Weekly Meeting Notes

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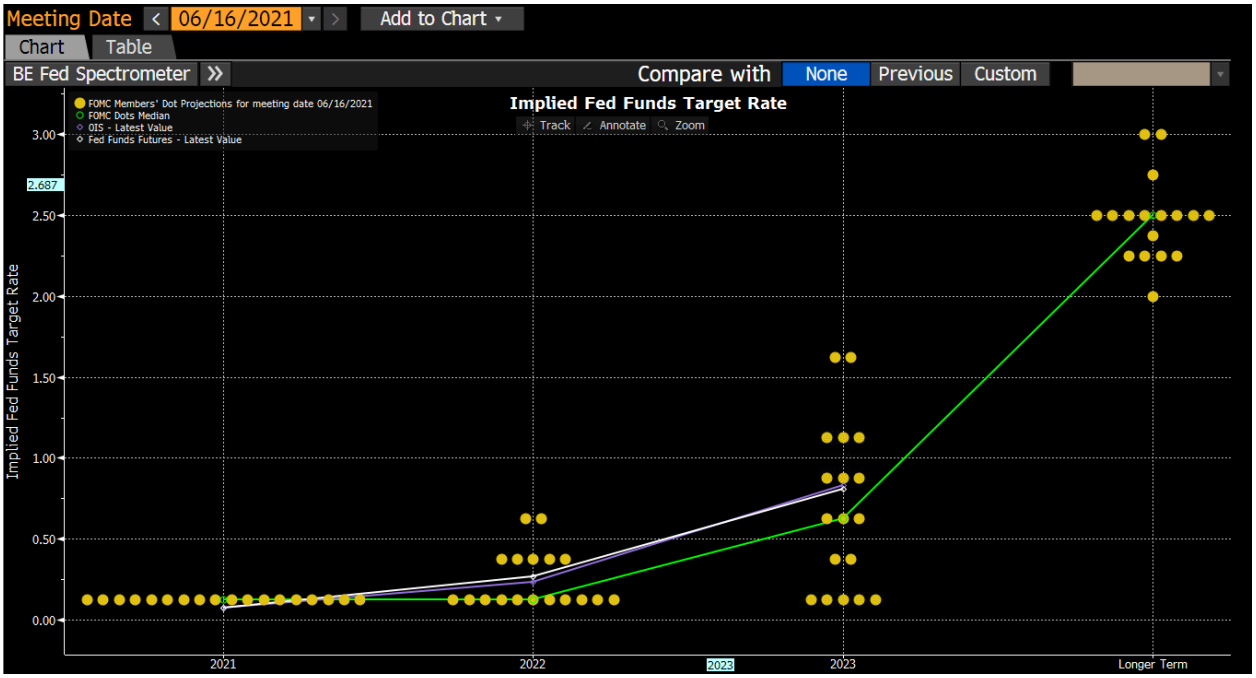
Overview:

- The Federal Reserve have its meeting updating tapering and rates
- A Chinese real estate property developer Evergrande has been having trouble making bond payments
- Left tail hedging is the process in which you buy options to protect yourself from a worst-case scenario
- Neural networks are an integral part of machine learning and is one of the driving forces behind artificial intelligence
- Stochastic differential equations are a basis for many financial models and modeling securities

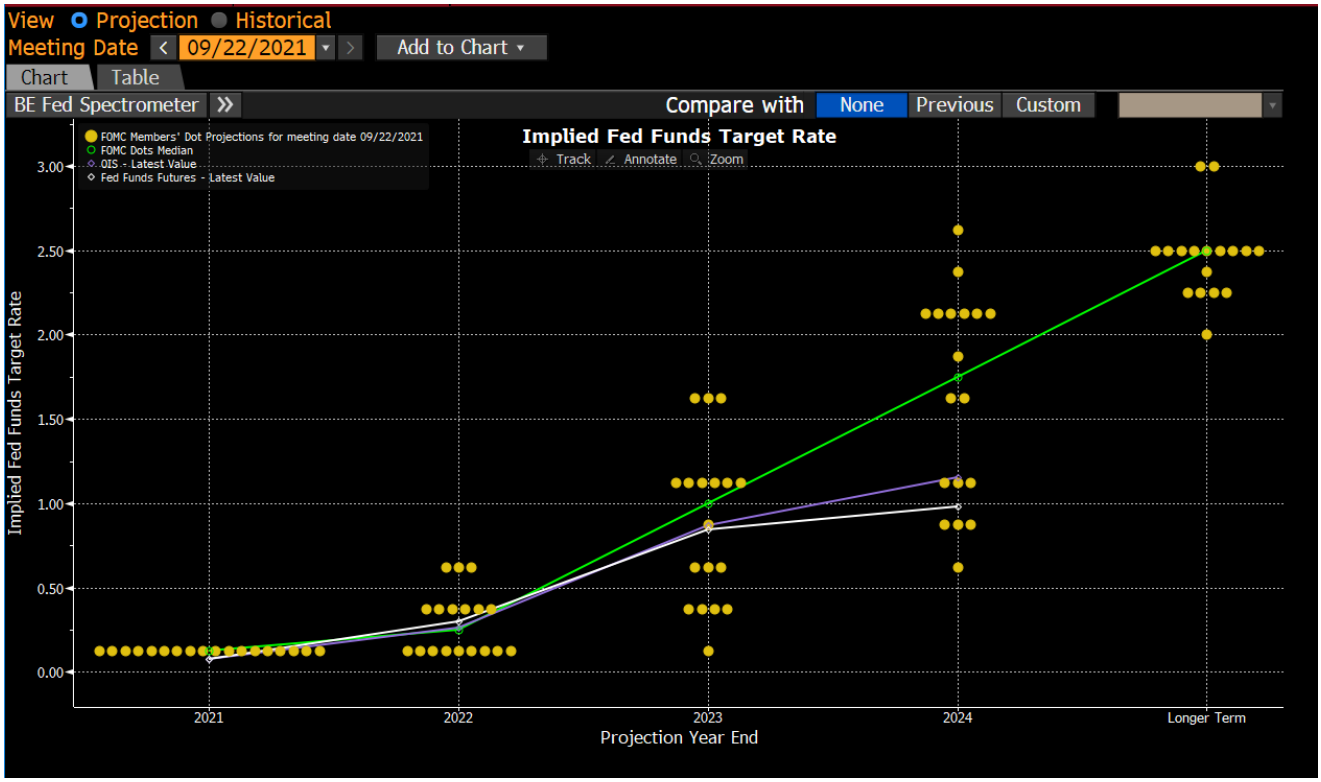
News: Federal Reserve Meeting: Tapering / Fed Dot Plots

- The Federal Reserve had their Federal Open Markets Committee Meeting from Sept 22nd-23rd
- They started to provide an insight on rates and tapering processing
    - FOMC median projection for 2022 inflation rose to 2.2% from 2.1% in June; held the 2023 forecast at 2.2%
    - Unemployment 3.8% 2022, 3.5% 2023; no change from June forecast
    - GDP growth seen at 3.8% in 2022, 2.5% in 2023, both higher than the prior projections
    - The fed has also said that they are going to double down on their per-counterparty limit on its overnight reverse-repurchase agreement facility to $160bn daily

06/16/2021 Federal Reserve Dot Plots



09/22/2021 Federal Reserve Dot Plots



What the dot plots show:

- Dot plots show the expectation of where the Federal Reserve members anticipate where they expect interest rates to change
- At the moment we see that they are looking for interest rates to go higher in the future.
- The Federal Reserve Chairman has always stated that dot plots are not a forward looking policy tool

What the future of dot plots show:

- The next dot plot will show how the federal reserve thinks of their rate policy
- It will also shed light on their tapering policy and their long term interest rate policy
- If the Federal Reserve makes their tapering policy they are also somewhat increasing the chance that they'll have to raise rates

"If you are making progress to start using one of your tools, that means you are making progress toward using the other" - Chief US Economist at Barclays

- A series of advisor have been recommending a more hawkish Fed dots
  - Hawkish - the term used for central bankers whose main goal is control inflation they are more likely to be aggressive on rage change, usually support higher interest rates
  - Dovish - the term used for central bankers tend to support low interest rates and are usually more interested in keeping unemployment low rather than managing inflation
- Some of the positions that banks have been marketing to their clients
  - Goldman Sachs Group and Toronto-Dominion Bank this weekend recommended paying the 2y1s OIS in dollars (S0042FS 2Y1Y BLC Curncy)
  - TD Ameritrade a similar trade using the 2Y1Y USD vs. 2Y1Y GBP
  - Morgan Stanley since June has recommended eurodollar curve steepening trade for the December 2024 contract

Goldman Sachs

TD Ameritrade

Morgan Stanley

Goldman Sachs & Dominion USD OIS FWD swap 2Y1Y:

- This is a vanilla interest rate swap
- They swap the cash flows (fixed vs. floating) in the same currency
- The OIS FWD is the overnight forward curve which is the Federal Reserve's daily overnight lending rate
- The 2y1y means 2 year into 1 year. Which means the rate in 2 years from now in regards to a loan lasting 1 year

TD Ameritrade's 2y1y USD vs. GBP 2y1y:

- TD Ameritrade advised clients to make the same position in USD rather than GBP
- Their reasoning is that the dot plot will most likely update with higher interest rate outlook even though we are looking to taper
- The BOE has taken a hawkish approach which has led to repricing the OIS curve for a 40bp hike by the end of 2022

Morgan Stanley out-of-the-money short 10-year Treasury and December 2022 / December 2024 eurodollar steepener trade:

- Eurodollars are time deposits denominated in US dollars held outside of the United States
- Essentially its an interest yielding bank depository with a specific date of maturity
- Really it's the difference between US currency held in a foreign bank vs domestic bank
- The future contract allows the owner to receive a eurodollar time depository
- Really the eurodollar future gauges the 3-month US dollar LIBOR

Resources:

Articles:

Yahoo Finance: What is the Federal Reserve's dot plot: Yahoo U (here)

Investopedia: Dot Plot (here)

Bloomberg: Powell Says Taper Could Start in November, Finish in Mid-2022 (here)

Bloomberg: Rate Traders Betting on Fed Dots Move Will Get Their Answer Soon (here)

Investopedia: Dove (here)

Investopedia: Inflation Hawk (here)

Investopedia: Trading Eurodollar Futures (here)

News: Evergrande and Contagion Risks

- Evergrande, a chinese real estate developer is currently
- They are currently in some financial troubles because there is risk that they may miss their bond payment
- The default transverse through the market
    - US equities down 2%
- The Markit CDX North American High index weakened

- There has been a substantial amount of issuance in the as of September there was around $118bn high grade debt in September which is historically high
- In financial markets and on a macroeconomic level quantitative analysts are worried about market contagion which is the risk that one problem creates a chain effect
- It also brings in a problem that the country has a history of unorthodox and opaque methods for resolving financial problems
- Banks called for a series of answers
    - Goldman Sachs asked called authorities to send a “clearer message” from causing “significant spillovers
    - Citigroup said officials must commit to a “policy error of over tightening”
    - Economists at Societe Generale assign a 30% probability of hard landing

Articles:

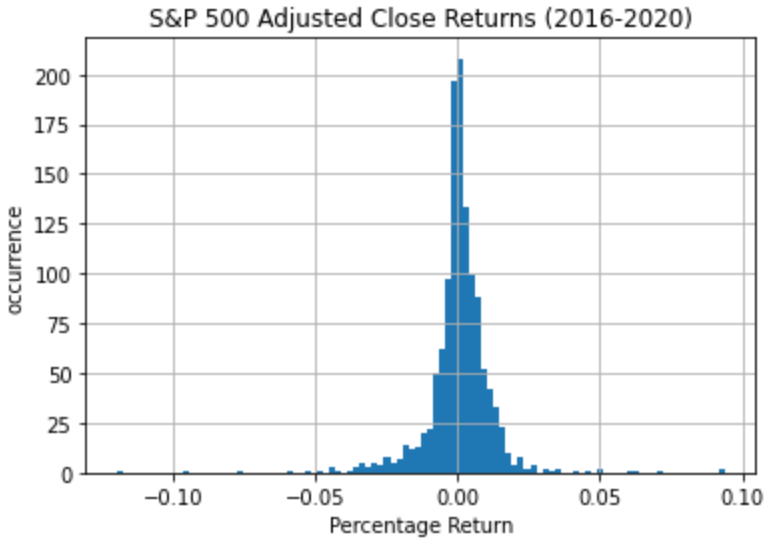
Bloomberg: America’s Corporate Bond Binge Interrupted by Evergrande Tumult (here)

Bloomberg: Market Contagion Tests Xi’s Resolve on Evergrande, Property Curbs (here)

Finance: Left Tail Hedging

Left tail hedging

- Left tail hedging is a strategy
- The motivation for the strategy
  - We are trying to reduce the left tail (bad days) of our security
  - To hedge out that risk you would buy options that bet on worst-case scenarios
  - These would be far out-of-the-money options
  - The strategy essentially creates



The arguments:

- The idea isn't that you will beat the market each year but this strategy argues that over a long term YoY this will be successful
- Breaking down the scenarios
  - Scenario 1: Nothing bad happens: In this scenario you get S&P 500 returns and
  - Scenario 2: something bad happens and the options pay out, essentially the insurance covers the lost

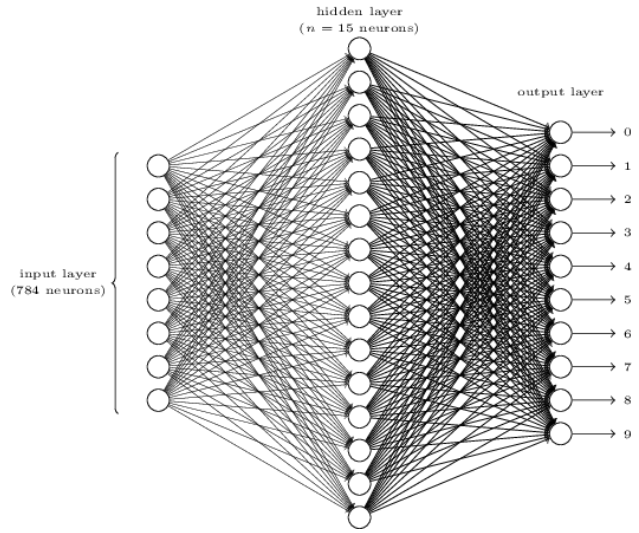
The implications:

- Most practitioners implement this strategy along the framework of standard financial models
- But the people who developed the theory (Taleb & Spitznagel) don't accept the modern financial framework
- Modern finance says that risk and return are a tradeoff and for one an investor to take on more return they have to take on more risk
- A lot of the initial work under Taleb involves non-ergodicity and they tend to not accept descriptive statistics

Computer Science: Neural Networks: Activation Functions

- Last week we covered neural networks and their design
- But a key feature of them are how the neurons are set up
- Really there isn't any biology in this its purely computational and statistically driven
- To get the desired output we need to need ways to fire the right neurons to get the right output
- We need to determine a way to "activate" each neuron

Example of Neural Network



Gradients

- Machine learning is really an optimization problem at heart
- The optimization comes from finding the gradient of problem
- The gradient is the plane vector in the direction of the steepest slope
- In optimization we look at gradient descent which finds the local minimum

Vanishing and exploding gradients

- The problems is that activation functions tend to make information "deemed" less important early on less important and vice versa
- For example if you neural network missing a key piece of information early on then the activation functions may create a problem
- The opposite can happen and the gradient can explode.

Machine Learning Mastery: How to Fix the Vanishing Gradients Problem Using the ReLU (here)

Mathematics: Ergodicity & Non-ergodicity

Ergodicity

- The mathematical description that measure how a dynamical system is preserved
- Really if we get a random process or stochastic process we are interested in how much that stochastic process' properties hold
- For example we may be interested in how different fluids / gases mix over time such as smoke in a room

Applications in finance

- Ergodicity has applications to finance such as understanding how cash flows are preserved or how the economy holds
- But ergodicity fails to capture large deviations from models such as financial crises
- The creators of the left tail strategy are big proponents of non-ergodicity

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