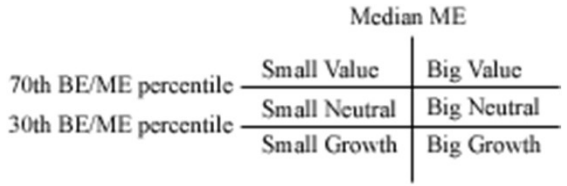
Literature Review

- Market Indicators
- Technical Indicators
- Fundamental Economic Indicators

Dependent Variables

- Farma-French's 2*3 portfolios based on Size and Book-to-Market
  - SMALL LoBM
  - ME1 BM2
  - SMALL HiBM
  - BIG LoBM
  - ME2 BM2

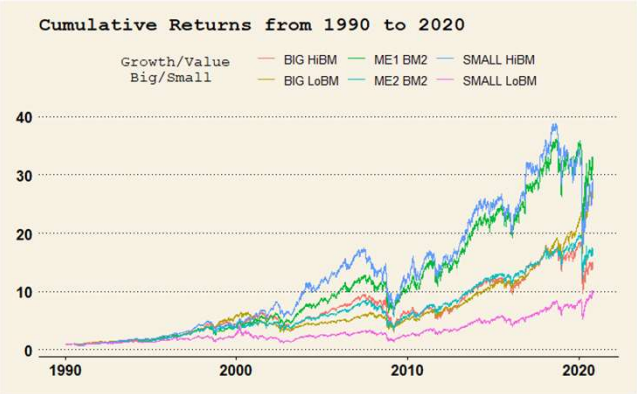


- Farma-French's 5 portfolios based on sectors
  - Consumer
  - Manufacturing
  - High technology
  - Health care
  - Others
- Overall Market: SPY index

Three Types of Indicators

- Market Indicators:
  - CBOE VIX
  - CBOE Equity Put-Call Ratios
- Technical indicators (all based on the overall market index SPY):
  - MA (5, 10, 50, 100, 200 days from SPY)
  - Relative Strength Index (below 30 is oversold, above 70 is overbought)
  - Bollinger Band (lower band, 20 day MA, upper band)
- Fundamental indicators
  - Unemployment rate
  - CPI growth rate
  - PPI growth rate
  - San Francisco Tech growth rate

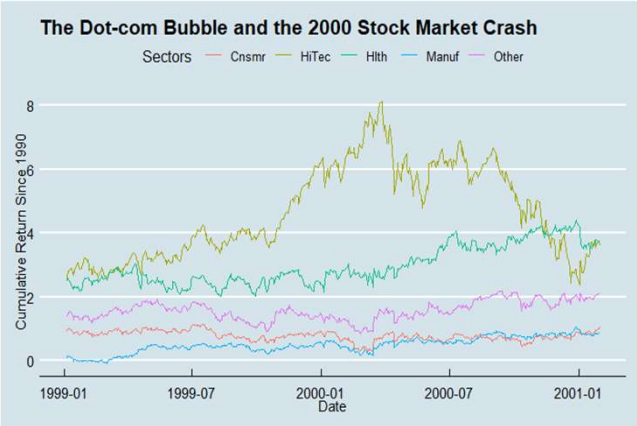
Preliminary Findings: General Trend from 1990 to 2020

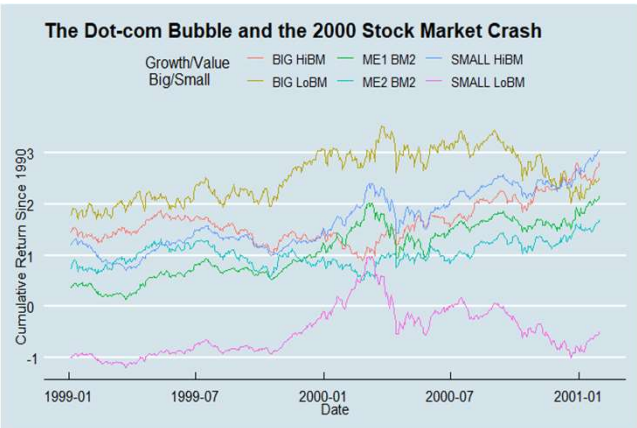


Key Observations:

- Small value stocks tend to do very well in the long run
- Growth stocks tend to generate less returns than value stocks
- Small growth stocks do not do very well
- The healthcare sector generated most returns
- The consumer sector experienced less maximum downfalls and volatilities
- The manufacturing sector did not generate much profits in more recent years

Visualizing the Dot-com Bubble and the Market Crash of 2000-2001

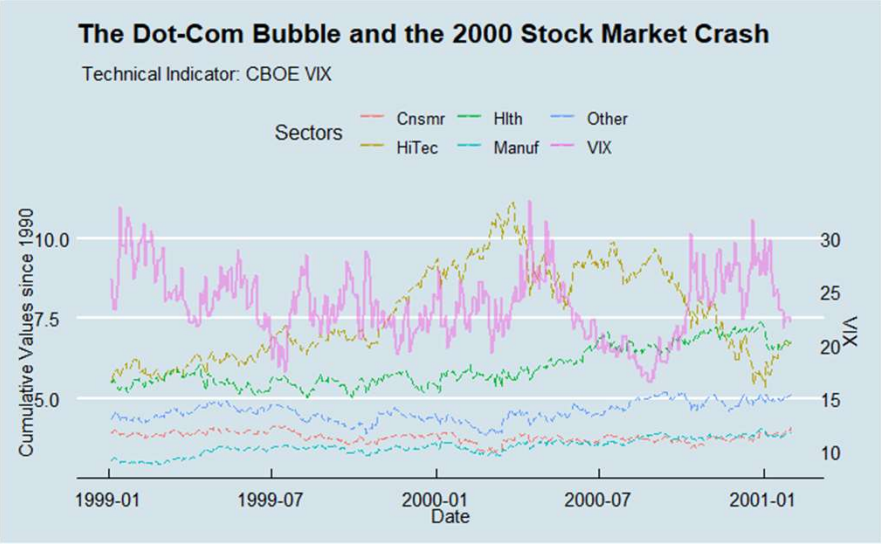




Key Observations:

- The high technology sector experienced the most increase before the bubble popped
- Other sectors did not experience too much downfall during this market crash
- But even if the technology sector had decreased, their values are still quite close to when the bubble started
- Small-cap growth stocks experienced the most volatilities during the same time
- They were not able to jump back very soon as compared with other stocks
- Big-cap growth stock instead seem to do quite well in the meanwhile
- Both big-cap and small-cap values stocks performed better than others during the crisis

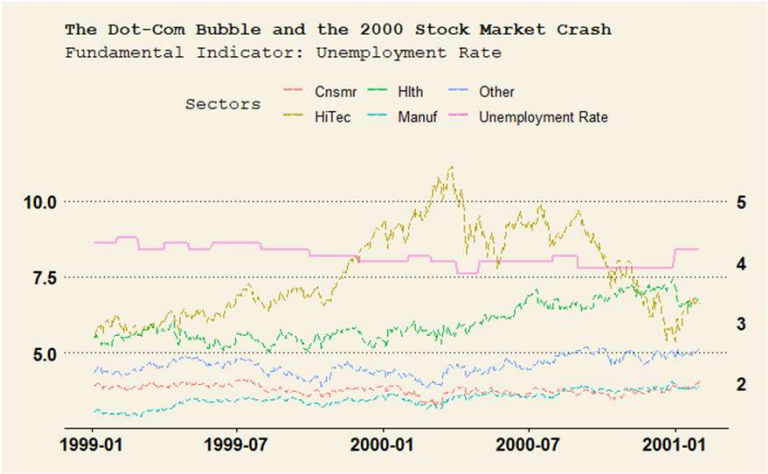
Visualizing the Dot-com Bubble and the Market Crash of 2000-2001

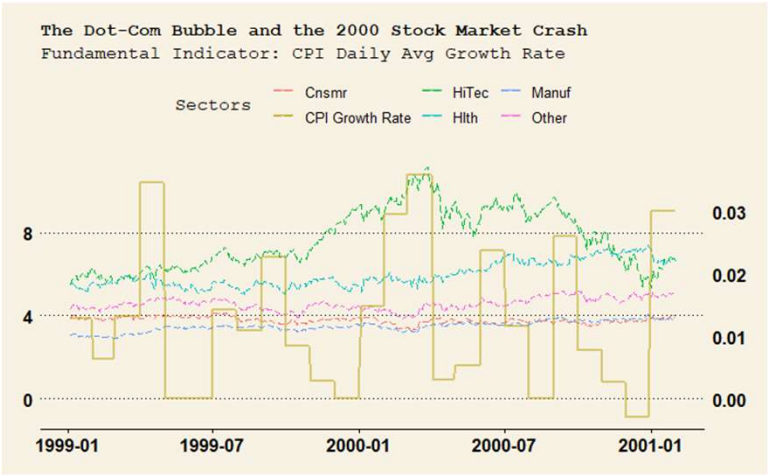


Key Findings:

- Highest volatilities one year before the market crashed
- Lowest volatilities soon before the market reached the peak and crashed later
- Relatively higher volatilities when the market reached its bottom

Visualizing the Dot-com Bubble and the Market Crash of 2000-2001

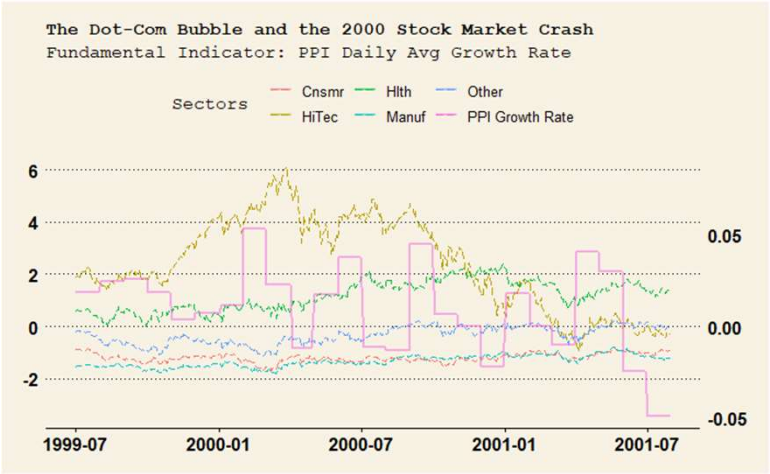


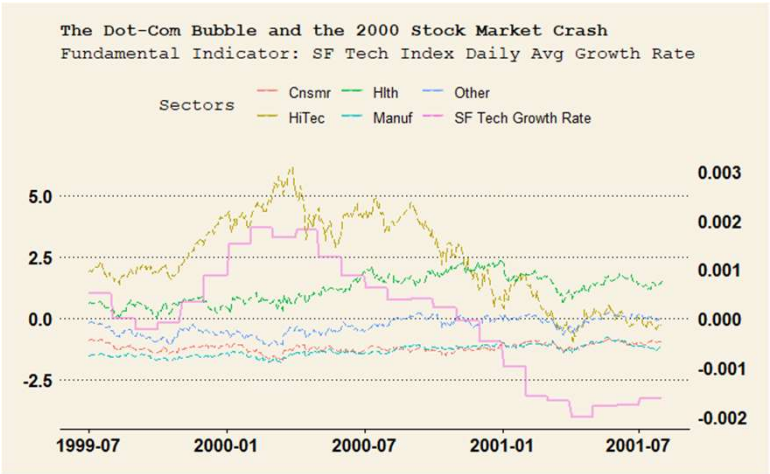


Key findings:

- Unemployment rate did not experience too much oscillation during the Dot-com Bubble market crash
- CPI growth rates experienced normal seasonal changes

Visualizing the Dot-com Bubble and the Market Crash of 2000-2001

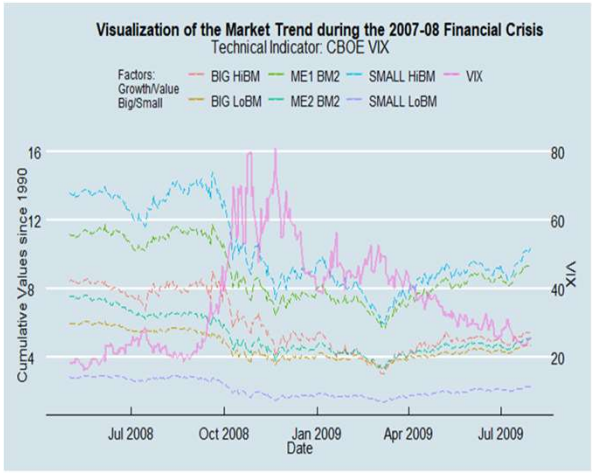


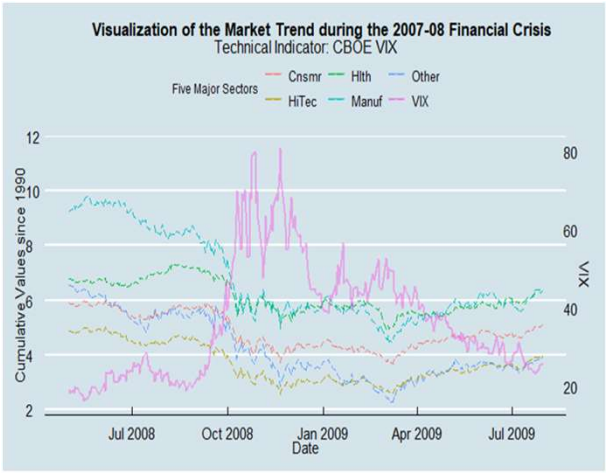


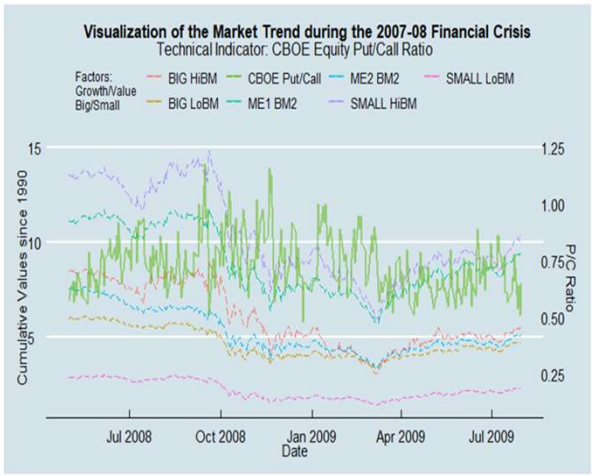
Key findings:

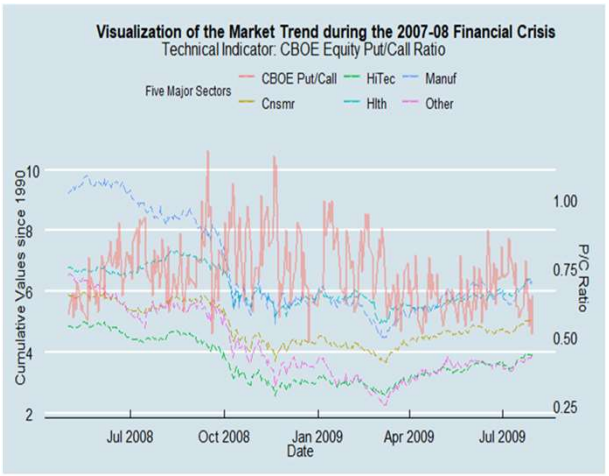
- PPI growth rates slightly decreased during the same period
- The San Francisco Tech Index growth rates are quite synchronized with the high technology sector of the market

Visualizing the Market Trend During the 2007-08 Financial Crisis





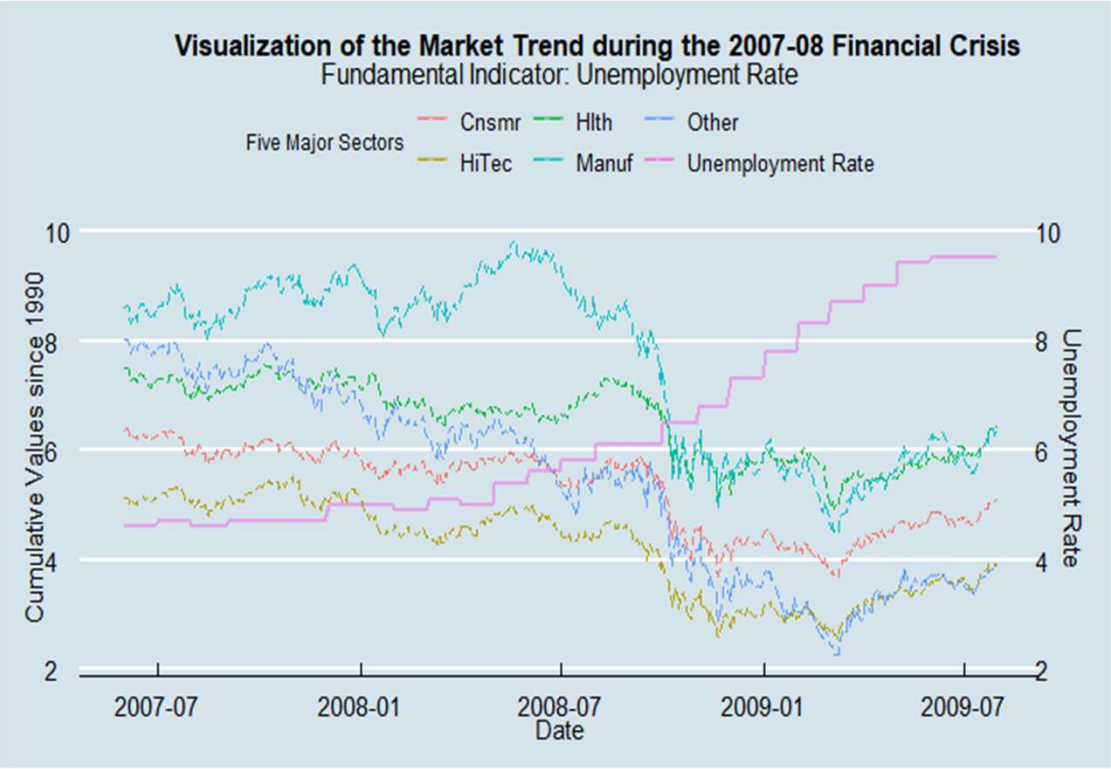




Key Findings:

- The manufacturing sector still experiencing another peak until the mid-2008 while other sectors started going down after reaching the peak since October 2007
- The volatility index remained low soon before the market started to plunge
- The volatility index reached two peaks, after the second of which the market started recovering
- Put/call ratios experienced more ups and downs than VIX during the same time
- Higher put-call ratio when the market did not reach the bottom

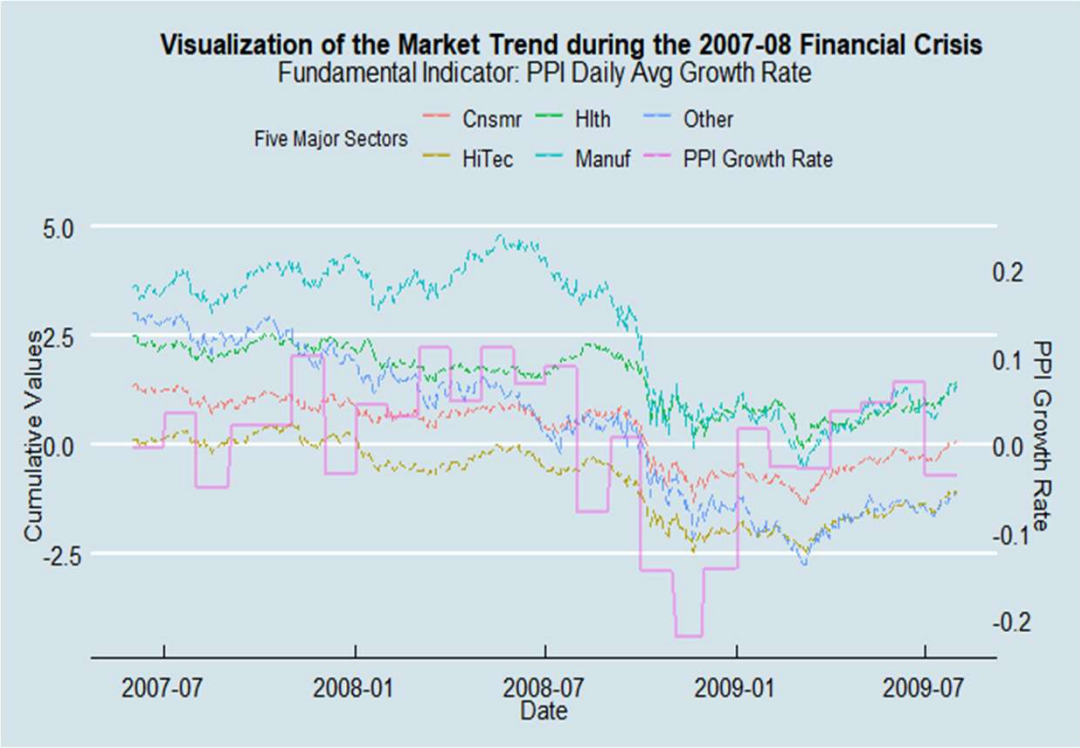
Visualizing the Market Trend During the 2007-08 Financial Crisis: Fundamentals: Unemployment



Key Findings:

- Unemployment rates already steadily decreasing starting in late 2007 and early 2008, several months, and continued to increase during the crisis
- Employment rates continued to increase after the market hit the bottom in March 2009 and took a long time to recover

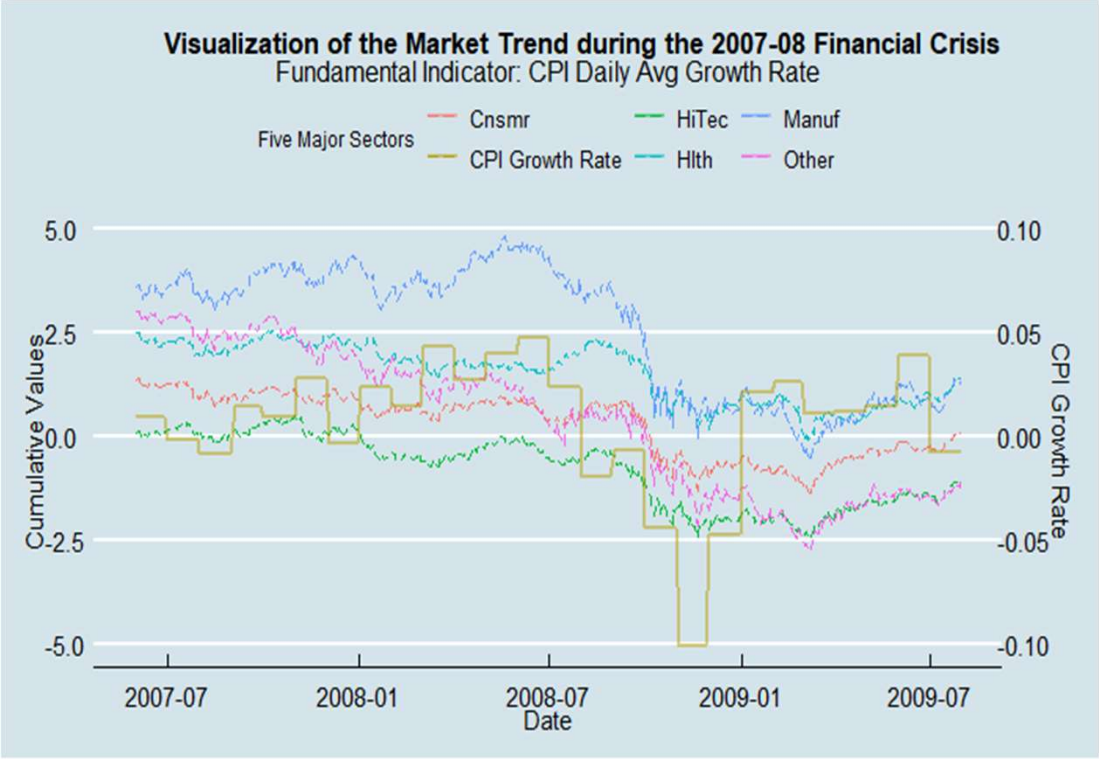
Visualizing the Market Trend During the 2007-08 Financial Crisis: Fundamentals: PPI Growth Rate



Key Findings:

- PPI growth rates were not significantly affected in the early time of the crisis
- PPI growth rates only started declining until the financial crisis had almost ended
- PPI growth rates were able to rebound back before the market found its bottom several months after

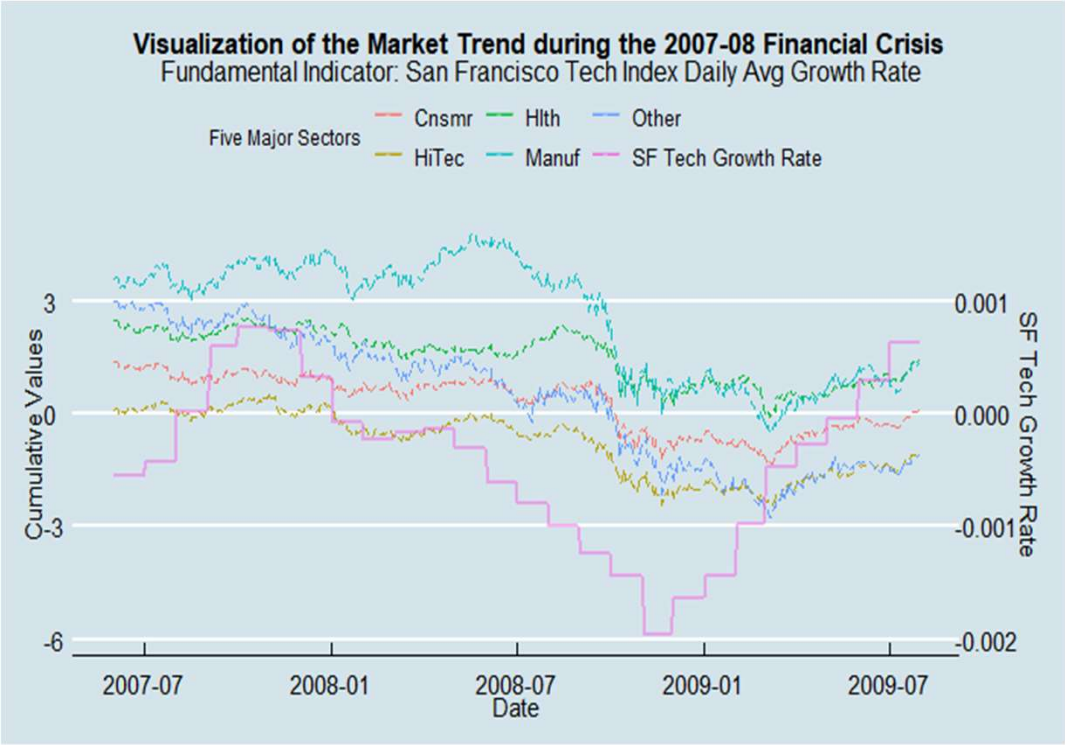
Visualizing the Market Trend During the 2007-08 Financial Crisis



Key Findings:

- CPI growth rates experienced certain lags to decrease after the market
- CPI growth rates decreased quickly during the middle of the crisis
- CPI growth rates found the bottom 2 months before the market reached its bottom

Visualizing the Market Trend During the 2007-08 Financial Crisis



Key Findings:

- San Francisco Tech Index growth rate was pretty responsive to the financial crisis and the market trend
- It reached its bottom several months before the market reached the bottom
- It was able to jump back very rapidly

Summary of Findings from Visualizing the 2007-08 Financial Crisis

Summary:

- Unemployment rates slightly increased before the financial crisis and market crash and took significant time to recover
- CPI growth rate was only affected during the very acute time of the crisis and was able to jump back before the market reached the bottom
- PPI growth rate was similar to CPI growth rate in that it was less affected in the beginning and was able to jump back very quickly
- The capital-intensive SF Tech Index growth rates experienced sharp declines in the beginning of the crisis and continued to plunge with the market
- SF Tech Index growth rates reached the bottom 4 months before the market