Narrative Triggers of Information Sensitivity

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Purpose of the paper

What did eventually calm the European money markets? Governor Draghi's statement "we will do whatever it takes - and you better believe it is enough". This is as opaque a statement as one can have. There were no specifics on how calm would be reestablished, but the lack of specific information is, in the logic presented here, a key element in the effectiveness of the message.

- Bengt Holmstrom (2015).

Purpose of the paper

- Identify news content that triggers companies to become information sensitive or information insensitive.
- Study how (journalist related) language used in the newsarticle affects these possible triggering news content.

Information Sensitivity

- Dang, Gorton and Holmstrom (2015) argue that debt markets are by design information insensitive.
- During normal periods, the cost of acquiring precise information about the collateral of the debt contract is higher than the value of that information.
- When information insensitivity is preserved, money markets function properly, as agents can trade without acquiring information, because they do not have to fear that other agents acquire information on the value of the underlying collateral.

Information Sensitivity

- When *sufficiently large negative news* about the value of the debt collateral arrives, the debt turns information sensitive, as the value of the information about the collateral becomes larger than the cost of acquiring that information.
- When debt becomes information sensitive, money markets freeze, and a financial crisis occurs, as the quantities adjust to zero instead of the prices because no one wants to hold debt due to fears of adverse selection (*information view on financial crises*).

Motivation

- The information sensitivity property has been empirically confirmed in many studies.
- However, the "bad news" that trigger a switch to an information sensitive state have not been studied previously.
- It is important to understand and identify these triggers as a switch to information sensitivity (in a larger scale) causes a financial crises.

Outline of the paper/presentation

- The four parts of the paper:
  1. Measure the information sensitivity state of a company.
  2. Measure the (surprising) content in the news.
  3. Measure the language used to discuss the news content.
  4. Use the data of parts 1.-3. to analyse triggers of information sensitivity.

Measuring Information Sensitivity

- We use the value of the Google trend index and the spread of a Credit Default Swap (CDS) contract to approximate company related public information acquisition and default probability.
- We want to separate the following states/days for each company:
    1. **Information sensitive state**: Default probability and information acquisition are both high.
    2. **Information insensitive state**: Default probability and information acquisition are both low.
    3. **Trending for other reason state**: Default probability is low and information acquisition is high.
    4. **Default state**: Default probability is high and information acquisition is low.

The Gaussian Mixture Model

- The gaussian mixture model (GMM) assumes that in each state m the variables are from a different multivariate normal distributions with their own means $(\mu_1, \mu_2, ..., \mu_M)$ and covariance matrices $(\Sigma_1, \Sigma_2, ..., \Sigma_M)$.
- Simplest model as possible given the possible combinations of the two variables is four states (high-Low CDS spread and high-Low Google search index value).
- Around 1.9 million daily observations of 576 companies from December 2006 to February 2022.

Information Sensitivity

Table: Information sensitivity states of companies.

Panel A	Variable	Mean	SD	N	Share %
Trending for other	CDS spread	72.9	34.9	941,001	48.9
	Google searches	36.1	22.9	941,001	48.9
Insensitive state	CDS spread	101.7	64.0	331,201	17.2
	Google searches	0	0.1	331,201	17.2
Default state	CDS spread	3,259.5	3,500.7	75,916	3.9
	Google searches	14.5	18.5	75,916	3.9
Sensitive state	CDS spread	307.5	178.4	575,884	29.9
	Google searches	28.9	22.9	575,884	29.9

Panel B	Trending for other$_{t-1}$	Insensitive state$_{t-1}$	Default state$_{t-1}$	Sensitive state$_{t-1}$	Total share %
Trending for other$_t$	90.986	8.525	0	0.463	100
Insensitive state$_t$	24.22	69.076	0	6.661	100
Default state$_t$	0	0	97.946	2.022	100
Sensitive state$_t$	0.747	3.836	0.267	95.123	100

Information Sensitivity

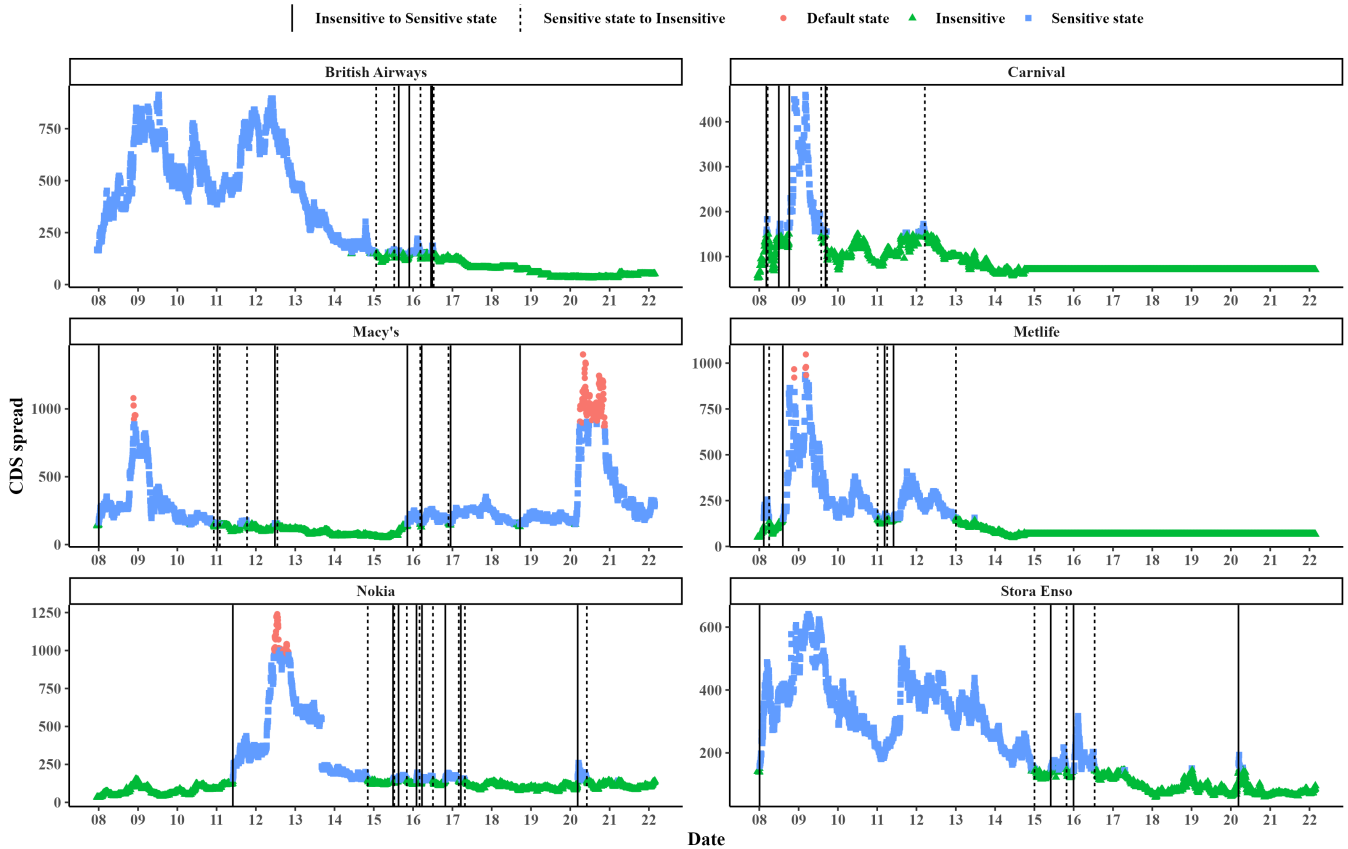

Figure: Information sensitivity states and CDS spreads for non-financial firms.

Topic Model to Measure News Content

- With D documents, V unique words and K topics in a newspaper corpus, a topic model estimates the topic proportions $\theta_{k,d}$ for each document d and topic k together with word-topic probabilities $\beta_{v,k}$ for each word v and topic k.
- We use all 4,323,637 *Wall Street Journal* article, feature and news titles from 1890 to 2022 to estimate a model with 80 topics.

Topics

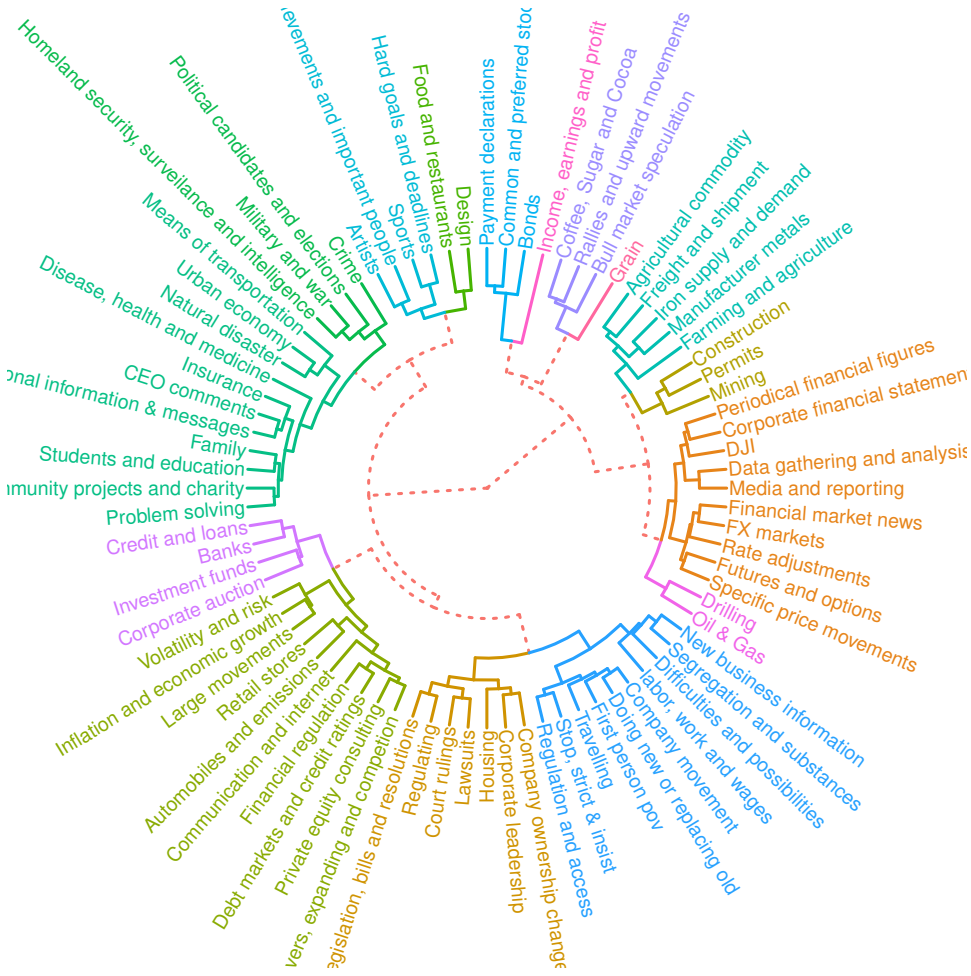

Figure: Hierarchical clustering of topics. The dendrogram plots the result of a hierarchical clustering model estimated with the topic word-distributions.

Unexpected News

- Unexpected attention means that this attention could not have been foreseen with prior information (news).
- Our approach is very similar to the procedure that Bianchi et al. (2022) used to extract biases in people's beliefs.
- We form the measure in the following way:
  1. A flexible elastic net model is estimated with cross-validation to predict tomorrow's topic distribution, given the information on topic distributions of the last 5 years.
  2. An out-of-sample prediction is made for the next day's topic distribution.
  3. The out-of-sample prediction error is used to measure the unexpected share of attention each topic has on a given day.

Example Unexpected News

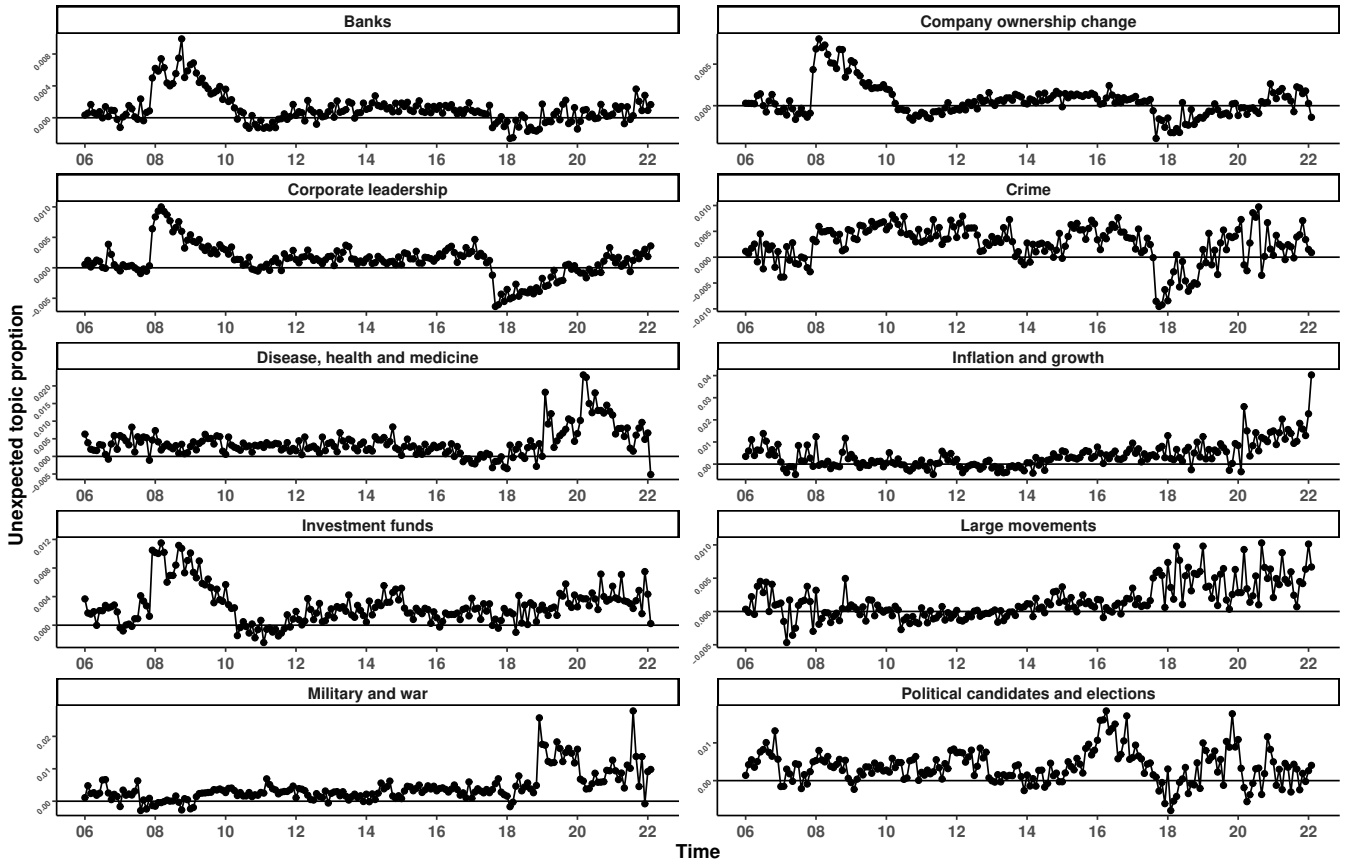

Figure: Evolution of Unexpected News in Selected Topics. The figure plots the unpredictable part of topic's daily prevalence for each topic aggregated to a monthly level across the period 2006–2022.

Measuring language used by reporters

- News is supposed to be an objective source of information about events of different levels of importance.
- However, the writing style, creativity and language used can vary across journalists.
- These aspects of the text can affect the signals that the economic agents receive from news articles.
- This variation in writing style can be a result of external (mood and other personal events) and news content-related (journalist subjective opinion/view about the news and its possible effects on the world) factors specific to the journalist.

Primordial and Conceptual Thinking Processes

- Psychological literature explains why a journalist's personal relationship with the news content can materialize in the way the news article is written.
- Freud (1938) argued that a person's personality consists of the id, the ego and the superego. The id is seen to be the most primitive part of the personality, and it is the first part of the personality that evolves when a human is born.
- According to Freud, the so-called primary thinking process is a way for the id to handle the primitive urges that the pleasure principle creates.
- When a person grows older, the ego plays a larger role in a person's personality, and the conceptual thinking process emerges to tackle the urges to satisfy primary needs that are not suitable in the real world.

Primordial-Conceptual thinking process continuum

- The primordial or primary thinking process has been seen to relate to thinking that is irrational, free-associative, sensational, impulsive, concrete, unconcerned with a purpose, free of time, space, real world and social institutions.
- Conceptual or secondary thinking is rational, reality-oriented, problem solving, logical, conceptual and narrowly focused.

Primordial-Conceptual thinking process continuum

- Journalists' primary feelings related to a news event might trigger the primary process during the writing process and emerge as a specific type of language used in the text.
- For example, a journalist might have strong feelings or opinions about specific politics, laws, or natural disasters that span from her id that developed early in her childhood.
- There might be a primary need to react to the news content, and the journalist's primary process facilitates this urge during the writing process.

Measuring the thinking process continuum

- We utilize the regressive imagery dictionary developed by Martindale (1975).
- The dictionary is a collection of words that are seen to relate to either primordial or conceptual thinking.

$$TP_d = Primary\ share\ \%_d - Conceptual\ words\ \%_d$$

$$TP_t = \sum_{d \in t} TP_d \qquad TP_a = \sum_{d \in a} TP_d$$

- We measure the thinking process behind document d as the difference between the shares of primordial thinking process words and conceptual thinking process words.

Dist. of the primordial-conceptual word share difference

4,654 authors with 91 articles on average

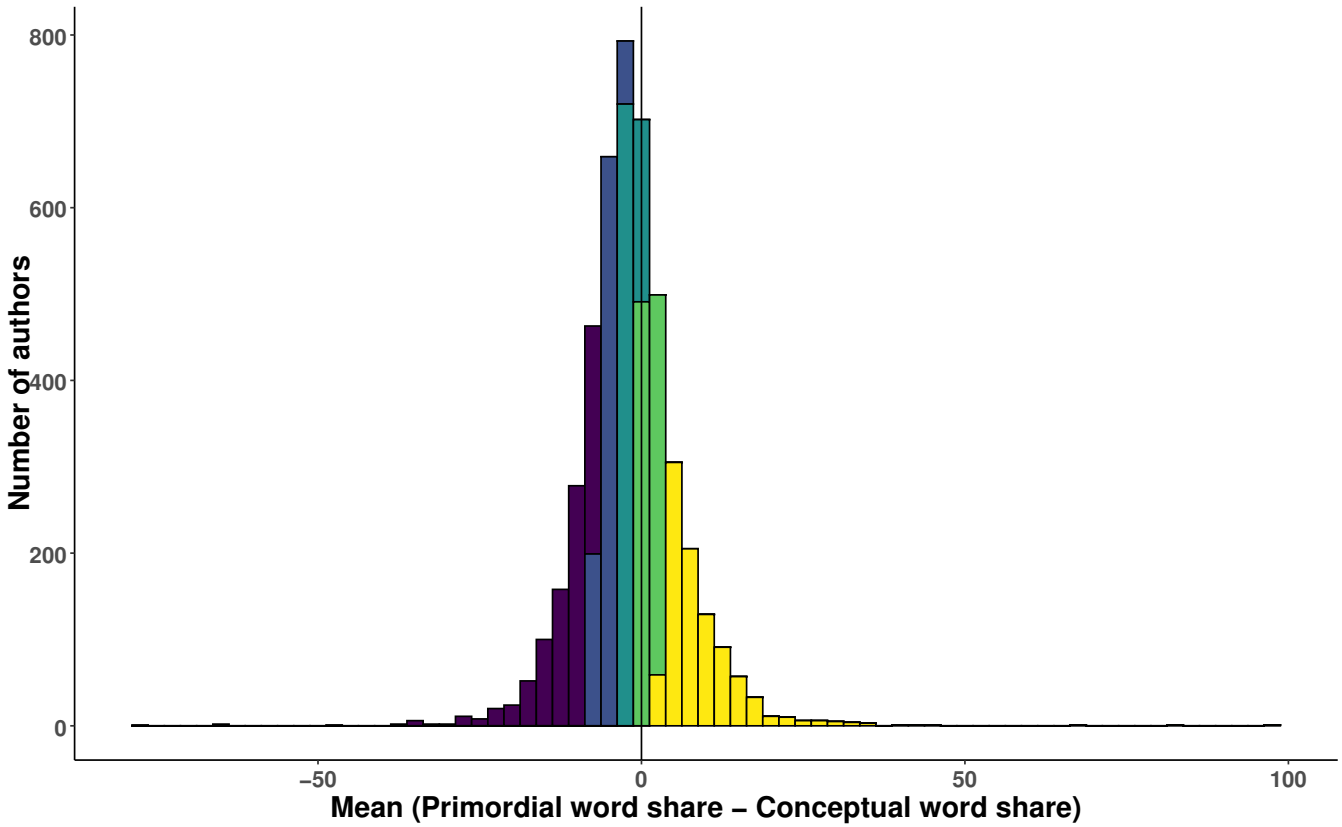

Figure: Mean TP_d.

Empirical Strategy

- We utilize the local projection method (Jorda, 2005) and estimate the following specification:

$$\Delta_h Y_t = \alpha^h + \beta_k^h \sum_{k=1}^{80} A_{k,t} + \epsilon_t \quad \text{for} \quad h = 1, ..., 90. \qquad (1)$$

- The dependent variable $\Delta_h Y_t$ is the change in the percentage share of information-sensitive companies from period t to $t + h$. The main explanatory variable $A_{k,t}$ is the daily unexpected attention to different topics k on day t.

- 3,487 daily observations aggregated from a dataset of 1,923,992 day-company observations for 576 companies from the period 17.12.2006-25.2.2022. 3,036 separate switches between states.

Triggers

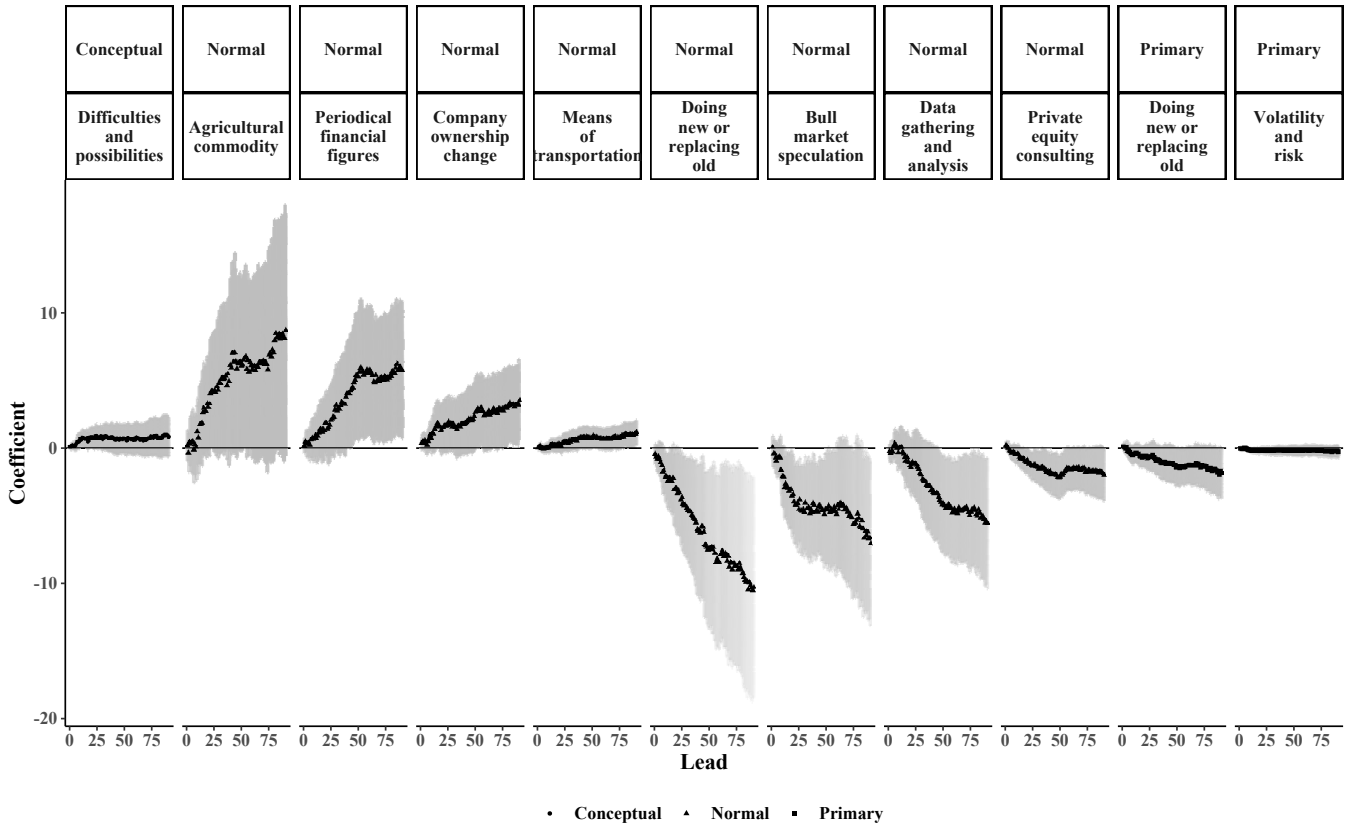

Figure: Journalists' thinking process and the strongest narrative triggers of information sensitivity. The figure plots the β_k^h coefficients of Equation 1 with 99% confidence intervals for topics with at least seven coefficients that are statistically significant at a 1% level between 1–90 day horizons.

Conclusions

- We identify highly persistent separate states characterised by public information acquisition on a company and company's default probability.
- Surprise attention to specific topics acts as a trigger of information (in)sensitivity in the economy.
- The language used in the news article determines whether a topic acts as a trigger of information sensitivity or not.

Monthly correlation of topics and thinking process lanugage

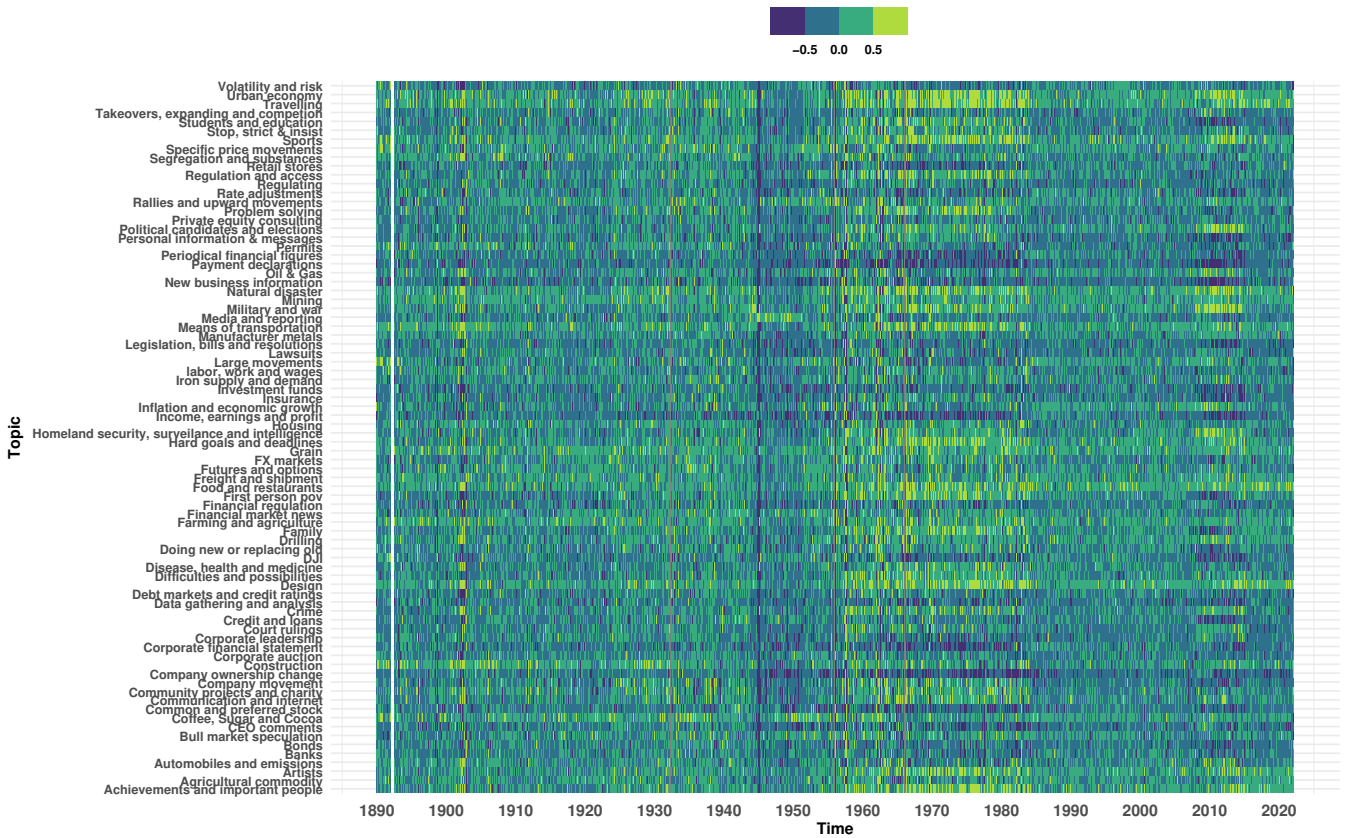

Figure: Monthly correlation of topics and primordial - conceptual word share difference across time and topics.