PERSONAL FINANCE 101

A Guide For Students Who Want to Take Control of Their Financial Future

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INTRODUCTION

I hope that you will find this guide informative, and that it comes in good use as you begin making decisions about your own financial future.

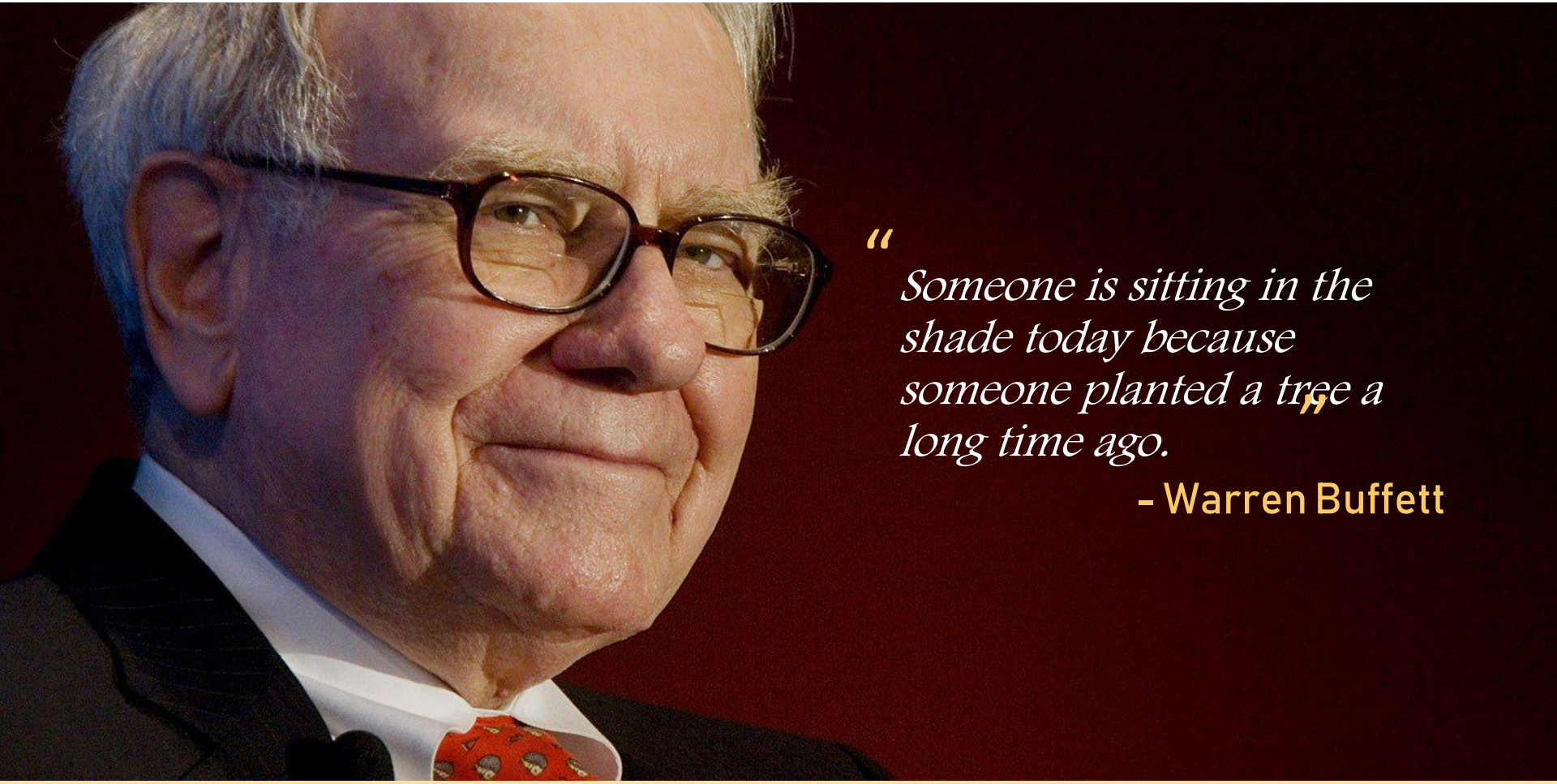
Finance and Investment is often tossed about as a trending career path with good future prospects. But how many of us know what it really means?

With this guide, I aim to shed light on finance & investment for young people who are considering a career in finance, looking to finance a business idea, or simply want to take control of their own personal finances.

I draw from my own research and experiences interning with investment firms, taking courses on investment, stocks and trading, and raising funding for my own initiatives.

PERSONAL FINANCE

- Stock, Bonds
Building a Portfolio &


“Someone is sitting in the shade today because someone planted a tree a long time ago.”
- Warren Buffett

It’s never too early to start investing your spare funds.

In fact, there are some very tangible benefits to investing early, including more time for your investments to mature, and racking up valuable investment experience before you start earning a regular pay check.

In order to be a

Smart Investor

though, you need to first know the basics of the market, including the different types of investments, and strategies to maximize your return for each.

Pro Tip

In case you’re too young to open your own accounts, ask one of your parents to open a Custodial Investment Account in your name, so you can start trading and building your own portfolio.

Intuition and Interpretation

- Money today is worth more than money tomorrow
- Can invest money today, money tomorrow comes with **opportunity cost**
- Opportunity cost captured by R, hence **opportunity cost of capital**
- Example: $95.24 can be invested at 5% to generate $100 on year from now. $100 one year from now comes at an opportunity cost of $4.76 (5%)

Discount Factor

- Discount factor is our “exchange rate for time”
- Example = 1/(1+0.05): $1 today is worth $1.05 one year from today. $1.05 one year from today is worth $1 today. $1 one year from today is worth $1/1.05 = $0.9524 today
- Discounting converts future money into “earlier” money

Take-Aways

- Money has a time unit
  - we only add/subtract money with same unit
  - use discount factor, 1/(1+R)T
  - to discount money to present values
  - to compound money to future values
- Present value of common cash flow streams
  - (growing) annuities and perpetuities
- Inflation and taxes
  - Impact rate of return

What Is A Portfolio and Why Is It Useful?

A **portfolio** is simply a specific combination of securities, usually defined by **portfolio weights** that sum to 1:

$$\begin{aligned} \omega &= \{ \omega_1 , \omega_2 , \ldots , \omega_n \} \\ \omega_i &= \frac{N_i P_i}{N_1 P_1 + \cdots + N_n P_n} \\ 1 &= \omega_1 + \omega_2 + \cdots + \omega_n \end{aligned}$$

Portfolio weights can sum to 0 (dollar-neutral portfolios), and weights can be positive (long positions) or negative (short positions).

Assumption: Portfolio weights summarize all relevant information.

Example 1

Your investment account of $100,000 consists of three stocks: 200 shares of stock A, 1,000 shares of stock B, and 750 shares of stock C. Your portfolio is summarized by the following weights:

Asset	Shares	Price/Share	Dollar Investment	Portfolio Weight
A	200	$50	$10,000	10%
B	1,000	$60	$60,000	60%
C	750	$40	$30,000	30%
Total			$100,000	100%

Example 2

You decide to purchase a home that costs $500,000 by paying 20% of the purchase price and getting a mortgage for the remaining 80% What are your portfolio weights for this investment?

Asset	Shares	Price/Share	Dollar Investment	Portfolio Weight
Home	1	$500,000	$500,000	500%
Mortgage	1	–$400,000	–$400,000	–400%
Total			$100,000	100%

What happens to your total assets if your home price declines by 15%?

Example 3

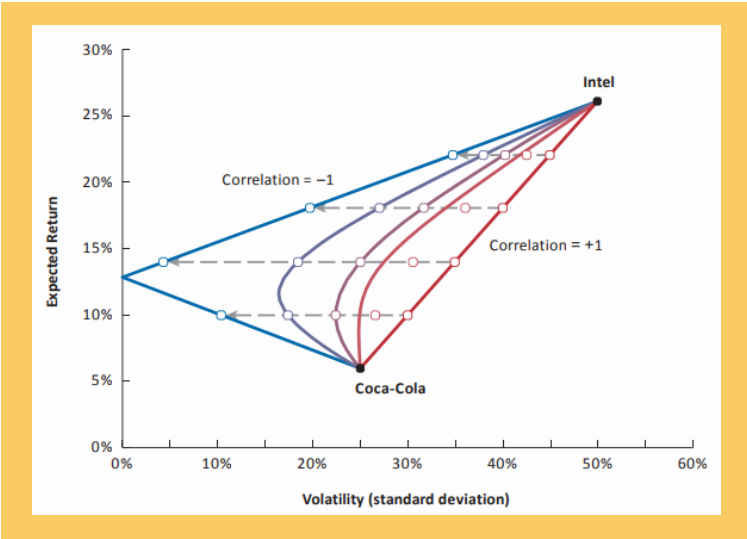
You own 100 shares of stock A, and you have shorted 200 shares of stock B. Your portfolio is summarized by the following weights:

Stock	Shares	Price/Share	Dollar Investment	Portfolio Weight
A	100	$50	$5,000	???
B	–200	$25	– $5,000	???

Zero net-investment portfolios do not have portfolio weights in percentages (because the denominator is 0)—we simply use dollar amounts instead of portfolio weights to represent long and short positions

Risk and Return: Diversification

- Correlation has no effect on the expected return of a portfolio
- The volatility of the portfolio will differ depending on the correlation
- The lower the correlation, the lower the volatility we can obtain
- As the correlation decreases, the volatility of the portfolio falls



Diversification

Consider an equally weighted portfolio:

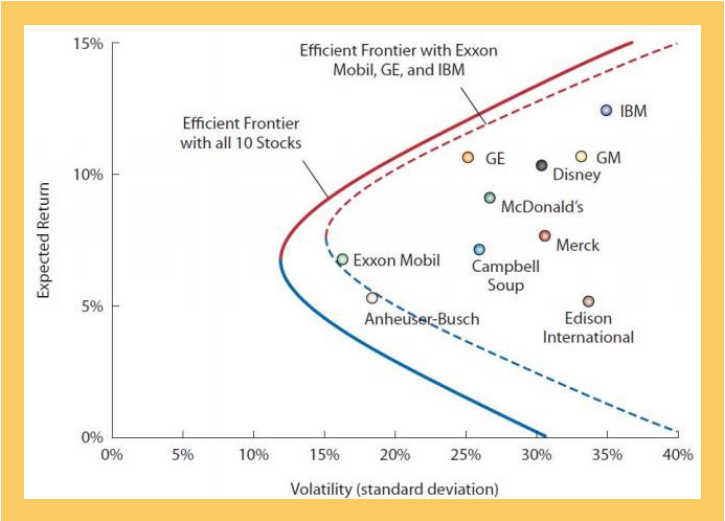
$$\omega_i = \frac{1}{n}$$

$$\begin{aligned}
\text{Var}[R_p] &= \sum_{i=1}^{n} \frac{\sigma_i^2}{n^2} + \frac{1}{n^2} \sum_{i \neq j} \text{Cov}[R_i, R_j] \\
&= \frac{1}{n} \times \text{Average Variance} + \frac{n-1}{n} \times \text{Average Covariance} \\
&\approx \text{Average Covariance}
\end{aligned}$$

For portfolios with many stocks, the variance is determined by the average covariance among the stocks

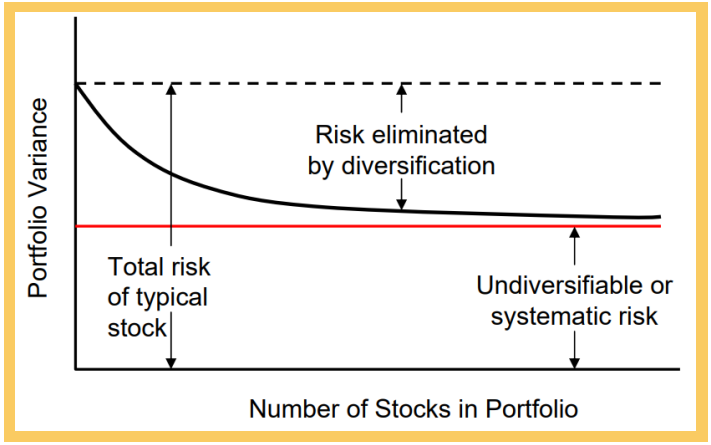
Risk and Return: Efficient Portfolios of Risky Assets

- Adding more stocks to the portfolio increases diversification
- The minimum variance frontier expands to the left
- The optimal portfolio for any investor must lie on the efficient frontier (red line)
- Top half of the minimum variance frontier



Diversification has limits

- Remaining risk known as systematic or market risk
- Due to common factors that cannot be diversified
- Example: S&P 500
- Other sources of systematic risk may exist
- Provides motivation for linear factor models



Market Efficiency and Active Portfolio Management

Are stock returns predictable? *Not* really in the short term, but exhibit

- medium-horizon *momentum:* "winners" over the past 6 months subsequently outperform 6-month past losers
- long-horizon *reversal:* "losers" over the past 36 months subsequently outperform 36-month past winners

Additional equity strategies with positive-α based on CAPM:

- *Size*: *small* (mkt cap) stocks have historically earned higher returns than the CAPM predicts
- *Value*: *value* (high book-to-mkt equity) stocks historically earned higher returns than the CAPM predicts

Market Efficiency and Active Portfolio Management

Four **facts from history of U.S. financial markets:**

1. Real interest rate has been slightly positive on average

2. Return on more risky assets has been higher on average than return on less risky assets

3. Returns on risky assets can be highly correlated to each other

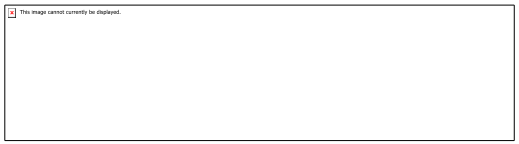
4. Returns on risky assets are (usually) serially uncorrelated

What is a

BOND?

What Is a Bond?

- A bond is a contract in which the issuer (borrower) promises to repay the investor (lender) the amount borrowed plus interest over some specified period of time
- A coupon bond promises a periodic interest payment (e.g., every 6 months or every year) and repayment of the face value (F) of the bond at the maturity date (T)
  - The periodic interest payment is also known as the coupon (C)
  - The annual percentage rate that the issuer agrees to pay on the face value is called the coupon rate
  - For a bond that makes m payments a year, the coupon is given by

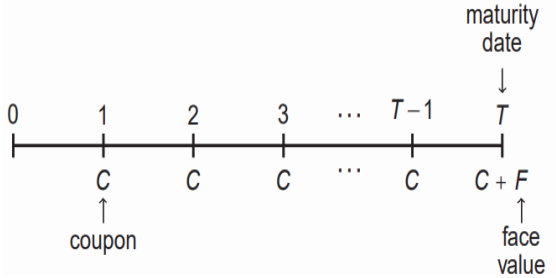


For example, a $1,000 bond with a 6% coupon rate and semiannual coupons pays-

($1000x6%)/2 = $30 every 6 months

What Is a Bond?

- Here is a time line for the payments made by a bond with an annual coupon C



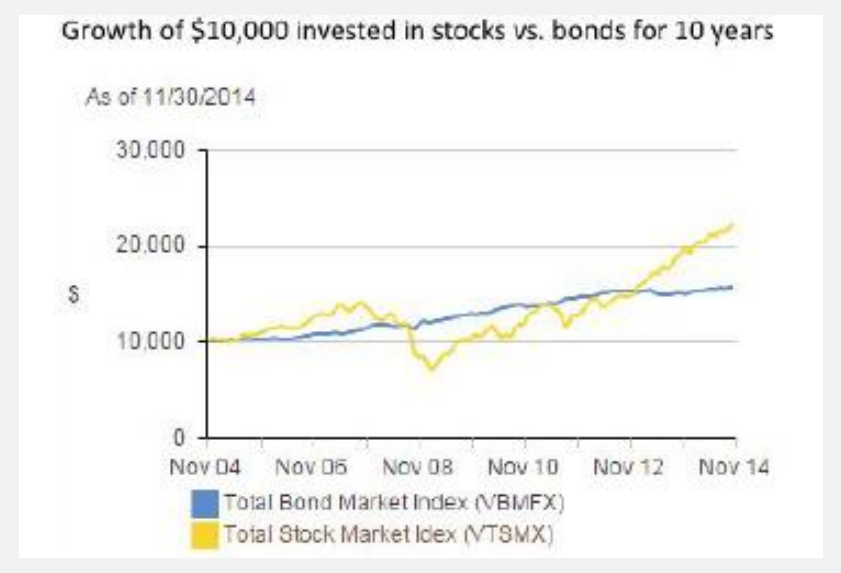
- The simplest kind of bond is a zero-coupon bond
  - There are no periodic coupon payments
  - Only one payment is made: the face value F at maturity T
  - Zero-coupon bonds trade at a discount (a price lower than the face value to account for the interest over the term of the bond)

Characteristics of Trading Bond?

- Equivalent of making a loan to a company
- Does not share the companies profits, instead
  - they receive a fixed return on their investment
- Limited upside
- Risk that coupon payments will not be paid
- Act as investor until the maturity date, for a defined amount of time

Why would you want to trade bonds?

- Less Risky
- Protection in bad times
- High- Yield (Junk) or distressed /more risky bonds can generate returns like stocks can, while more secure bonds can be expected to generate a steady 3-4% a year – especially good for risk – intolerant portfolios



Corporate *vs.* Government *vs.* Municipal Bonds

- Us Government/ Government Agency bonds are considered the safest bond investment
  - Backed up by “full faith in credit” by US Govt.
- Corporate bonds are issued by industrial corporations, financial firms, public utilities and transport companies
  - Generally speaking pay more interest than the government bonds but also carry a greater risk of default
- Municipal bonds (Munis) are bonds that are the equivalent of loaning money to smaller, local governments (that govern towns, countries, cities or states)

High Yields- (Often called “Junk” bonds)

- These bonds are farther down the capital structure and are therefore more risky
  - this means they are “less senior” than other more secure bonds, that are more likely to be paid in full
- They have a lower bond rating, signaling that they are less likely to be paid at full maturity
- Can potentially generate much higher returns than less risky, more secured bonds

Bonds or Fixed Income Securities

- We distinguish between these bonds by denoting each in its naming: e.g., UST 6% Sep 2027, or GE 4.125% 9Oct2042
  - Both these examples are of fixed coupon bonds
  - Many banks issue floating rate bonds or notes, where the coupon rate is reset periodically to a reference rate (e.g. 5-year Treasury "yield"), but these are still to be though of as Fixed Income securities
- The bonds trade in larger denominations, typically in face amounts of $10m or more. And there are other possibilities and name you will learn: Zero Coupon Bonds; semi-annual (in the US) or annual coupons (e.g., in Japan)

Issuers: Governments & Agencies

- The US Treasury and other “sovereigns” issue (sell) securities to the public – they borrow money at the date of issue – and promise to pay a semi-annual cash coupon (= c%/2) plus a redemption amount called the “face” amount of the bond
  - Cashflows?: the US Treasury 8% coupon maturing Aug 2038 which pays 4% semiannually on the 15th of Feb & Aug each year until 15 Aug 2038, when it also redeems the security for its face amount
- A Treasury issue is considered default-free – but other “sovereigns”, e.g. the Russian Bonds, have defaulted. Agencies are the securities issued by the Federal Home Loan Banks, Fannie Mae, and similar government agencies, they have the backing of the government, up to a point

Treasury Securities

- The U.S. Treasury is the largest single issuer of debt in the world
  - U.S. Treasury securities are backed by the full faith and credit of the U.S. government
  - They are viewed by market participants as having (close to) no default risk (i.e., no risk that the issuer will default on his payments of interest and/or principal)
- There are three major types of Treasury securities
  - Treasury Bills are issued with maturities of 3, 6, or 12 months
  - Treasury Notes are issued with maturities between 2 and 10 years
  - Treasury Bonds are issued with maturities greater than 10 years
- Treasury bills are zero-coupon bonds, while Treasury notes and bonds are coupon bonds with interest paid every 6 months
- We have longer dated Treasury Securities with Zero Coupons: STRIPS

How Treasury Securities Are Quoted

- Here is a table of prices for Treasury notes and bonds (with a face value of $100), extracted from the Wall Street Journal Online on July 28, 2014:

Maturity	Coupon	Bid	Ask	Chg	Ask Yield
07/31/2015	1.750	101.6172	101.6250	-0.0078	0.132
07/31/2016	3.250	105.4141	105.4375	-0.0469	0.521
07/31/2017	2.375	103.9609	103.9922	-0.0703	1.023
07/31/2018	2.250	103.0625	103.0938	-0.1016	1.452
07/31/2019	0.875	95.8594	95.8672	-0.0859	1.741
07/31/2020	2.000	100.2422	100.2891	-0.1328	1.949
08/15/2021	8.125	139.6094	139.6563	-0.1641	2.052
08/15/2022	7.250	137.0859	137.1328	-0.1719	2.191
08/15/2023	6.250	131.7109	131.7578	-0.2344	2.335
11/15/2024	7.500	145.8438	145.8750	-0.2734	2.435

- This tells us that the bond maturing on July 31, 2020
  - has a coupon rate of 2% (and so pays a coupon of $1 every 6 months)
  - can be sold for $100.2422 and bought for $100.2891
  - has decreased in price by $0.1328 since the previous day

What is

STOCK?

What is Stock?

- Common Stock represents an ownership stake in a corporation
- Also known as equity
- One of the three main ways corporations finance themselves

Rights of Stockholders

- As a Stockholder, you have certain rights and entitlements within a company. These are usually set out in articles of incorporation
- The two main rights are:
  - Voting
  - Dividend

Voting Rights

Right to:

- Elect directors of the firm
- Also to vote on mergers and other matters of importance
  - Important issues like a merger may require a supermajority(e.g. 2/3 or 75%)
  - Some companies have different classes of stock with different voting rights

Dividend Rights

- Shareholders have the right to share in dividends in proportion to their stake
- Includes right to share in liquidating dividend (final payment if company is liquidated)
- Note: company not obligated to pay dividends

Issuing Stock

- Initial Public Offering (IPO)-First offering of stock to the general public (unseasoned offering)
  - Primary: issue of new stock
  - Secondary: sale of existing stock (not mutually exclusive)

Motivations for IPO's

- Raise money for expansion
- To allow insiders and venture capitalists (particularly) to "cash-out"
  - Venture capitalists are usually aggressive in pushing for an IPO, since that is how they traditionally obtain their returns

Valuing Stocks

- One way to think about valuing stocks is **absolute valuation** – recognizing that they represent a claim to expected future dividends
  - Note that dividends (which are cash flows to investor) and not earnings (which may be reinvested) should define dividends sufficiently generally (liquidation, merger, etc.)
  - Note that dividends are uncertain – so we discount expected future dividends

Discounts and Premiums

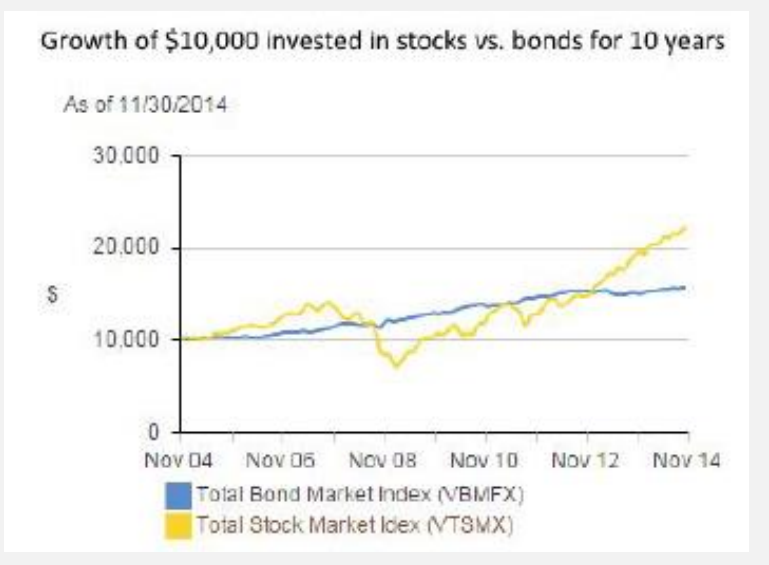
- **At Par**: Price = Face Value
  - When Coupon rate = required return on the bond
- **Premium:** Price> Face Value
  - When Coupon rate > required return on the bond
- **Discount**: Price <Face Value
  - When Coupon rate > required return on the bond

Characteristics of Trading Stock

- Raised by a corporation through issuance and distribution of shares – through Initial public offerings (IPO's) or later equity sales
- Buying a stock is buying ownership in a corporation
- Having a centralized exchange or trading system (sold through the NYSE or Nasdaq, stock exchanges)
- Theoretical unlimited upside
- Can be an investor indefinitely

Why would you want to trade stocks?

- Greater returns
- Ownership in a company (Ex owning 1/5.1 Billionths of Apple)
- Can make money through upside (how much you paid for the stock vs. how much it's currently trading at) or if more established through dividends (money the company pays shareholders from the profit it makes)



Index Stock Trading

- Single stocks can be categorized into numerous different sectors
  - Healthcare
  - Energy
  - Consumer Retail
  - Financials

- Investors can also buy a basket of stocks, known as an index, that can serve as a broad measure of the overall health of the stock market

The Big Three

- **S&P 500**: 500 largest companies in the USA with market capitalizations of at least $6.1 billion
- It is seen as a leading indicator of U.S. equities and a reflection of the performance of the large-cap universe
- **Dow Jones Industrial Index**: price-weighted average of 30 blue-chip stocks that are generally the leaders in their industry
- It has been a widely followed indicator of the stock market since October 1, 1928
- **NASDAQ**: The Nasdaq Composite Index is the market capitalization-weighted index of approximately 3,000 common equities listed on the Nasdaq stock exchange

The 30 Companies in the DJIA as of January 2017

Company Name	Ticker	Exchange
The 3M Company	MMM	NYSE
The American Express Company	AXP	NYSE
Apple Inc.	AAPL	NASDAQ
The Boeing Company	BA	NYSE
Caterpillar Inc.	CAT	NYSE
Chevron Corporation	CVX	NYSE
Cisco Systems, Inc.	CSCO	NASDAQ
The Coca-Cola Company	KO	NYSE
The Walt Disney Company	DIS	NYSE
E. I. du Pont de Nemours and Company	DD	NYSE
Exxon Mobil Corporation	XOM	NYSE
General Electric Company	GE	NYSE
The Goldman Sachs Group, Inc.	GS	NYSE
The Home Depot, Inc.	HD	NYSE
IBM Corporation	IBM	NYSE
Intel Corporation	INTC	NASDAQ
Johnson & Johnson	JNJ	NYSE
JPMorgan Chase & Co.	JPM	NYSE
McDonald's Corporation	MCD	NYSE

The

Asset Classes

- **Gold**
- **Foreign Exchange**
- **Oil**

Gold

- Safe Asset Class
  - Inflation hedge and hedge against risk in financial markets/economy
- Doesn’t pay a dividend
- Not like other commodities (doesn’t get used up)
- Investing in Gold
  - Gold Bullion
  - Gold ETF
  - Gold ETN
  - Gold Miner Stocks

Foreign Exchange (FOREX)

- FOREX: largest and most liquid market
- Spot exchange rate: exchange rate between two currencies for immediate delivery
- Appreciation: Rise in the exchange rate
- Increase in value of currency unit in denominator
- Eg: Yen/$ goes from 100 to 105, rise in US dollar and fall in Yen

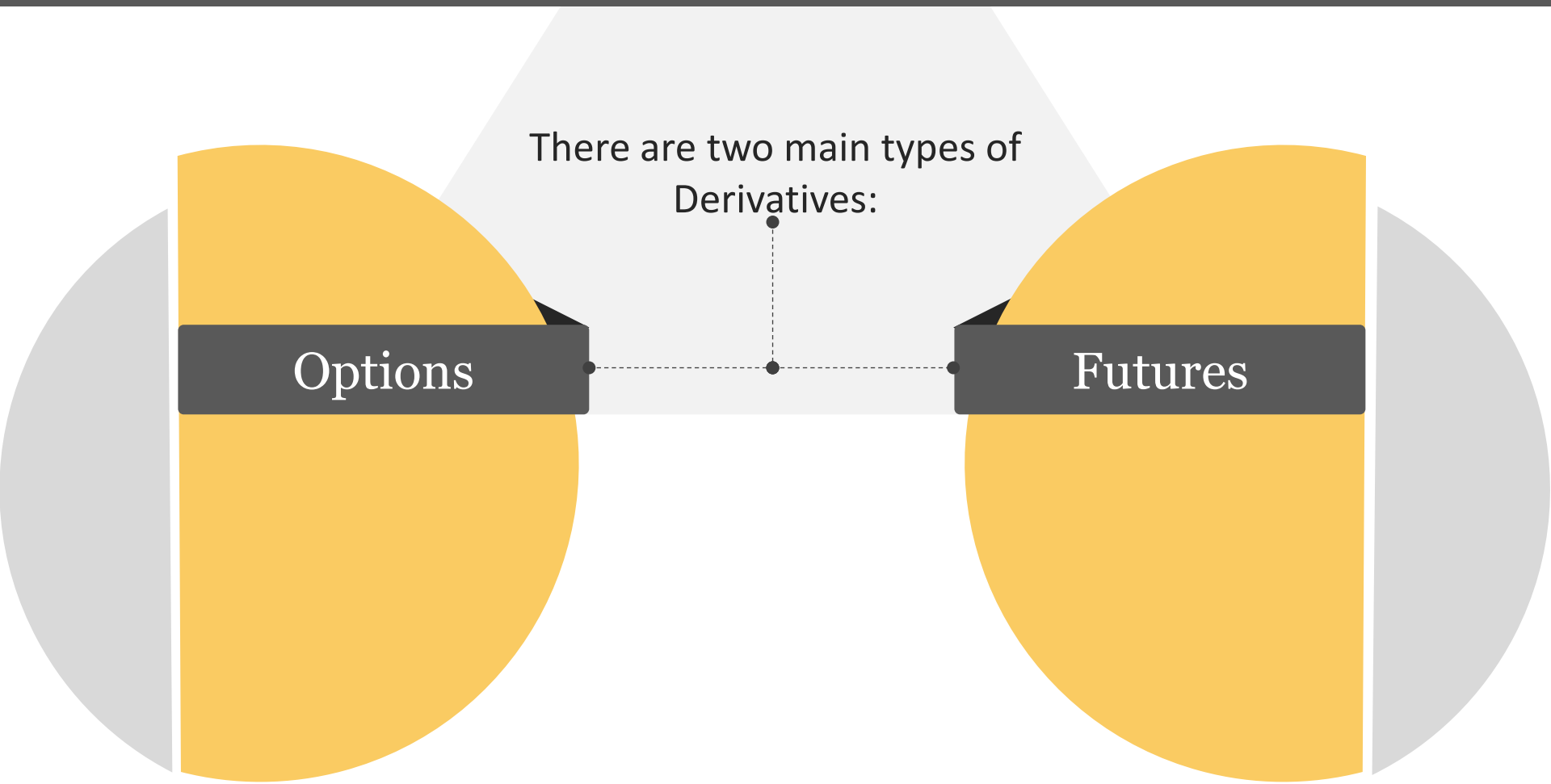
Demand and Supply of Currencies

- Demand for domestic currency depends on both demand for exports and demand for domestic assets
- Factors affecting FX changes:
  - Expected real interest rates – when investors realize more gains in one country, usually bid that currency up
  - Economic growth – high economic growth is associated with higher exchange rates
  - Inflation – Development that worsen a country's inflation will devalue exchange rate
  - Monetary Policy

Oil

- Asset class that trades purely on supply and demand
- Misalignment causes significant prices moves in market
- Demand Drivers:
  - State of global economy
  - Seasonal consumption (heating, driving, hurricane)
- Supply Drivers:
  - Availability of raw material
  - Processing capacity
  - Oil production
  - OPEC (Saudi Arabia - de facto leader)

Types of Derivatives



Options

- A **call option** represents the right, but not the obligation, to purchase an asset for a specified price, called the exercise price or **strike price** on their **Expiration or Maturity Date**
  - Example: A November call option on Intel stock with a strike price of $25 entitles its owner to purchase 100 shares of Intel stock for $25 each any time before November
  - If the price is below $25, it is obviously not profitable to exercise the option
- Similarly, a **put option** represents the right, but not the obligation, to sell an asset at the **strike price**
- An option is more valuable if it has longer until it expires. Options become profitable only when their **in the money or close**
  - In the money = when stock is at/close to strike price

Options Strategies

- **Basic Options Strategies with Examples**

- Profit from stock price gains with limited risk and lower cost than buying the stock outright
  Example: You buy one Intel (INTC) 25 call with the stock at 25, and you pay $1. INTC moves up to $28 and so your option gains at least $2 in value, giving you a 200% gain versus a 12% increase in the stock

- Profit from stock price drops with limited risk and lower cost than shorting the stock
  Example: You buy one Oracle (ORCL) 20 put with ORCL at 21, and you pay $.80. ORCL drops to 18 and you have a gain of $1.20, which is 150%. The stock lost 10%

- Profit from sideways markets by selling options and generating income
  Example: You own 100 shares of General Electric (GE). With the stock at 34, you sell one 35 call for $1.00. If the stock is still at 34 at expiration, the option will expire worthless, and you made a 3% return on your holdings in a flat market

- Get paid to buy stock
  Example: Apple (AAPL) is trading for 175, a price you like, and you sell an at-the-money put for $9. If the stock is below 175 at expiration, you are assigned, and essentially purchase the shares for $166

- Protect positions or portfolios
  Example: You own 100 shares of AAPL at 190 and want to protect your position, so you buy a 175 put for $1. Should the stock drop to 120, you are protected dollar for dollar from 174 down, and your loss is only $16, not $70
  https://www.cnbc.com/id/30095574

Futures

- A futures contract calls for delivery of an asset (or in some cases, its cash value) at a specified delivery or maturity date for an agreed-upon price, called the futures price, to be paid at contract maturity
  - Long position: Take delivery at maturity
  - Short position: Make delivery at maturity
  - Example: Corn futures trade at the Chicago Board of Trade

  Taking a long corn position obliges the trader to take possession of 5,000 bushells (175,000 liters) of No. 2 yellow corn
- Most futures contracts are traded out before the maturity date

Investing Glossary of Terms

- **Stock**: A stock is a share of ownership in a company. A stock usually pays dividends, which are variable payments from the company to its owners.
- **Preferred Stock**: A stock that entitles the holder to a fixed dividend, whose payment takes priority over that of common-stock dividends.
- **Initial Public Offering**: An initial public offering, or IPO, occurs when a private firm offers to sell company shares in the public market for the first time. After the offering, the firm becomes a public firm.
- **Patent**: A patent is a legal document that grants inventors exclusive rights to use the new technology they developed for a fixed time period.
- **Liquidity**: Liquidity is the ability to sell or buy an asset, fast, at low cost, and without moving its price too much.
- **Dividends**: Dividends are payments made by corporations to their shareholders. A dividend is a means by which a corporation shares its income with its shareholders.
- **Copyright**: The exclusive legal right, given to an originator to print, publish, perform, film, or record literary, artistic, or musical material, and to authorize others to do the same.
- **Trademark**: A symbol, word, or words legally registered or established by use as representing a company or product.

Investing Glossary of Terms

- **Franchise:** A franchise model is when a company grants permission to other firms or people to sell products or services to a customer under its name. Within a franchise model, a franchiser controls several factors related to the franchise, which can include pricing and brand-related elements.
- **Bonds:** A bond is a promise to pay interest in the future, in exchange for money right now. Governments and companies sell bonds to investors. So, when the city of Philadelphia needs a lot of money to construct a new bridge, it can either borrow money from one bank by asking for a loan, or from several investors, by issuing a bond.
- **Coupon Bonds:** An investment bond on which interest is paid by presenting coupons, typically semi-annually.
- **Principal:** a sum of money lent or invested, on which interest is paid. Payments on loans typically include payments toward principal and toward in interest (below).
- **Interest:** The price a borrower pays for the use of money they do not own. Interest rates are normally expressed as a percentage rate over the period of one year.

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Thank
you!