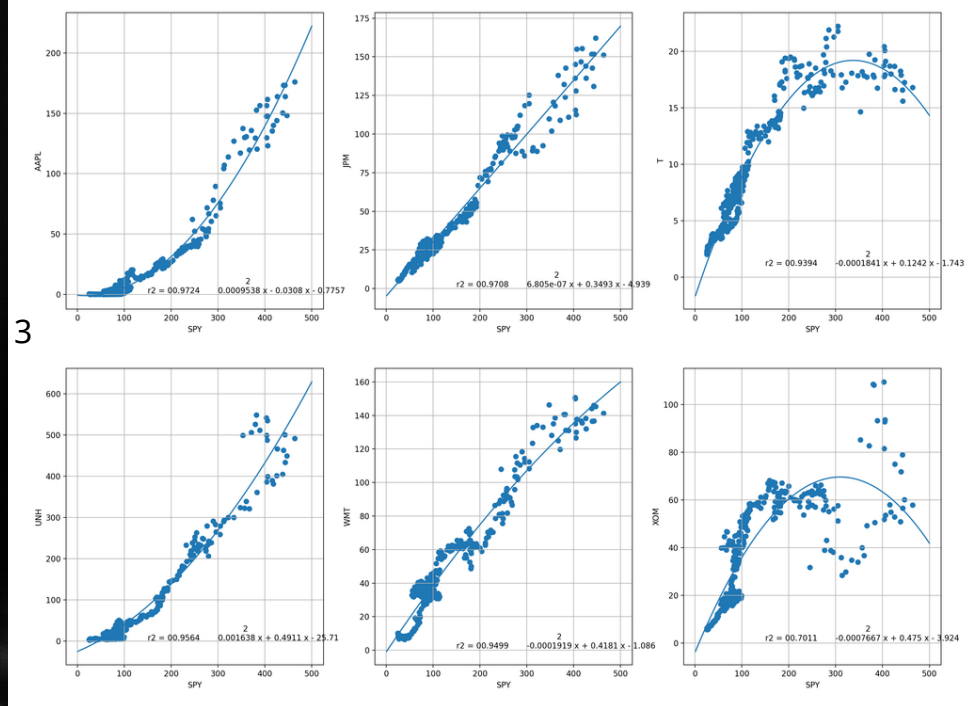


How has major world events (Asian Financial Crisis, World Financial Crisis, Covid-19) affected the US stock market in various aspects?

To analyze cumulative returns of selected stocks by sector, average future returns, volatility of future returns and correlation of selected stocks against S&P index of the three major world financial events in recent years. A portfolio of weighing of stocks is then generated to support investors based on risk-aversion level.

1

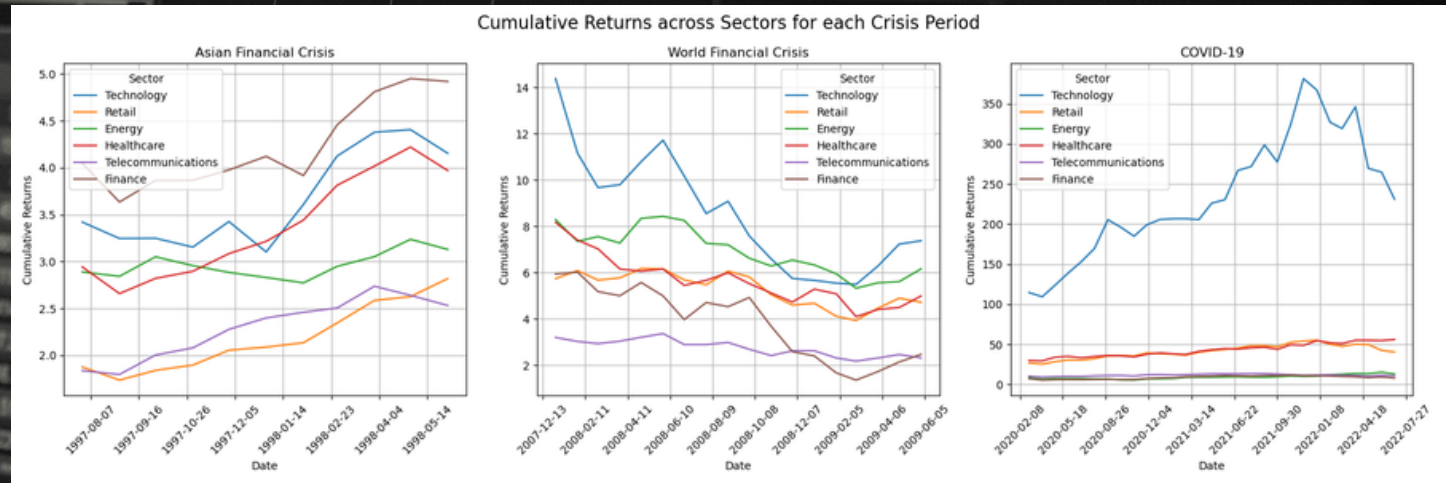
SPY vs Stocks in Different Industries



3

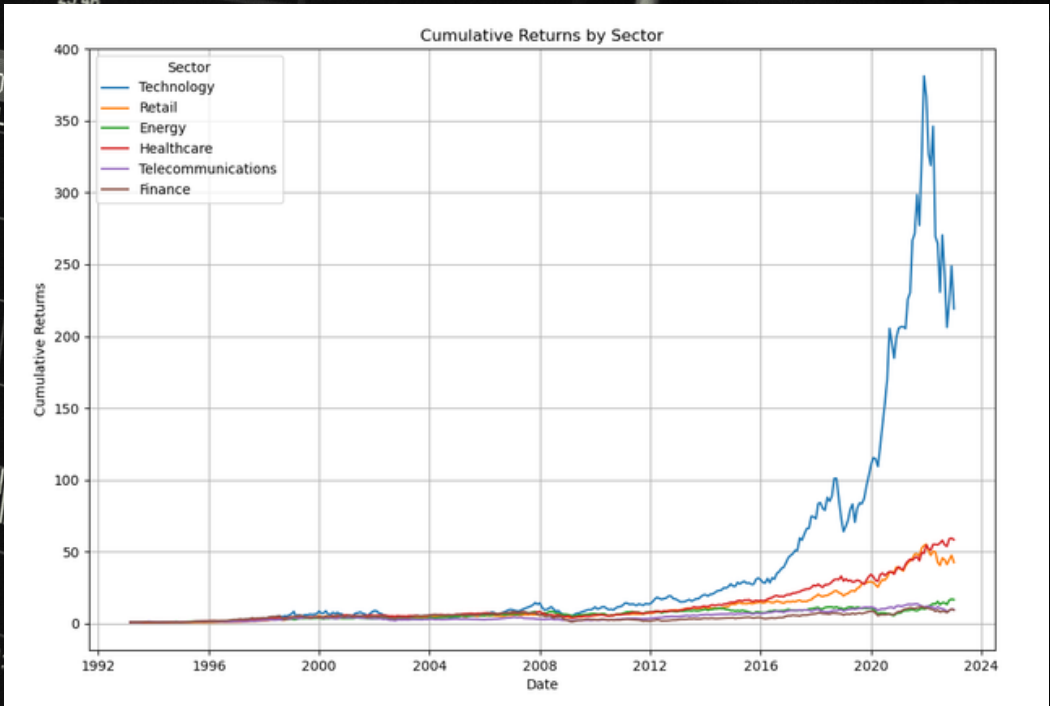
3

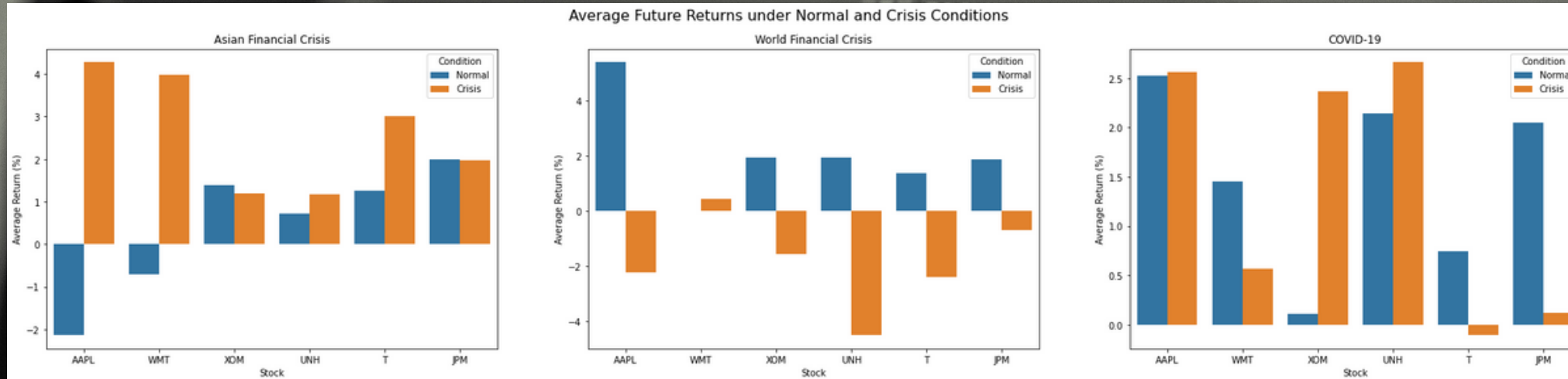
Performance of sectors by a selection of stocks during the crises



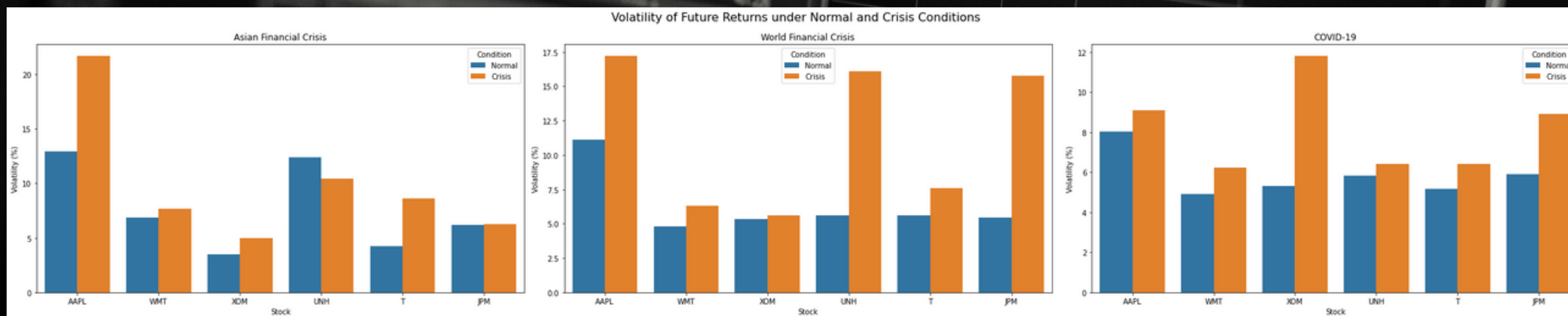
2

- Regression:
- JPM correlates the most linearly to SPY
 - AAPL is the least negatively affected stock by the crisis





- Simulation:
- Average Future Returns using Geometric Brownian motion
 - Volatility: Stocks like WMT and T relatively more stable, XOM and AAPL more volatile



Are you looking at a Normal period or Crisis period?

Normal

How much risk are you willing to take on on a scale of 0 - 50
(0 being no risk at all and 50 being a lot of risk)?

30

	0
AAPL	0.959779
WMT	0.000002
XOM	8.114777
UNH	0.000002
T	0.000001
JPM	90.925438

Are you looking at a Normal period or Crisis period?

Crisis

How much risk are you willing to take on on a scale of 0 - 50
(0 being no risk at all and 50 being a lot of risk)?

5

	0
AAPL	0.000189
WMT	0.000000
XOM	23.286362
UNH	0.000000
T	0.000166
JPM	76.713627

Portfolio Optimization:

- Based on whether you are looking at a Normal or Crisis period
- Generates weights for an optimal portfolio that minimizes the negative Sharpe Ratio