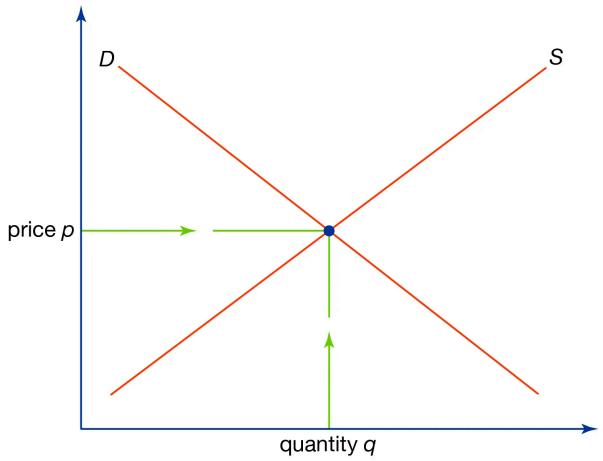
Lecture 1: Finance Introduction

- Personal, Business, Corporate finance
- Stocks vs bonds
    - Stocks help raise money + investment
    - Bonds are a loan made by an investor/borrower to government/business generally (used to finance projects/operations). Bondholders are creditors w/ different rights than shareholders
- Derivatives - type of security (tradable financial asset) for hedging (options, futures, forwards, swaps)
- Liquidity (short-term) - how fast an asset can be converted to cash (stocks fast, big assets are slow)
- Solvency (long-term) - business' ability to meet its debt obligations
- Credit - ability to borrow/access goods and services
- Leverage - debt relative to equity/capital
- Circular Flow of Money

Lecture 2: Introduction II

- Mitigating risk
    - Hedging, diversification, insurance
- Components of Financial System
    - Money, financial products/markets/firms, regulatory agencies, central banks (control money supply via buying/selling securities)
- Financial System Players
    - Lenders/Savers => Financial Institutions => Borrowers/Spenders
    - Sellers <= Institutions <= Buyers
- Prices provide incentives + information to market participants (invisible hand of market)
    - Coordinate activity without government actors
- Model of Market: Supply & Demand
    - Demand - relationship between price + quantity demanded; downward sloping
    - Supply - price + quantity supplied

Supply and demand



- Market equilibrium (price + quantity): quantity demanded = quantity supplied
- Modes of failure: market failure vs government failure (evaluate imperfect market outcome vs government intervention)
- Major Markets
    - Stock markets
        - Traditional exchanges, off-exchange e-trading, private placements
    - Bond markets - categorized by credit worthiness of issuer (i.e. US Treasury, municipal bond, corporate bonds)
    - Options/future markets
        - derivative products are bought/sold on exchanges
- Major Types of Financial Products
    - Loans, bonds (maturity, ratings, seniority), stocks (regular + preferred) - ETFs
    - Mutual funds (active vs passive - index funds), options/futures
    - Insurance products, real estate mortgages,
- Major Institutions
    - Banks, Insurance companies (specialized by product suite), asset management companies, investment banks, brokerages, mutual fund families (fidelity, blackrock), pension funds
    - Hedge Funds
    - Real Estate (Real Estate Investment Trusts), private equity + VC firms, SIFIs
- Major Laws Governing Financial Markets/Institutions
    - Contract law, securities law, licensing requirements, self regulation
    - Securities Act of 1933 (regulates distribution of new securities), Securities Act of 1934 (regulates trading securities by brokers), Trust Indenture Act of 1939 (regulates debt securities specifically)
    - Self regulatory organizations - FINRA
- Bank runs/bailouts/crises
    - Maturity mismatches (borrowing short and lending long)

Lecture 3: Time Value of Money

- Borrowing: transporting money from future to present, investing: transporting money from present to future
- Time value of money = increase in amount of money as a result of interest earned or returns
    - Returns = equities/mutual funds which produce appreciation + dividends
    - Interest earned = bonds/bank accounts/money market funds
- Time value intuition
    - Inflation causes purchasing power of cash to decrease over time
    - Risk associated with future cash flows reduces its value
- Discounting - process by which future cash flows are adjusted to reflect time value (magnitude = discount rate)
- Multi-period investment: Future value = C_0 (initial cash flow) * (1 + r)^T (T = number of periods)
    - PV = FV / (1+r)^T
- Rule of 72: approximates doubling time of investment
    - 72/annual compound interest rate ~= doubling time
- Discounted cash flow analysis
    - discount rate = opportunity cost of capital (investors can compare rate across investments with similar riskiness)
- Present value of investment = sum of present values of future cash flows
- If NPV > 0, accept investment
- Annual percentage rate vs effective annual rate (m = # compounding times)
    - $$FV = C_0\left(1 + \frac{r}{m}\right)^{mt}$$
- Nominal interest rate = real interest rate (inflation-adjusted) + expected rate of inflation
    - Fisher equation
- Annuity - stream of constant cash flows for fixed # of periods (car loan, mortgage)
    - $$PV = \frac{C}{r}\left(1 - \frac{1}{(1+r)^t}\right)$$
- Mortgage basics
    - principal loan amount, down payment, amortization (fully - no balloon payment at end, constant payment), fees (points, origination fees, prepayment fees)
- E-Z Financial Calculator

Lecture 4: Balance Sheets, Personal Budgets, Financial Advisors

- Money Management
  - 1) Store/maintain personal financial records and documents (BOTH HARD COPY + ON COMPUTER)
  - 2) Create personal financial statements
  - 3) Create/implement plan for spending + saving
- Records
  - Birth certificates, wills, social security for LIFE
  - Personal property/investments for as long as you own them
  - Documents re: purchase + sale of real estate (indefinitely)
  - Copies of tax returns + supporting data (3/7 years)
- Keep in safe deposit box
  -

• **Birth, marriage, and death certificates** • **Citizenship papers** • **Adoption, custody papers** • **Military papers**	• **Serial numbers of expensive items** • **Photographs or video of valuable belongings**
• Certificates of deposit • List of checking and saving account numbers and financial institutions	• Credit contacts • List of credit card numbers and telephone numbers of issuers
• Mortgage papers, title deed • Automobile title • List of insurance policy numbers and company names	• Annual stock and bond statements • Rare coins, stamps, gems, and other collectibles • Copy of will

- Shred quarterly investment account statements (keep annual summary statements) + financial documents with personal information
- Personal Balance Sheets
  - Net worth = items of value - amounts owed
  - Value = liquid assets, real estate, personal possessions, investment assets
  - Amounts owed = current liabilities + long term liabilities (debts not required to be paid in full for > 1 year)
- Insolvency - inability to pay debts when you due
- savings = income - consumption
- Creating cash flow statement
  - Record income
  - Record fixed + variable expenses
  - Determine Net Cash Flows
- Developing a Monthly Budget
  - Set Financial goals
  - Estimate income
  - Budget emergency fund/savings, fixed expenses, variable expenses
  - Record spending amounts, spending/saving patterns
- Choosing a Financial Advisor

    - Fiduciary
    - What else do you do other than financial planning? (so they don't push you into certain packages), qualifications(RIA, CFA, CPA, etc)

Lecture 5: Life Cycle Model, Labor Market Earnings, Social Security

- Consumption smoothing (keeping consumption at fixed level over time) requires us to save/borrow (i.e. we might get paid biweekly but we have expenses on the weeks we aren't paid)
- Marginal utility - added satisfaction for consumer from having one more unit of good/service
- Saving for retirement IMPT!!
    - Life Cycle Model: shows you should decline consumption starting mid 30s to start saving for retirement
    - You should start earlier, though, by using employee based retirement plans + compound interest builds up
- Growth rates in wages haven't increased for most degree types (except post-bachelor degrees)
- Social security retirement benefits are paid out as inflation-indexed life annuities (low income: replaces 75% of wages, middle income: replaces 40-50% of wages)
    - Financed with a pay as you go system
    - This requires that the taxes of the workers are sufficient to pay the the benefit of retirees
    - Current tax rate (10.6%) is too low to sustainably continue financial balance of system (needs to be closer to 15%)

Lecture 6: Interest Rates, Taxes, Public Debt

- Keep organized records of taxes
    - Saving via tax-deferred vehicles
    - Tax advantages of owning a home
    - Debt financing a company (interest payments are deductible from taxes)
- Fed Reserve: price stability + maximize employment
    - Lender of last resort (esp impt for banks/bailouts)
    - Interest rate changes => change borrowing costs (investments, home/auto purchases)
    - Lower interest rate by buying Treasury bills/bonds and make deposit into bank account of seller
    - Raise interest by selling Treasury bills/bonds and money is removed from bank accounts
- 2% inflation goal
    - CPI + PCE index for measuring inflation
- Changes in output over business cycle
    - Recession = shrinkage of economy over 2+ quarters
    - Output gap = difference between potential GDP (growth at trend growth rate) + actual GDP

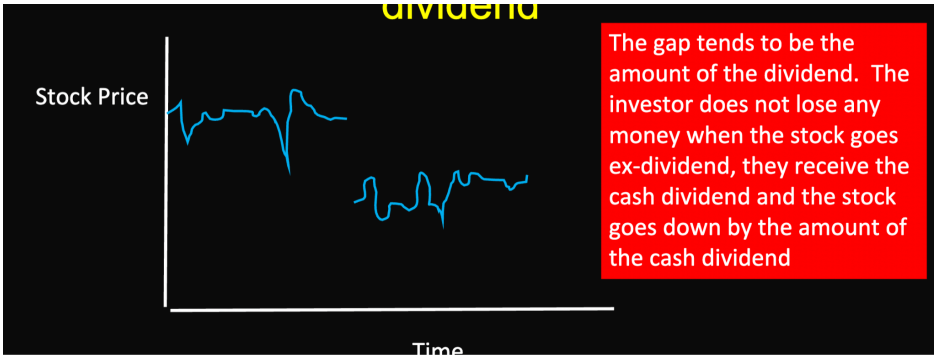
        - Subpar growth: growing but below potential
    - Phillips curve (inverse relationship b/w unemployment and inflation) + NAIRU (theoretical rate of unemployment below which inflation would rise)
- Aggregate supply + demand is used to analyze inflation/deflation
- Quantitative Easing - lowers long-term borrowing costs to increase spending and lower inflation
- Laffer curve - maximum tax revenue at what rate?
    - Higher tax rates -> less efficiency + less revenue to redistribute
- Taxable income = adjusted gross income - deductions (standard + itemized)
    - Tax credits -> less liability

Lecture 7: Public debt (national debt) + Taxes

- Reagan tax reforms reduced rates + increased investment incentives (401k, IRA, etc)
- Trump increased standard deduction, changed inflation indexing, capped state/local deduction
- Carried interest loophole
    - Money managers treat income as capital gains - preferential tax treatment
- Consumption taxes vs personal/income taxes
    - Tax reform => prosperous, stable democracy?
- Deficits => moving bill for current consumption to future generations + crowding out private investment
- Good: broad-based taxes with lowest rates to fund government
- Unemployment insurance - paid for by a payroll tax
- Negative Income Taxes
    - Breakeven level = Guarantee level/ tax rate

Lecture 8: Investment Basics 1

- Figure out investment goals
- Save 10-20% per year (ideally 20%)
- Tax advantaged investments are important, employer-sponsored retirement programs
- Bank account alternative is Money market mutual fund
- Market capitalization of stocks = # of shares * price per share
    - Price of share set by supply and demand (bid-ask spread)
- Holding period return = ((End of period price - beginning period price) + distributions) / P0
    - Spinout = distributing shares of a subsidiary company to the public
- price-earnings ratio gauges whether a stock is expensive or not (price of shares/ earnings per share)
    - high growth = high PE
- Smaller companies metric = market capitalization / sales ratio
- Operating margin = profit/sales
- High PE ratio companies
    - Tesla, Moderna, Rivian, Uber

- Investment Philosophies: Growth (high PE, low dividends) vs Value (low PE, high dividends)
- Price volatility
    - Transparent for treasury bonds + stocks
- Types of risk: market risk, idiosyncratic risk, interest rate risk, inflation risk (decrease in purchasing power)
- Portfolio risk < asset risk if assets have returns that are relatively uncorrelated or ideally negatively uncorrelated
- Statistical characteristics of assets
    - Expected return, variance/std of future returns, covariance/correlation with other assets
- Over long haul dividends matter a lot!! (S&P index, Dow Jones industrial average, Russell 2000)
- Stock splits signal confidence of company in itself and options always involve multiple of 100s of shares (if the options trading becomes too expensive based on stock price, split can happen)
- Reverse stock split to increase stock price (based on poor performance)
- After ex-dividend date (when stock's dividend gets paid), stock price drops by dividend amount
    - 

- Efficient portfolio
    - highest possible expected future return for a given risk level

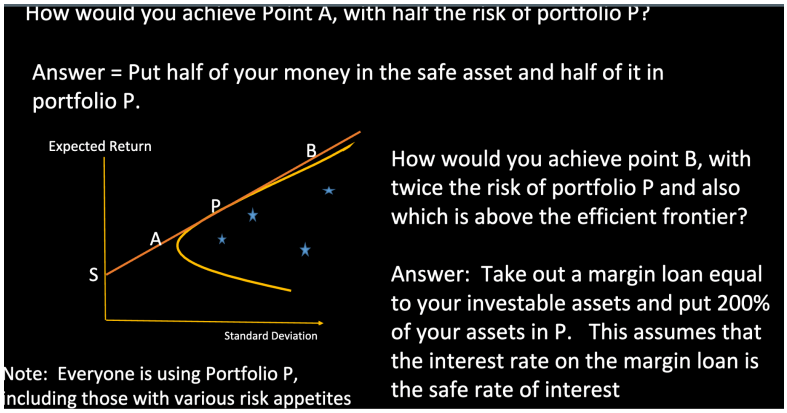
Lecture 9: Investment Basics II

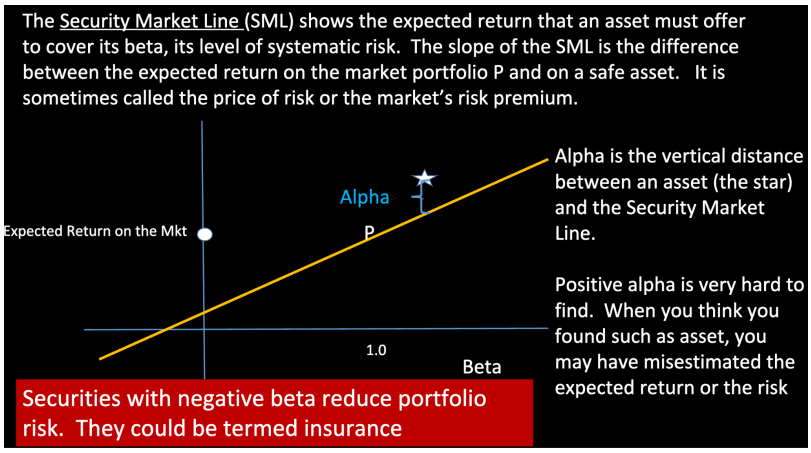
- Companies have a rough target of what fraction of earnings they pay out as dividends
    - So generally companies will increase dividends if they are growing
- Only realized (i.e sold) capital gains are taxes - long run capital gains (positions > 1 yr) + qualified dividends (most dividends in S&P 500) are taxed at lower rates
- Net Investment Income Tax - surtax on investment income on dividends, capital gains, interest income, rents & royalties
    - Used to pay for Obamacare
- Share repurchases - companies buy back shares directly from shareholders
    - More flexible than dividends as a mechanism to give shareholders money back
    - Useful to pump up value of stock if its undervalued
- Fluctuating Returns <<< Steady Returns
    - Even if fluctuating returns have the same average returns as the steady returns

    - Geometric average return >> arithmetic average return for estimating profit
- Sectors of the equity market - can buy ETF for each
    - Consumer Services, Consumer Discretionary, Consumer Staples, Energy
    - Should buy multiple funds across sectors
- If you want to buy smaller capitalization stocks, look into the Russell 2000 Index
- Preferred stock - fixed dividend (unlike common stock), but most preferred are "cumulative preferred" meaning that all missed dividend payments must be first paid to the preferred stockholders and then the common ones
- international mutual fund (non-US), global (US + non US stocks)
- Selling Short
    - Sell stock that you do not own with obligation to buy it later
    - "Covering your short" = buying stock back either when you make money or you are forced to buy back because of "margin call" by broker
    - Better to bet against stock using options
- Buying on margin - get loan from broker to buy more shares
    - Risky, but can multiply profits and losses
- Sell losers instead of winners for better tax benefits once losses are realized

Lecture 10: Portfolio Diversification

- Average SD on annual rate of return of a stock is about 40%
    - diff between -1 to +1 SD is 80%
- One idea is 70%/30% split between stocks and bonds
    - Further breakdown into 40% (large cap stocks), 10% (small cap stocks), 20% (foreign equities), 30% (bonds)
- Buy/sell positions to establish optimal market allocation every 6 months to 1 year
- Risk/volatility - measured by SD of returns
    - $$\sigma^2 = \sum_s p(s)\left[r(s) - E(r)\right]^2$$
- Calculating expected rate of return using past data
    - $$r_A = \frac{1}{n} \sum_{t=1}^{n} r_t$$
- For an n asset portfolio
    - $$Var(r) = \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j Cov(r_i, r_j)$$

- Finding least risky portfolio out of 3600 common stocks in the U.S. that could still earn 6% is non-linear optimization problem
    - Find weights that minimize variance given that expected return is > 6%
- Capital Market Line
    - point of tangency between efficient frontier of portfolios (sideways shaped hyperbola) and a safe asset (like government-backed security)
    - That point is the part of the portfolio that everyone should have as the risky part of their portfolio
- 

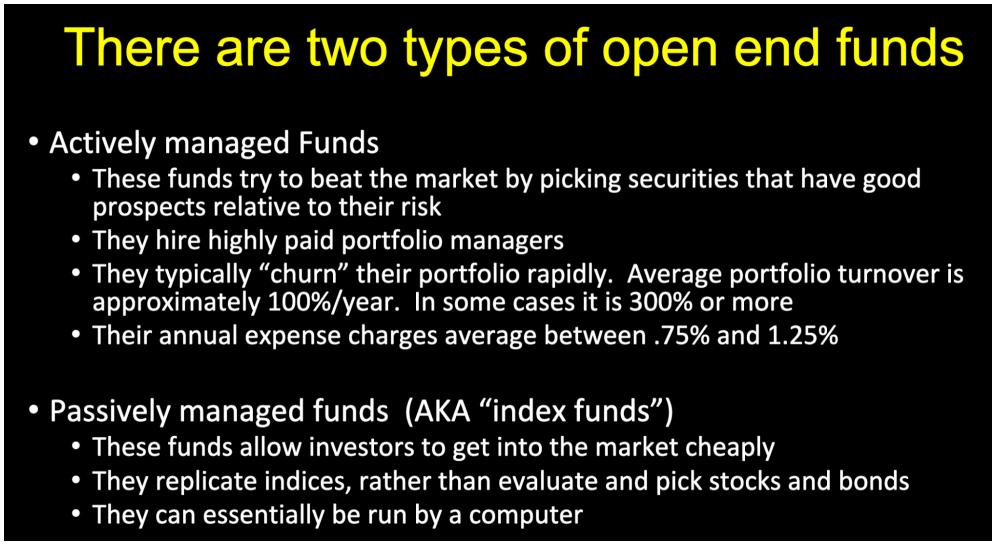
- Beta = systematic risk of portfolio/asset
    - Market beta = 1, average beta of individual securities = 1
- Alpha = Excess return after adjusting for market risk
- 

- Efficient market hypothesis - past data can't help you beat the market (inside information might)
    - Hard to systemically time market
- **Well diversified portfolio has at least 12 positions from different industries with no more than 10% in any single investment**
    - **Try to have real estate, VC, or PE investments (assets other than stocks and bonds)**

Lecture 11: Mutual Funds and ETFs

- Stock trading terms
    - Market order - buy/sell stock at best price available immediately

    - Limit Order - buy/sell stock at set price or better
    - Shorting stock = sell stock you don't own
    - Stop loss order = sell once you starting losing more than x amount
- Mutual Funds
    - Open-ended (traditional)
    - Exchange-traded funds (ETFs)
    - Taxable accounts or in tax deferred accounts
- Open End Mutual Fund
    - Trade once per day after market closes at 4 PM ET
    - Funds announce Net Asset Value (NAV) every day using closing prices of holdings, calculated as (total value of assets - liabilities) / (number of shares outstanding)
    - New orders (buy/sell) are settled at NAV
- Different styles of Equity Mutual Funds
    - Value, growth X large cap, small cap
- Different styles of Domestic Bond Funds
    - Short maturity, long maturity X investment grade, below investment grade



- Index funds charge much lower expense fees
    - Types: Broad Market (S&P 500, NASDAQ, Total stock market funds, DJIA), sector funds, style funds (growth rate/cap value), ESG funds
    - Inverse/leveraged inverse index funds, bond indexed, money market funds (highly liquid + near-term instruments)
- Very hard for actively managed funds to >> passively managed funds
- ETF's - mutual funds that trade continuously on stock exchanges
    - most are indexed portfolios, etf options

- ETFs don't necessarily sell for exactly NAV. In fact, they have a bid-ask spread just like a stock.
- ETFs trade relatively close to NAV because of a process called arbitrage. So-called "Authorized Participants" are allowed to trade large blocks of ETF shares and settle in the underlying securities rather than in cash. For instance, if these Authorized Participants think that the ETF is selling above NAV, they can buy it by delivering the underlying securities and taking the ETF shares and making a profit. The ETF shares they receive are called creation units. If the ETF is selling below NAV, they sell the ETF and take delivery of the underlying securities. In both circumstances, they make a profit. This process forces the ETF to sell pretty close to its NAV.

    - More tax-efficient than mutual funds
    - Low expense ratios (i.e. low % in terms of cost of portfolio management / net assets)
- 5 BP = 50 cents on $1,000 investment
- Look at what fees the fund charges you - required by SEC
    - Annual Fund Operating Expenses
    - Shareholder fees (look for ones that don't charge any of this)

- Money Market Funds are mutual funds that invest in high quality short term loans, usually with a maturity of 90 days or less.
    - The borrower could be corporations in which case the loans are called commercial paper.
    - The borrower could be state and local governments, usually from a particular state. In that case, the MMF would be a so called muni money mkt fund
    - The borrower could be the federal government, in which case the investment is in Treasury Bills or similar federal agency debt
    - Typically, the price of money market funds remains at $1.00. They pay monthly dividends. Current dividends are roughly 5% for taxable funds and 3% for tax free funds.

Lecture 12: Bonds and Other Fixed Income Assets

- Asset Allocation
    - Historically, 60% stock + 40% bonds
- Debt Markets

LOW *Credit Quality* HIGH

Low-Grade Commercial Paper Subprime Bank Loans	Money Market Federal Funds Treasury Bills Certificates of Deposit	SHORT
Junk Bonds C&D Rated Bonds Subprime Mortgages?	Highly Rated Long-term Debt, e.g. Apple (Treasury and Corporate)	*Maturity* LONG

- Corporations sell bonds to fund major purchases/business activities (think insurance companies when payout needed)
    - Investors consider them a safer investment than stocks

- Default risk is the chance that the issuer may not make the promised payment. Example: Greece, Depression munis
- Interest rate risk arises from a bondholder's investment horizon, which may be shorter than the maturity of the bond. This is duration risk (example: Silicon Valley Bank)
- Inflation risk is when an investor can't be sure of what the real value of the payments will be, even if they are made. This is both, as historically countries have attempted to "inflate away" the real value of their bonds, especially if held by foreigners
- Currency (exchange rate) risk, if in another currency

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1. **Zero-coupon aka "discount" bond**
    - Promise a single payment on a future date
    - Example: U.S. Treasury bill
2. **Coupon bond**
    - Periodic interest payments + principal repayment at maturity
    - Example: U.S. Treasury Bonds and most corporate bonds
3. **Fixed-payment loan (amortizing)**
    - Sequence of fixed payments
    - Example: Mortgage or car loan
4. **Many others:**
   PIK (payment in kind), Consol, Balloons, you name it… guiding principles we examine today can help you quickly understand what's going on in a structure you encounter in the future

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- Securitization = financial institutions pool assets that generate revenue and transform them into a bond that gives bondholder access to revenue
    - 90% of securitized debt is mortgage-backed securities
- Bonds
    - Certificate = states terms of bond
    - Maturity date = final repayment date
    - Coupon = promised interest payments
- Coupon payment = coupon rate (APR) * face value
- Bond returns come from interest (periodic coupon), income from reinvestment of coupon (interest-on-interest), capital gains/loss when bond matures/sells
- Zero-coupon bonds
    - Always sells at discount (i.e. value < face value)

      Yield to Maturity

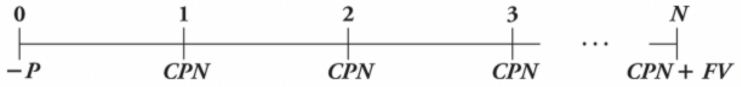
        - *The discount rate that sets the present value of the promised bond payments, in this case the present value of the face value (FV), equal to the current market price of the bond (P).*

    - $$P = \frac{FV}{(1 + YTM_n)^n}$$

Term Structure—Relationship among yields of different maturities of the same type of security

- Expectations of future short-term rates partially determines how long-term rates are related to short-term rates
  - Buying and selling pressure (arbitrage) maintains the long-term rate as an average of current short-term rate and the expected future short-term rates
  - If expected future short-term rates are above current short-term rates—yield curve will be upward sloping
  - Alternatively, lower expected future short-term rates will cause the curve to be downward sloping
- In addition, prices of long-term securities are more volatile
- Possibly suffer capital loss if owner needs to sell security prior to maturity
- Prefer to hold short-term securities for liquidity
- Demand **liquidity (risk) premium** for exposure to price uncertainty with long-term securities
- These factors combine with expectations to set the shape of the yield curve.

- Yield curve
  - Plot of yield of risk-free bonds as a function of the bonds maturity rate.
  - Slopes downward when shorter rates are higher than longer rates
- Coupon Bonds
  - Pay face value at maturity + regular coupon payments
  - Treasury notes (maturities between 1-10 years), bonds 10+ years
- Yield to Maturity formula for coupon bonds
  - The YTM is the *single* discount rate that equates the present value of the bond's **remaining** cash flows to its **current** price.



  - Expressed as the sum of a present value annuity of coupons and a separate present value of the face value

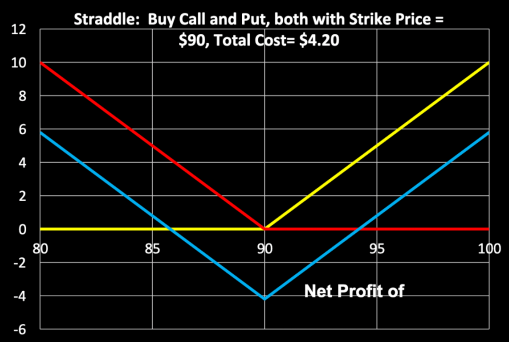
$$P = CPN \bullet \frac{1}{y}\left(1 - \frac{1}{(1+y)^n}\right) + \frac{FV}{(1+y)^n}$$

- Bond < face value (discount) => YTM > coupon rate, bond = face value (par), bond > face value (premium)
  - Bonds issued in units of $1000/bond
- Taxable vs municipal/tax-exempt bonds
  - Municipal bond: general obligation bond (backed by state/government that issues it)
  - Revenue bond: riskier, repaid from income generated by the project
- Tax-Exempt Bond Yield = Taxable Bond Yield * (1 - Tax Rate)
- Macaulay duration + modified duration (changes in interest rate)
- Bond prices fall, when interest rates rise
- Buy bonds with different maturation dates

    - Bond laddering
- Interest rate exposure of assets and liabilities (match durations)'
- Treasury Inflation Protected Securities (TIPS) protect holder from inflation
    - 5,10,30 year maturities
- Bond Ratings - Moody's + Standard & Poor's
    - AAA to D (top 4 categories are investment grade)

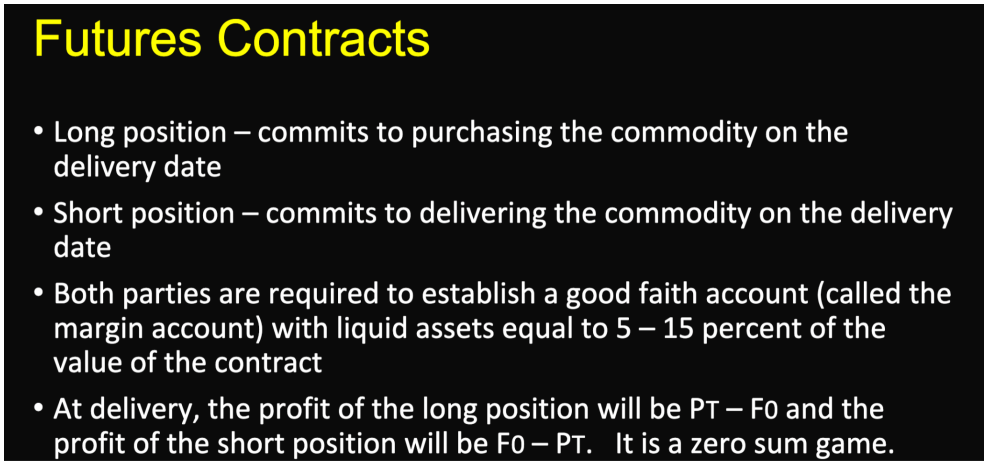
Lecture 13: Options and Futures

- Having options is a good thing (aren't negative value)
- Stock options
    - • Call Option = the right to BUY (but not the obligation) a particular number of shares at a specified price within a specified period of time.
      • Put Option = the right to SELL (but not the obligation) a particular number of shares at a specified price within a specified period of time.
      • The option writer grants these rights to the buyer in exchange for a payment of money called the option price or option premium.
      • The company has essentially nothing to do with these options markets. They represent a bet between two individuals.
- Options contract
    - Exercise price/strike price
    - Expiration date
    - Number of shares (multiple of 100)
- Longer options > shorter options, volatile assets have more valuable options than stable assets
- "Options chain" - set by brokerage for expiration dates/exercise prices
- A straddle is buying both a call and a put each with the same strike price ($90 in this case) and with a total cost of $4.20. This results in a "V" shaped return. The lower V takes into account the cost of the package. Who would buy a straddle?

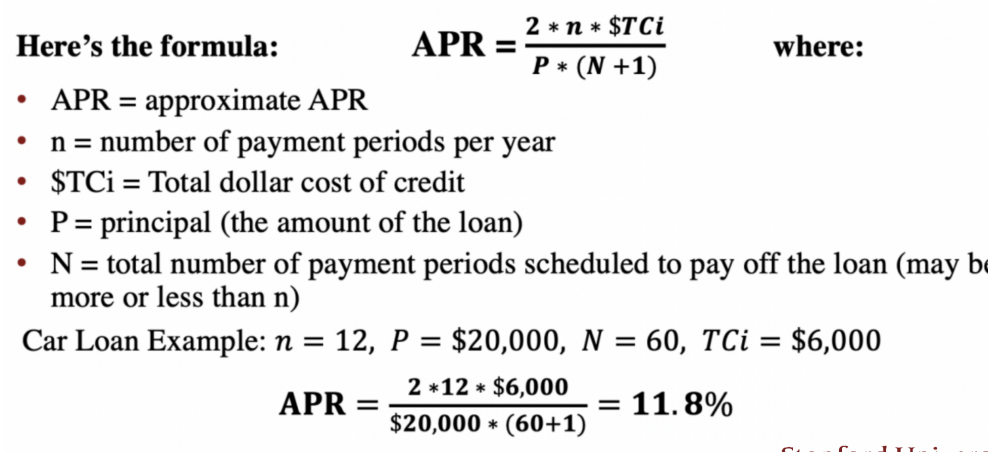


A straddle would be a way to bet on volatility. Note that you make money if the stock goes up or down by a lot. You lose the most if the stock price stays unchanged or doesn't change much.

- Covered Call

    - Buy stock + write/sell a call
- Protective Put
    - Buying a stock + buying an "out of the money" put option at the same time
- 

Lecture 14: Borrowing/Loans

- Bond/fixed-income laddering
    - Buying many assets with different maturity dates to diversify/spread risk on interest rate curve
- Speculative bonds = bonds issued by companies/countries that may have difficulty making their payments, but are not at risk of default
- Close-ended vs open-ended consumer credit
    - close-ended = credit for a specific purchase
    - open-ended = line of credit
- Leverage = ratio of debt/worth
- Recourse loan vs non-recourse loan
    - Recourse = lender has access to your other assets (i.e. if you fail to pay, they can seize your assets)
    - Non-recourse = lender only has access to explicit collateral
- TCO = total cost of ownership
    - loan + interest rate payment + insurance + warranty
- 

- Trade-off between loan length and APR

Lecture 15: Retirement Plans

- In 2023, growth stacks are up 20%, value stocks have returned 0.44%
    - Generally, though, it isn't clear which is better
- Tax-advantaged saving opportunities
    - Retirement savings - 401k, 403b, 457, IRA, Roth IRA/401k
    - College saving plans - 529 plans
    - Health Saving Accounts
- Saving inside tax deferred account >>> saving outside
    - Because you can compound at the full interest rate in the tax deferred account but saving outside means you are taxed on the compounding interest
- "Defined Contribution" Retirement plans
    - 401k plans - offered by private employers + common with large employers
    - 403b plans - offered by non-profits such as Stanford
    - 457 plans = offered by state + local governments
    - The total amount contributed is limited to $22,500 annually, but $30k after age of 50
    - After age of 59.5 no penalty for withdrawal, before then = 10% penalty on withdrawn amount
    - Accounts are portable
- Employers generally offer a menu of mutual funds (equity/bond funds, index funds, actively managed funds)
    - Common to include target date funds (TDFs) <- reduce their risk (reduce equities and increase bonds) as employee approaches retirement
    - Participants choose how to allocate assets, 12-15 choices would be typically be available
    - Some employers permit self-directed accounts where you choose individual stocks/other ETFs
- Defined Benefit (Pension) Plans
    - Large private employers used to offer these, most state/local employee plans (for teachers, fire fighters, policemen, judges, etc)
    - Employer offers a life annuity at a particular age (i.e. 65) with amount = Percentage * (years w/ firm) * final salary
    - No portability (might need to stay for 5 years to get anything)
    - These plans are being underfunded (public policy issue) + employers bear burden/risk of returning the investment benefits
- Individual Retirement Account (IRA)
    - Can only do this if you aren't doing 401k - only low income workers can do both
    - Limits are $6,500 < 50, $7,500 > 50+
    - Contributions are tax deductible (not taxed), withdrawals are taxable (with some specific exceptions - down payment for house, etc.)
- Roth IRA
    - You get taxed when you put the money in, aren't taxed when you take money out

    - Good for when you are young
    - $6,500 per year, $7,500 if you are > 50
- Roth 401k exists too - taxed contributions, no tax on withdrawals
- 529 College Savings
    - parents/grandparents/friends can set up a 529 plan for college education expenses of child
    - Taxable like Roth IRA
    - Limit is $17,000/child/year <- married couple gets $34,000/child/year
- Health Savings Account (HSA)
    - Before tax money can be placed in accounts + compound without tax + if money is spent for health expenses, withdrawals are tax free
    - Up to $3850/year w/ employer contribution
- Target date funds (TDFs), mutual funds that reduce their risk (reduce equities and increase bonds) as employee approaches retirement
    - Glide path = change in asset allocation closer to retirement
    - Generally default option in tax advantaged retirement accounts (401k)
- **Portfolio Strategy: Stock analysts recommend (buy, hold, or sell). Hold stocks that are "buy", sell stocks that are "hold or sell"**
    - **If you wouldn't own it, don't buy it**

Lecture 16: Credit, Insurance

- Credit capacity - deciding whether to seek a loan + what terms to accept
- Rules of thumb (after-tax)
    - No more than 1/3 of income on housing (e.g. mortgage + utility payments)
    - No more than 15-20% on consumer credit + auto loans
    - Debt/net worth ratio < 1
- Personal bankruptcy - sell assets to pay off creditors
- Insurance terminology
    - Coverage - what a policy pays for under certain conditions
    - Premium - amount you pay (annual amount)
    - Deductible - first dollars of loss the insured is liable for, insurer liable for amounts above deductible
    - Copays - percentage amount that insured pays

Personal Risk	Main Financial Implication	What You Can Do	Private Insurance	Government Insurance
Health:				
Illness	Loss of income and increased expenses	Healthy behavior	HI	Medicare, Medicaid, HI subsidies
Disability	Loss of income and increased expenses	Safety	DI	Social Security DI
Death	Loss of income and increased expenses	Estate planning	Life insurance	Social Security survivors
Retirement	Decreased income	Saving and investments and part time/ return to work	Pensions, IRAs, 401ks	Social Security and government employee pensions
Property Loss	Repair and replacement cost	Repairs and upkeep, defensive investments	Auto and home insurance, supplemental policies	Various

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- Risk pooling - aggregating risks and pricing them (average cost of insuring pool of different risks)
- Consumption smoothing - we prefer consumption to be more stable than current income
- McCarran-Ferguson Act leaves insurance oversight to state level governments
- Use services like Select Quote to compare insurance policies
- Types of Coverage
    - Homeowner's - home/living expenses/personal property
    - Automobile - bodily injury + property damage
- Types of Life Insurance
    - Term life insurance - covers specific period/option to renew
    - Whole life insurance (cash-value life policy)
    - Life insurance is generally worse than separate savings/investments
- Medicare Reform
    - Improve incentives: medicare has copays and deductibles but most elderly want no copays
    - Improve management: fix fraud, use telemedicine, fix data privacy
    - More competition: competitive bidding

Lecture 17: Housing Economics and Financial Bubbles

- 48.3 T total value of homes in US
    - 1/3rd of all household wealth
- Holding period return = change in asset value + distributions (rental services) received by asset
- Capital gains for real estate = house price appreciation: net of remodeling + maintenance expenses
- Landlord Net Income = GR - Maintenance Expenses - Depreciation Expenses - Interest Expenses - Property taxes
- IRS lets you deduct property taxes + mortgage interest
    - Tax advantage of owning a home

- Houses don't appreciate more bc of housing tastes changing (remodeling costs)
    - Grew slower than S&P 500
- Dividends of owning house = not having to pay rents (imputed rent)
- **Useful Formula for Mortgages**

  Payment = interest rate X loan amount/D
  - Where **D = 1 – 1/(1+interest rate)^T**
  - Interest rate = monthly interest rate = annual rate/12
  - T is term of the mortgage <u>in months</u>
- Refinancing fees
- People used to get mortgages from local bank. Bank held the loan as a bank asset. Local bank knew area and knew customers
- Now, people get mortgage loan from a loan originator (a bank, S&L, or broker). Bank sells the asset to Freddie Mac or Fannie Mae or an Investment bank and collects origination fee
- Freddie or Fannie or Investment bank package together a portfolio of mortgages and issue "mortgage backed securities" to investors (MBS)
- Reverse annuity mortgages - someone pays old person for their house and gets it after they die
- REITs (real estate investment trust) - similar to mutual fund
    - Add diversification to portfolio of stocks + bonds