Economic Narratives and Market Outcomes: A Semi-supervised Topic Modeling Approach

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This paper

1. Use natural language methods to automate Shiller's narratives idea
2. Panic narrative index helps predict excess stock market returns, and volatility
3. For monthly excess return predictions, Panic has an in-sample R^2 = 4.2% and an out-of-sample R^2 = 2.6%

Data

- Data: 6.8 million NY Times articles 1871 – 2019
  - 3,800 articles per month
  - Articles average 493 Ngrams (i.e. cleaned up words)
  - Both vary over the decades

- Market data
  - S&P index monthly from Global Financial Data starting 1871
    - Daily as of 1927
  - Risk-free rates from Ken French and from Welch and Goyal (2008)

narrative

1. a story or account of events, experiences, or the like, whether true or fictitious.
2. a book, literary work, etc., containing such a story.
3. the art, technique, or process of narrating, or of telling a story: Somerset Maugham was a master of narrative.
4. a story that connects and explains a carefully selected set of supposedly true events, experiences, or the like, intended to support a particular viewpoint or thesis: *to rewrite the prevailing narrative about masculinity; the narrative that our public schools are failing.*

https://www.dictionary.com/browse/narrative

Narratives

- Use a list of seed words fed into an sLDA algorithm to create a set of categories called topics that the paper calls narratives.

- Methods used here do not create or isolate stories that connects or explains events

- The paper actually has categories
  - defined in an unusual manner
  - no clear theoretical foundation (partly due to Shiller's pop writing)
  - lists of key words

Not Topics and Not Sentiment

1. Panic (Panic)

bank failure, bank panic, bank run, crisis, depression, downturn, epidemic, fear, financial panic, great depression, great recession, hard time, pandemic, panic, recession, tension, war

2. Confidence (Confidence)

autosuggestion, business confidence, confidence, consumer confidence, crowd psychology, suggestability

3. Frugality (Saving)

compassion, extravagance, family morale, frugal, frugality, modesty, moral, poverty, save, saving

4. Conspicuous Consumption (Consumption)

american dream, conspicuous consumption, consumption, equal opportunity, equality, homeownership, luxury, patriotism, prosperity

5. Monetary Standard (Money)

bimetallism, bitcoin, cryptocurrency, devaluation, gold, gold standard, inflation, monetary standard, money, silver

6. Technology Replacing Jobs (Tech)

artificial intelligence, automate, computer, digital divide, electronic brain, internet, invention, labor save, labor save machine, machine, machine learn, mechanize, network, robot, technocracy, technological unemployment, technology, unemployment

7. Real Estate Booms and Busts (Real estate)

boom, bubble, bust, crash, flip, flipper, home index, home ownership, home price, home purchase, house bubble, house index, house market, house price, land boom, land bubble, land price, price increase, real estate, real estate boom, real estate bubble, speculation

Not Topics and Not Sentiment

8. Stock Market Bubbles (Stock)

advance market, bear, bearish, boom, boom and crash, bubble, bull, bull market, bullish, bust, crash, earnings per share, fall market, inflate market, margin, margin requirement, market boom, market bubble, market crash, price earn ratio, price increase, sell short, short sell, speculation, stock, stock crash, stock market boom, stock market bubble, stock market crash, stock market decline

9. Boycotts and Evil Business (Boycott)

anger, boycott, community, evil business, excess profit, fair wage, moral, outrage, postpone purchase, profiteer, protest, strike, wage cut

10. Wage and Labor Unions (Wage)

consumer price, cost of live, cost push, cost push inflation, high wage, increase wage, inflation, labor union, rise cost, wage, wage demand, wage lag, wage price, wage price spiral

Concerns

- What exactly are these categories?
  - The labels are emotional and only loosely connected to the key words
  - To me the categories seem somewhat inconsistent and poorly separated
- What justifies grouping these words in theory?
- What validates grouping these words in the cross-section?
  - Within or across articles?
- What validates grouping these words in the time-series?

The data generating process?

The paper does not give much thought to the underlying data generating processes

1. An event actually happens in the world
2. It may or may not be reported in the NY Times, and elsewhere (WSJ, Bloomberg, newswires, etc.)

How and when do market participants actually learn about it?

Do different market participants learn about it at the same time?

NY Times as data?

1. The NY Times prints things that they think their audience will be interested in reading: Affluent New Yorkers
2. The WSJ prints things that they think their audience will be interested in reading: People interested in Wall Street

- WSJ has many business news stories that may affect markets, including many that NY Times readers might find boring.
  - NY Times is probably a biased reflection of information that moves markets
  - Gentzkow and Shapiro, 2008 “Competition and Truth in the Market for News”, JEP

- Take articles seriously: Multiple connected articles suggests that it is big

Data generating process?

- Normally in an event study we focus on events that are not simultaneous with other events.
  - This is to avoid confounding and misinterpreting the driving force
- The NY Times data has 3800 articles a month
  - About 150 articles a day
  - The NY Times chose to divide its pages into these distinct articles
  - The method in this paper seems to treat all 3800 articles as one big “bag of words”.
  - If narrative is intended to measure sentiment could be a justification.
    - “Are the article writers in a good mood this month?”
    - But the word lists have words for opposite sentiments within a narrative
- Words are used very differently in different decades
  - Extreme examples: OPEC, Covid, Patriotism
  - Pooling across many decades may be problematic

Evidence for Narratives? Suggestion

- Use ML methods to see if articles and/or words naturally cluster in anything like the assumed “narrative” categories
  - Various clustering methods. Might even use something like principal components
- If “no”, then how do the words and the articles cluster?
  - How much variation over time?
  - Does pooling words from distinct articles matter?
  - Does “news” differ from “analysis” and from “editorial” stories?
- How do we distinguish words or articles that define a topic, a sentiment, a narrative?

What is this data actually like?

Stock returns process

Frank and Sanati, 2018, "How does the stock market absorb shocks?" JFE

- Financial Times 1982-2013, firm level data, S&P 500 firms
- Use ML methods to define news topics
- Distinguish good news and bad news

- Typical stock market reaction
  - Good news: positive overreaction
  - Bad news: negative underreaction

- Why? Retail investors are long only, institutions try to take advantage
  - Depends on how busy the institutional investors are
  - Can take a long time to fully undo some pricing biases
  - Market microstructure issues are more important than specific news topics

Paper's Hypothesis: Panic = risk aversion

- Risk aversion is a property of an investor.
- Panic is a property of the currently reported news.
  - Traditionally we assume investor preferences are exogenous and time-invariant
  - Traditionally we assume news is time varying

- How do we justify using one as a proxy for the other?

Panic vs other factors?

- Literature on stock returns has a huge number of factors
  - Harvey, Liu, and Zhu, 2016. "… and the cross-section of expected returns", RFS
  - Few people defend the CAPM – perhaps not a good benchmark for long run returns
  - Do Panic and the PLS index have information beyond the known factors?

Instability over time

- PLS mainly works 1950-1999
- Panic mainly works 2000 – after
- Why? We are not told.

- Paper page 38: “Overall, this analysis confirms the economic significance of news narratives in an out-of-sample context and the importance is increasing over time.”
  - Wishful thinking?
  - The instability of PLS and Panic needs to be properly explained before we accept it as more than accidental overfitting

Where does this leave us?

This is an interesting start on a very ambitious topic.

1. What is a narrative really?
   - What categories can we justify theoretically?
   - What can we justify empirically?
2. How and why is the news created?
   - What is an article? Are there links in the cross-section or the time series?
   - What biases are associated with NY Times? How does that affect the interpretation of the estimates?
   - Gentzkow and Shapiro 2006 JPE, 2008 JEP, 2010 Econometrica, etc.
3. How are stock returns generated?
   - Address known factors and effects
   - Show how this goes beyond Frank and Sanati 2018 JFE
   - How does the market interact with the news creation process?

- Lots of interesting work lies ahead to pin this down