

Data visualisation project

A simple demonstration of the use of **Vega-Lite** code to develop a visualization that provides insight beyond what maybe conventionally practicable using MS Excel or equivalents.

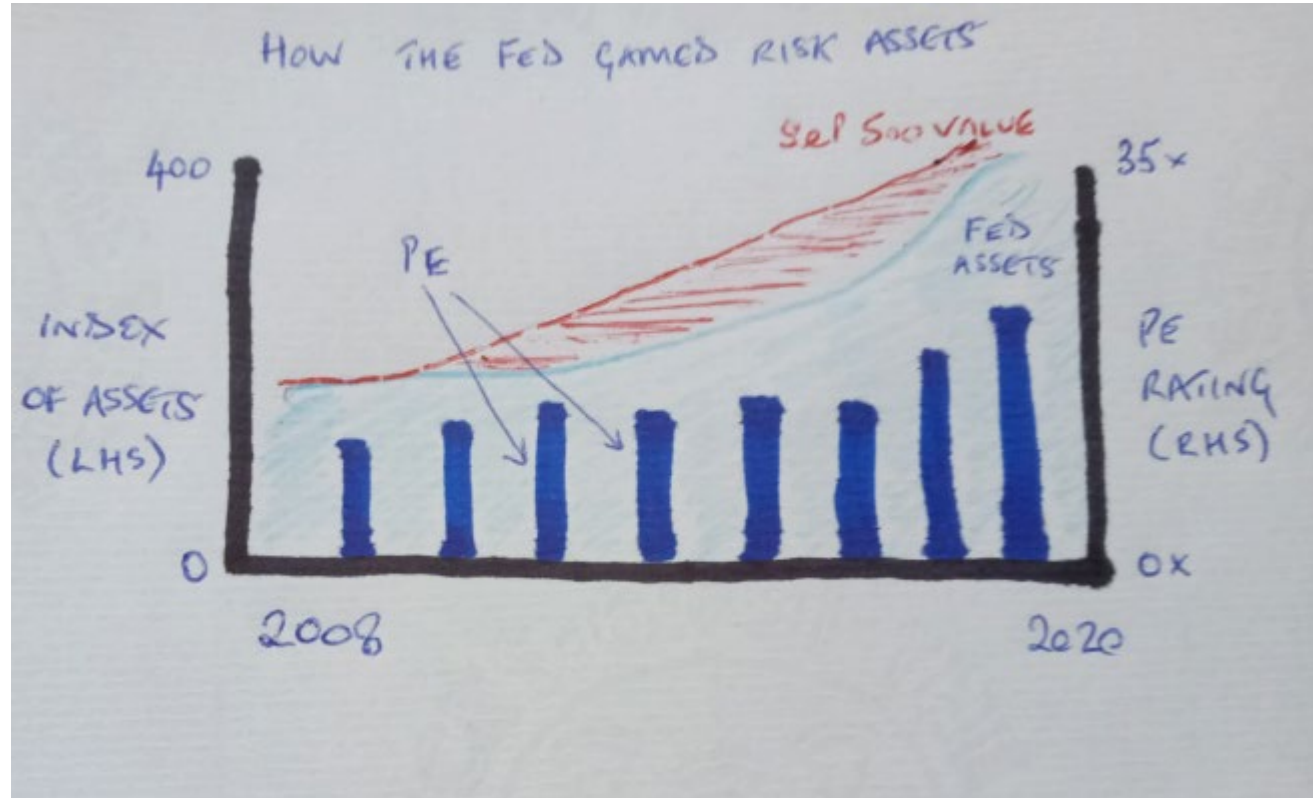
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Research Questions

- US stock markets have been on a decade plus bull run. Stock market capitalization levels have increased materially (e.g. S&P500 index). At the same time, central banks, such as the Federal Reserve (the 'FED'), have massively expanded the assets on their balance sheets. This is intriguing.
- Since 2009, what relationship, if any, is discernable between central bank asset levels (balance sheets) and stock market capitalization?
- Using the Global Financial Crisis (GFC) as a starting point & the S&P 500 as a proxy for the US stock market, have valuation ratios (multiples) for the stock market increased ?
- Has the US central bank gamed risk assets? If so, to what benefit?

The visualization, step 1

Sketching a rough visualization – the ‘*human in the loop*’



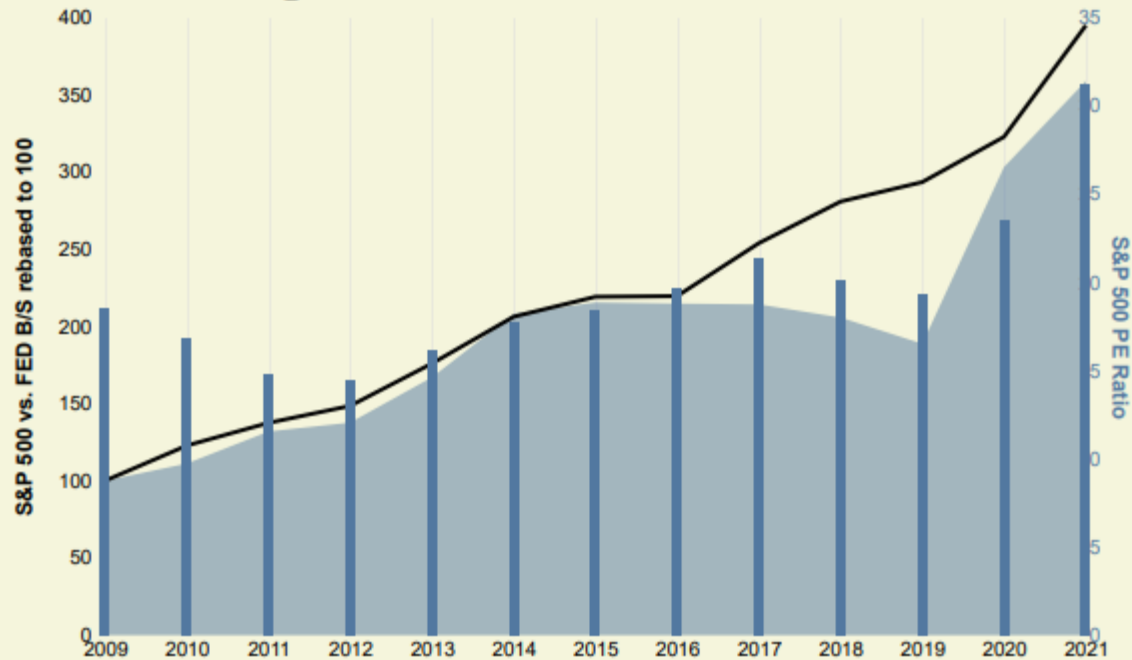
Using **superposition** to make connections & provide insight

The visualization, step 2

Getting the *'computer in the loop'*

Employing Vega-Lite to visualize the rough sketch in digital form.

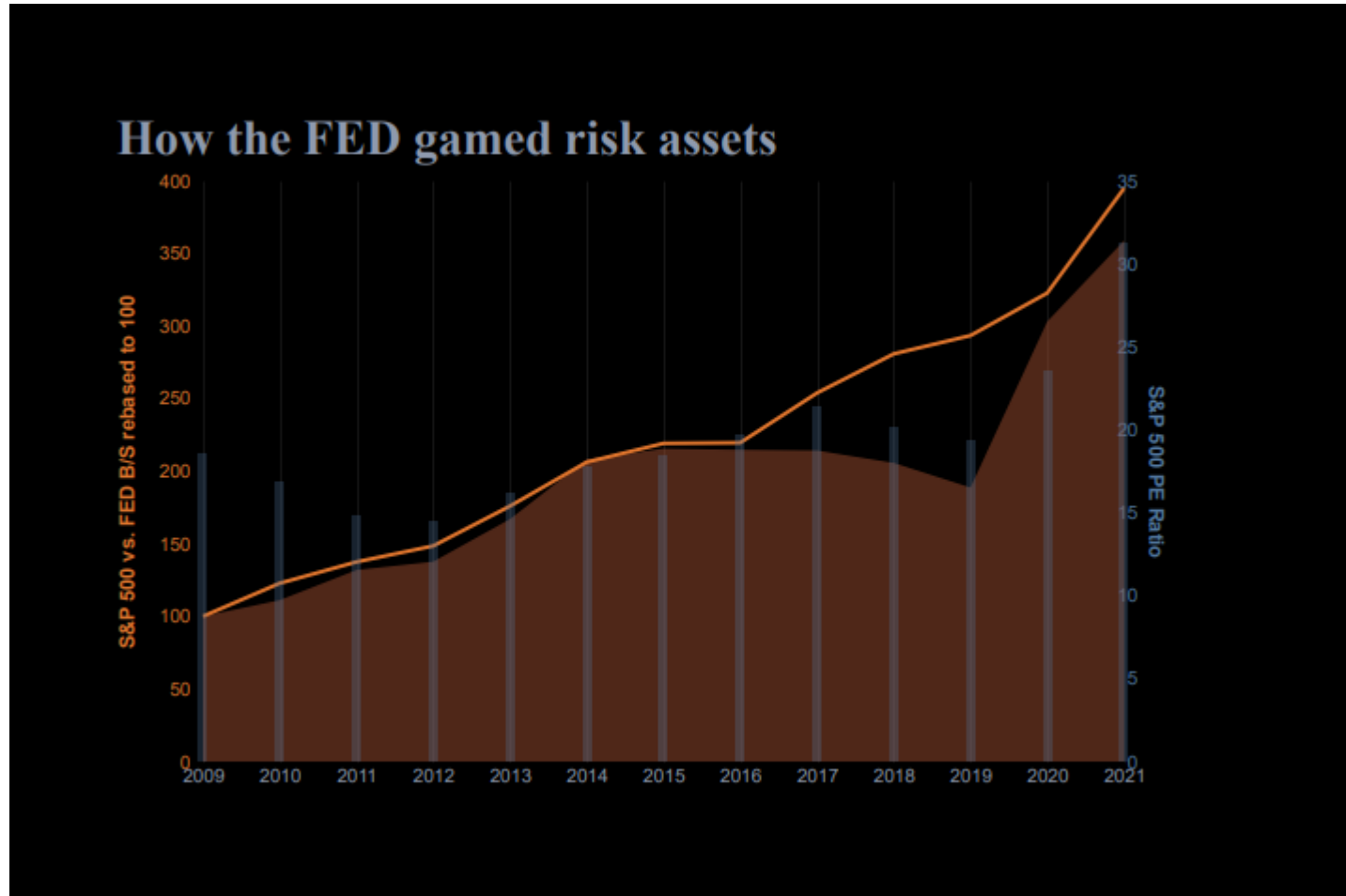
How the FED gamed risk assets



Note unintentional
obscured right hand Y axis
legend due to colours

The visualization, step 3

The final design



Taking inspiration from
*'Dicaprio refuses to date
women over 25'* (Reddit)

https://www.reddit.com/r/dataisbeautiful/comments/azjt7/leonardo_dicaprio_refuses_to_date_a_woman_over_25/

Data visualisation insights

1. From 2009 to present, the y-axis on the *left hand scale* provides a clear view of the **positive correlation** evident between the US dollar value of 'assets' held on the FED's Balance Sheet and the capitalisation level of a broad basket of large publicly listed US firms (the S&P 500 index).

NB. To aid comparability I have re-based the dollar value of FED assets and the S&P 500's market capitalization to 100 at the start point (2009). In a supposedly free-market environment, where capitalism allegedly dominates, this correlation may come as a surprise. Effectively, the narrative is that in the wake of the GFC, monetary policy by the FED has 'gamed' (intentionally or unintentionally) the stock market (it's US\$ value)

2. Using the y-axis on the *right hand scale*, we can also clearly observe an increase in valuation for the US stock market over the time period, using the PE ratio ($PE = \text{Price} / \text{Earnings}$) as a proxy. From trading at a mid-teen PE ratio in the early part of the time-series, the valuation multiple expands to >20x from the year 2017 onwards. During the most recent COVID crisis the ratio has increased to over 30x, reflecting both record highs for the stock market, with depressed profits caused by the virus. Normally, stock markets fall in value when profits are depressed & crisis reigns.

3. The choice of 2009 as a starting point for analysis is purposeful. This year saw unparalleled central bank intervention into the world economy. The action was justified at the time by the need to avoid another great depression. Some have argued that increasing asset values on the stock market reduces the cost of capital for new investment and creates a wealth affect (trickle down economics). Others have pointed out this is misleading; trickle down doesn't work. The oligarchic class has been a key beneficiary of policy choices.