# Project 2

FINA 6333 – Spring 2024

Team 36

Introduction

Spanning over four decades, this project captures the resilience and volatility of the S&P 500, marked by a series of economic crises and recoveries. It presents a thorough analysis of the market's long-term growth trajectory, highlighting the cyclical nature of correlations among stocks during times of financial stress. The included visualizations offer a stark illustration of the spikes in correlation and betas within crisis periods, emphasizing the limited effectiveness of diversification during market turmoil. This narrative underscores the complex interplay between individual asset movements and broader economic events, providing a compelling overview of market behavior through various seasons of change.


Prices of SP500 from 1980 to 2023
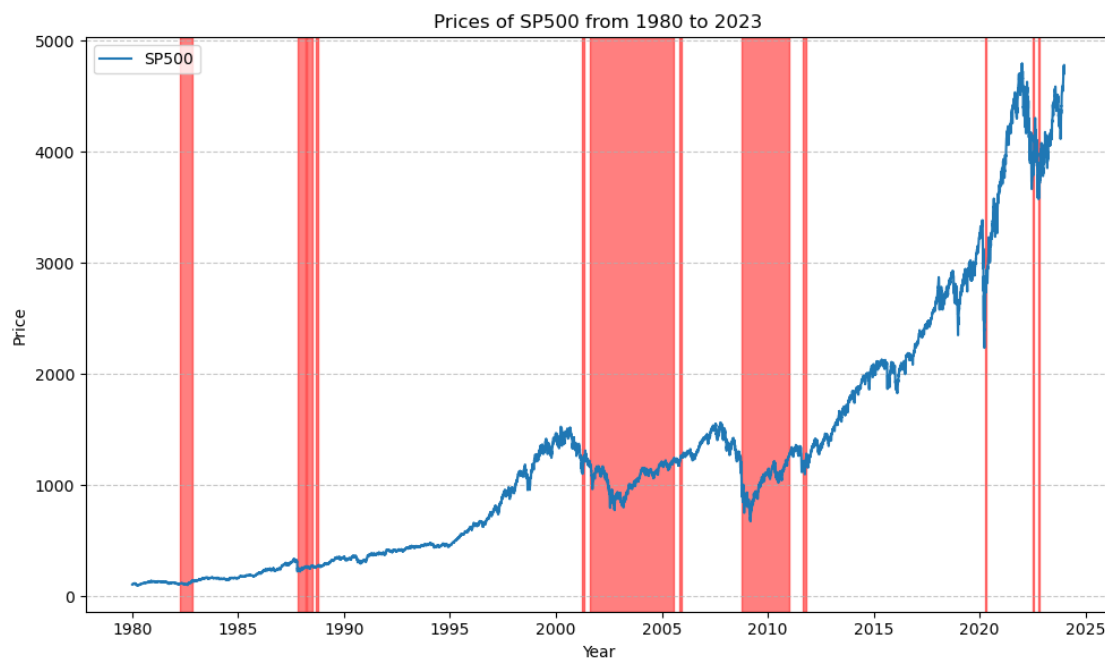
Comments:

The chart depicts a long-term upward trajectory for the S&P 500 index from 1980 to 2023, punctuated by periods of heightened volatility. These periods, shaded in red, correspond to significant historical market downturns, such as the dot-com bubble burst in the early 2000s and the 2008 global financial crisis. While these events can cause temporary setbacks, the index has exhibited a remarkable capacity for recovery, often reaching new highs. This underscores the inherent resilience of the market and the potential benefits of long-term investment strategies. Notably, the recovery timelines may vary, but the

persistent upward trend reflects both underlying economic growth and the compounding effect of market returns over extended timeframes. This visualization emphasizes the importance of understanding cyclical market behavior. By incorporating historical context and maintaining a patient approach, investors can navigate periods of economic uncertainty with greater confidence.

Monthly Mean Correlation with Highlighted Crisis Periods
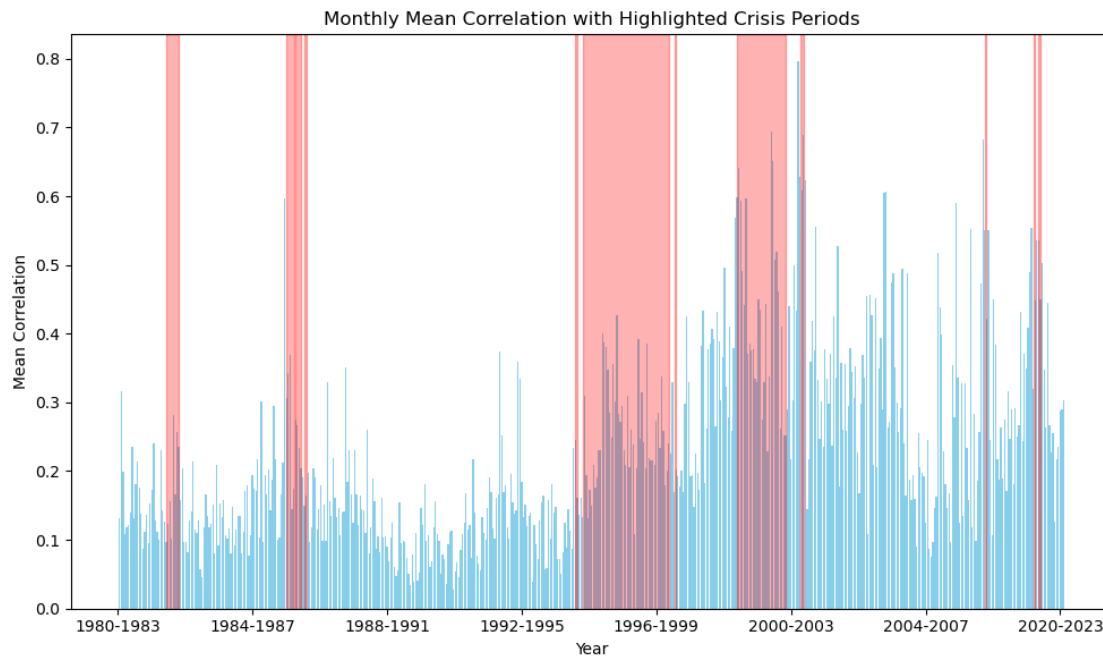
Comments:

This graph visualizes the average monthly correlation between S&P 500 stocks over period of 1980 to 2023. Red-shaded sections highlight periods of heightened correlation, which coincide with market crises. During these times, individual stocks tend to move in the same direction due to systemic shocks. The correlation spikes, particularly pronounced during economic downturns, emphasize the limitations of portfolio diversification during market stress. This is because diversification's effectiveness diminishes when asset prices become more interconnected. The graph's chronological layout, divided into year blocks, reveals the cyclical nature of market behavior. Periods of relative stability are punctuated by intervals of increased correlation, reflecting investors' collective response to significant macroeconomic and geopolitical events.

Bear vs Bull correlation

Bear vs Bull Beta
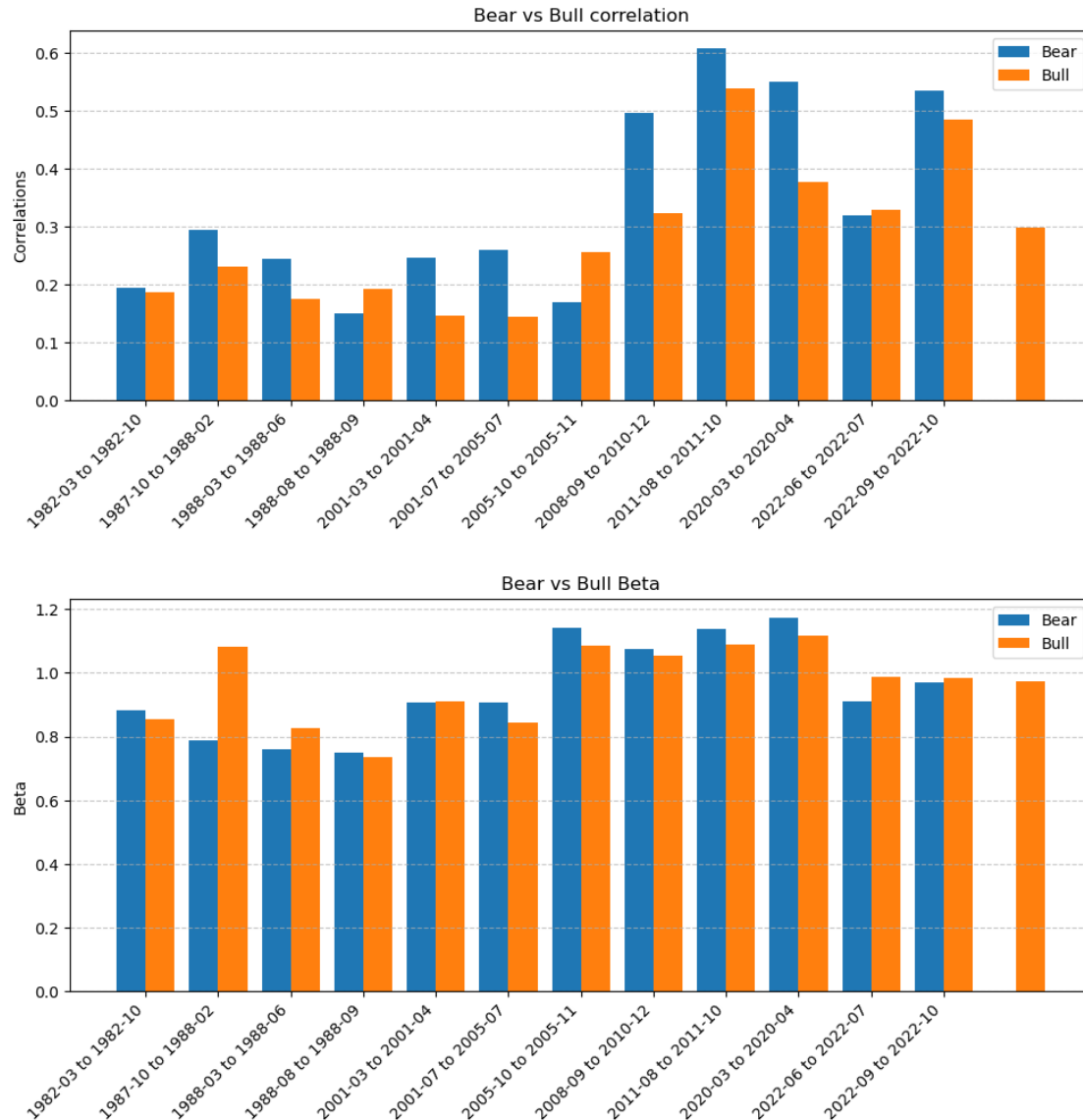
Correlation Convergence in Crises:

The adage "correlations go to one during crises" suggests that during market downturns, the price movements of individual stocks become highly correlated, moving together as a single entity in response to a macroeconomic shock. The graph of monthly mean correlations you provided does indicate increased correlations during crisis periods, evidenced by the spikes within the red-shaded areas. However, the correlations don't reach exactly one, but they do show a marked increase, signifying that while stocks tend to move more closely together during crises, they still retain some level of individual price movement. This could be due to factors such as differing levels of sensitivity to the crisis cause, varying fundamentals among companies, and the presence of stocks that may be countercyclical.

CAPM Betas in Crises:

For CAPM betas, a similar pattern might be expected, where beta values increase during crises because betas measure the sensitivity of a stock's returns to the market returns. In turbulent times, many stocks are likely to follow the market more closely, which could result in higher beta values. This relationship hinges on the idea that market risk (systematic risk) becomes more pronounced during crises, and as a result, the stock's price reacts more strongly to market movements. However, whether betas move uniformly higher during crises would depend on each stock's characteristics and how they relate to the crisis. To convince of this pattern, one would analyze beta values over time, highlighting changes during the identified crisis periods and comparing them to more stable periods.

Weaknesses of the Analysis

One potential weakness in the correlation analysis is that it treats all crises as homogeneous events when, in reality, each crisis has unique causes and effects. Moreover, it doesn't account for possible lag effects where correlations might increase before or after the visually identified crisis period. For CAPM betas, the analysis may not consider changes in the risk-free rate or the market risk premium, both crucial components of the CAPM. These rates can fluctuate significantly during crises, affecting beta calculations.

Possible Solutions

To address these weaknesses, a more granular analysis could be conducted that examines the lead-up and aftermath of each crisis, potentially using a wider window to capture pre- and post-crisis correlation movements. Incorporating event studies that analyze how specific stocks react to individual crisis events could provide more nuanced insights. For CAPM beta analysis, ensuring that the risk-free rate and market risk premium are accurately captured during crisis periods would refine the beta estimates. Including a variety of models, like the Fama-French three-factor model, which accounts for size and value factors, could provide a more comprehensive view of the market during different economic climates.