News Implied Volatility and Disaster Concerns

Authors:
Asaf Manela
Alan Moreira

Discussant:
Paul Tetlock, Columbia University
Idea

- Measure investors’ fears of stock market uncertainty using the text of front page WSJ articles
Identification

- *WSJ* news selection reflects topics of interest to investors
  - The front page features investors’ primary interests

- Option-implied volatility (VIX) reflects investors’ fears
  - Prices of options on the market increase with fear of “disasters”
    - Disaster: a long period of reduced consumption (-15% to -30%)

- Proxy for uncertainty/fear using words in high VIX months
  - NVIX is fit to mimic the implied volatility of options on the market
Key Tests

- Establish the validity of the uncertainty measure (NVIX)
  - Predict stock market volatility out of sample
  - Predict economic disasters out of sample

- Apply the uncertainty measure
  - Decompose NVIX into categories of investors’ concerns
    - War, government, intermediation, etc.
  - Predict stock returns out of sample
    - High (disaster) risk = high expected returns in several theories
Main Findings

- NVIX predicts volatility (implied and realized)
  - $R^2$ values ranging from 16% to 20% (not 34%)

- NVIX predicts disasters based on models
  - $t$-stat between 1.5 and 2.0 in most specifications

- High values of NVIX are associated with words related to “war” and “government” (disasters?)

- NVIX predicts stock returns
  - Magnitude/significance peaks around the 12-month horizon
  - “War” words are especially predictive of stock returns
Goal: Estimate Fear of Disasters

- NVIX is a novel measure of stock market uncertainty
  - It could reflect investors’ fears of disasters
  - Textual data can be used to estimate disaster expectations

- NVIX is designed to mimic VIX (option-implied volatility)

- But VIX is not closely related to disasters
  - “Conventional measures of financial volatility have virtually no information about impending transitions into a disaster regime”
    - Page 3 of the introduction
Past Volatility vs. NVIX

- Besides, past S&P volatility mimics VIX better than NVIX
  - $R^2$ of 83% based on past volatility vs. 20% based on NVIX

Graph showing comparison of VIX and Past S&P Volatility over time from Jan-86 to Jan-14.
Model-based Disaster Expectations

- Disasters occur only in the early years (before 1950)
- But NVIX is based only on recent data (1986 onward)

Figure 5: Filtered Probability that the Economy is in a Disaster State, $I_t^D = \text{Prob}(s_t = 1|y^T)$
An Alternative: News Implied Disasters

- Estimate disaster probabilities using NSBU (2013)
  - Use economic and financial data (as the authors already do)

- Estimate the model using data that contains disasters
  - Early part of sample (pre-1950) in multiple countries

- Determine which words are associated with disasters

- Examine model implications for US and recent data
  - Disaster probabilities; and the words associated with disasters
  - Stock return predictability; and VIX and the variance premium
Interpreting the News

- Some findings depend on word categorization methods
- SVM used to determine word combinations linked to VIX
- WordNet used to form topics and decompose NVIX
  - Alternative is to apply a topic algorithms such as LDA
- Government: “tax, money, rates, government, plan”
  - Should government include “treasury” and “Washington”?
- Intermediation: “financial, business, bank, credit, loan”
  - Should “money” and “rates” be part of intermediation?
Predicting Stock Returns

- NVIX predicts returns in the 1945-2009 sample
  - Not in the early 1890-1944 sample

- War and Government topics are the most important
  - War: “war, military, action, world war, violence”

- War robustly predicts stock returns across subsamples
  - Intuitive positive relation between (disaster) risk and return

- Government only works in the 1945-2009 sample
  - Questionable whether high taxes represent a disaster
Relating Topics to Disasters

- Are the “war” and “government” topics associated with disaster probabilities?
  - Are other topics associated with disasters?
  - Again, a direct approach would eliminate any doubt

- Predictability from NVIX and its components should be interpreted in light of previous results
  - Bekaert and Horoeva (2014, JE) decompose VIX and find that VP predicts returns and conditional volatility predicts economic activity
    - Their findings extend those in Bollerslev, Tauchen, and Zhou (2009, RFS)
Concluding Thoughts

- Creative and clever use of textual data
- Intriguing evidence on words linked to return volatility
  - But we can already measure and forecast volatility fairly well
- Which words relate to investors’ disaster concerns?
  - Disaster probabilities are otherwise difficult to assess
- This study has the potential to shed light on the link between economic disasters and stock market activity