The use of debt is oftentimes referred to as financial leverage. The more debt, the more financial leverage. Debt can be short-term or long-term.

Advantages of using debt

- Debt is cheaper than stock (lower risk investment to consumer)
- Interest payments are tax-deductible (even cheaper!)

Disadvantages of using debt

- Required interest payments, if not made, can cause bankruptcy

Goal is to find capital structure that maximizes firm value

Factor influencing target capital structure

Business risk (what is your product?)
 Amount of financial flexibility desired
 Tax position (interest xps is deductible)

Effect on amount of debt used

High risk – use less debt
 High flexibility desired – use less debt
 Low tax rate – use less debt

NOTE: Retained earnings are internally generated profits plowed back into the firm rather than paid out as dividends to the stockholders. Retained earnings are not cash!

Cost of Capital (WACC)

Assume the firm has a target capital structure of 40% debt, 10% preferred, and 50% common:

	DEBT	$w_d = 40\%$	$K_d = 8\%$
Assets	PS	$w_{ps} = 10\%$	$K_{ps} = 10\%$
	CS	$w_{eq} = 50\%$	$K_{eq} = 12\%$

$$WACC = (w_d)(K_d)(1-T) + (w_{ps})(K_{ps}) + (w_{eq})(K_{eq}) = .40(8)(1-.30) + .10(10) + .50(12)$$

- The weighted average cost of capital (WACC) is nothing more than an average of the costs of debt, preferred, and equity, weighted by their use.
- It represents a “blended” cost of obtaining money on the RHS of the balance sheet.
- The goal is to invest in assets (LHS) with returns greater than the cost to fund them (WACC, RHS).
- Can WACC be used to evaluate ALL new potential capital budgeting projects? NO!!

WACC is appropriate for projects that have risk similar to the firm’s existing projects or assets (LHS). If a new project has higher risk, WACC should be adjusted upward. If a new project has lower risk, WACC should be adjusted downward.

Financial Statement Analysis

Balance Sheet

Cash & marketable securities	Accounts payable
Accounts receivable	Accruals
<u>Inventories</u>	<u>Notes payable</u>
Current assets	Current liabilities
Gross plant & equipment	Long-term debt
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Net plant and equipment	Preferred stock
	Common stock
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<u>TOTAL ASSETS</u>	<u>TOTAL LIAB & EQUITY</u>

Income Statement

Sales
<u>-Cost of goods sold</u>
Gross profit
-Operating expenses (mkt, advert,..)
<u>-Depreciation expense</u>
Operating profit = EBIT
<u>-Interest expense</u>
Earnings before taxes = EBT
<u>-Taxes</u>
Net Income → Common dividends
→ Additions to retained earnings

Statement of Cash Flows

CF from operating activities
NI, Depr, ΔCA , ΔCL
CF from investing activities
ΔFA
CF from financing activities
ΔNP , ΔLTD , ΔEQ
Net increase in cash

Liquidity– Ability to meet short-term obligations as they come due

$$\text{Current Ratio} = CA / CL$$

$$\text{Quick Ratio} = (CA - INV) / CL$$

Debt Management (Financial Leverage) – Use of debt in the capital structure

$$\text{Total Debt Ratio} = TD / TA$$

$$\text{Debt/Equity Ratio} = TD / TE$$

$$\text{Equity Multiplier} = TA / TE$$

$$TIE = EBIT / \text{Interest expense}$$

Asset Management – Efficient or effective use of assets

$$\text{Inventory Turnover} = COGS / INV$$

$$\text{Days' Sales in Inventory} = 365 / INVTURN$$

$$\text{Receivables Turnover} = SALES / AR$$

$$\text{Days' Sales in Receivables} = 365 / RECTURN$$

$$\text{Fixed Asset Turnover} = \text{Sales} / FA$$

$$\text{Total Asset Turnover} = \text{Sales} / TA$$

Profitability

$$\text{Net Profit Margin} = NI / S$$

$$\text{Return on Assets (ROA)} = NI / TA$$

$$\text{Return on Equity (ROE)} = NI / TE$$

Exchange Rate Risk Management

1. Futures contract
 - Long– obligation to buy underlying asset for specified price for specified time period
 - Short– obligation to sell underlying asset for specified price for specified time period
2. Option contract
 - Call option – right to buy underlying asset for specified price for specified time period
 - Put option – right to sell underlying asset for specified price for specified time period
3. Forward contract – similar to futures contract but less formal:
 - Futures are for specific commodities (certain grade); forward is negotiated
 - Futures are for specific time periods (preset to choose from); forward is negotiated
 - Futures are standardized (time, delivery, dates, all terms); forward is negotiated
 - Futures are agreements with the futures exchange; forward is with the other party

What are the underlying assets?

- Commodities like corn or pork bellies (farmer)
- Interest rates (banker)
- Currencies (exporter/importer)
- Stock indexes (pension fund manager)

Who are the participants?

- Hedger - trying to reduce natural risk they already have (like insurance)
- Speculator – trying to gamble on future price movements to make a profit

What does it mean for a currency to appreciate / depreciate?

- Current exchange rate = \$1USD = 1.97YEN
- New exchange rate = \$1USD = 2.50YEN
- We could say the dollar appreciated against yen (\$1 buys more Yen)
- We could say the yen depreciated against dollar (takes more Yen to buy \$1)

How might an importer hedge against exchange rate risk?

- Buying foreign goods now, but pays later in yen (buy yen in 1 month)
 - Risk – yen appreciates (becomes more expensive) or dollar depreciates
 - Hedge – contract that locks in the price you will pay for yen in the future
- ✓ Long future, buy call option, enter into forward contract to buy yen

How might an exporter hedge against exchange rate risk?

- Selling US goods now, but will receive yen later (buy dollars in 1 month)
 - Risk – dollar appreciates (becomes more expensive) or yen depreciates
 - Hedge – contract that locks in the price you will sell yen for in the future
- ✓ Short future, buy put option, enter into forward contract to sell yen

Miscellaneous Terms and Definitions

Money market instruments (maturity < 1 year; all short-term debt instruments)

Treasury Bills

- Issued by the federal government.

Repurchase Agreement (REPO)

- An arrangement where one firm sells some of its financial assets with a simultaneous agreement to repurchase it back at a higher price.

Federal Funds

- Overnight loans from one bank to another – used to meet Fed reserve requirements

Banker's Acceptance

- Similar to a post-dated check with a bank guarantee – used lots for international trade

Commercial Paper

- Short-term IOU - unsecured loan issued by large creditworthy corporations.

Negotiable Certificate of Deposit (CD)

- Time deposit at a bank or another financial intermediary
- Payable to the bearer, so they can be sold (traded) prior to maturity

Eurodollar Deposit

- A U.S.-dollar denominated deposit held at a bank outside of the U.S.
- No exchange rate risk, and earns (usually higher) foreign interest rate

Money Market Mutual Funds

- Pooled funds managed by an investment company – invests in above securities

Capital market instruments (maturity > 1 year; long-term debt instruments and equities)

Treasury Bonds

- Issued by federal government

Municipal Bonds

- Issued by state and local government

U.S. Government Agency securities

- GNMA, FNMA, Freddie Mac, Sallie Mae, Farm Credit Agencies

Corporate bonds

- Issued by corporations (think loans!)

Corporate stocks

- Issued by corporations (think ownership!)

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- **IPO market** – new public offerings by previously private firms.
 - **Primary market** – additional shares sold by publicly owned companies.
 - **Secondary market** – outstanding shares of established, publicly owned companies.

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- **Organized exchanges** (NYSE, AMEX, various regional exchanges) – listed securities
 - **Over-the-counter markets** (OTC) – NASDAQ
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- **Federal funds rate** - Depository institutions trade excess reserves held at the Fed among themselves; the interest rate on these inter-bank transactions is called the federal funds rate.
 - **LIBOR** – Interest rate paid on dollar-denominated deposits, known as Eurodollars, traded between banks in London as an alternative source of overnight funding. LIBOR and the Fed Funds rates tend to be closely related.
 - **Discount Rate** – Rate charged by the Fed for banks to borrow overnight funds.
 - **ADR (American Depository Receipt)** - An ADR is created by a U.S. bank that buys stock in foreign corporations in their currency. The dollar-denominated ADR is issued, backed by the shares of the foreign stock, and trade on exchanges in the U.S. The major attraction to U.S. investors is that they trade on U.S. exchanges in dollars.

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- **Investment Banking** - Underwriting, issuing, and distributing new securities (debt & equity). Investment banking firms also advise companies on mergers & acquisitions, and restructuring of existing corporations.
 - **Commercial Banking** - Depository institutions – accepts deposits and makes loans.
 - **Reserve requirements** - Depository institutions must maintain reserve assets (vault cash + deposits at Federal Reserve Banks) to back transaction deposits held as liabilities on their balance sheet. The requirement is usually set as a ratio of transaction accounts (e.g. 10%). A decrease in the reserve requirement ratio means depository institutions can hold fewer reserves, and hence loan out a greater percentage of their deposits, increasing credit availability in the economy → expansionary effect!

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- **Glass-Steagall Act (1933)** - separated commercial banking (loans & deposits) and investment banking (stocks and bonds)
 - **Riegle-Neal (1994)** - removed bank branching limitations (geography)
 - **Gramm-Leach-Bliley Act of 1999 (Financial Modernization Act)** - relaxed barriers separating commercial banking (deposits & loans), investment banking (stocks & bonds), and insurance

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- **Market efficiency** - The efficient market hypothesis (EMH) states stock prices equal the present value of expected future cash flows. Stock prices reflect all known information, thus the future flow of news is random and unknowable. Future stock prices follow a random walk. EMH generally implies you cannot make above-average returns.
 - Weak-form: stock prices fully reflect all historical information
 - Semi-strong form: stock prices fully reflect all historical and newly available information – share prices adjust instantaneously and unbiased to publicly available new information.
 - Strong form: stock prices reflect all available information – historical, new, and even unknown (insider) information. Insiders cannot profit on the basis on information only they know.
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Federal Reserve System

- Established 1913, the Fed is the central bank in the U.S. (bank's bank)
- 12 independent district banks (banks have multiple branches)
- Responsibilities of the Fed
 1. Direct monetary policy: stable employment, prices & interest rates
 - FOMC – open market operations (buy & sell government securities)
 - Set reserve requirements
 - Federal Funds Rate and Discount Rate
 2. Regulate & supervise depository institutions (bank exams)
 3. Lender of last resort (discount window / discount rate)
 4. Facilitate payments mechanism (check clearing)