

Text as Data in Economic Analysis

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This Paper

- ▶ **Analysis of earnings calls**, other texts firms produce as part of their daily decision making represents a sea change in our ability to track and understand economic shocks.
- ▶ Capture opinions, preferences, expectations of key decision makers.
- ▶ Track expected, ongoing, and realized impacts of economic shocks across firms, countries, and sectors.
- ▶ Distinguish effect of risk vs. good/bad news.
- ▶ Available almost in real time.
- ▶ Large, internationally comparable datasets.

Earnings Calls

- ▶ Primary channel through which investors and analysts learn management's interpretation of firm performance.
- ▶ Format: Management presentation for 20 min, followed by Q&A with firm's analysts (20-40 min).
- ▶ Available immediately for practically all US listed firms and most large international firms (>80% of market capitalization in most developed / emerging countries.)
- ▶ Quarterly data for 12,500 firms in 90 countries going back to 2002.
- ▶ Merge directly with Compustat / Compustat Global.

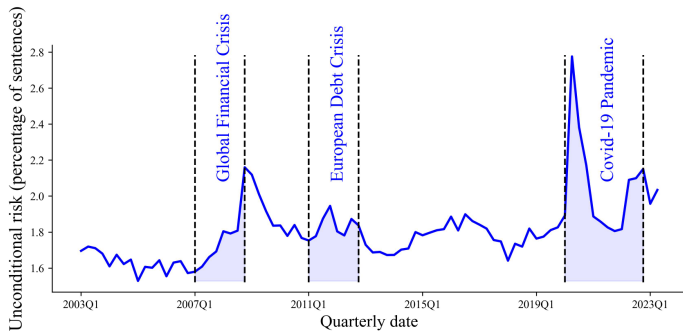
Tools: Exposure, Risk and Sentiment

(Hassan, Hollander, van Lent, and Tahoun, 2019 QJE)

- ▶ Time earnings call participants spend discussing a given topic reveals its importance to them: most significant topics for the firm receive more time/attention.
 - ▶ **TopicExposure:** Share of sentences in a given call that mention your topic.
 - ▶ **TopicRisk:** Share of sentences that mention your topic and a synonym for risk.
 - ▶ **TopicSentiment:** Share of sentences that mention your topic with a happy tone - with a sad tone.
- ⇒ Quickly assess impact of economic shocks.

Overall Risk

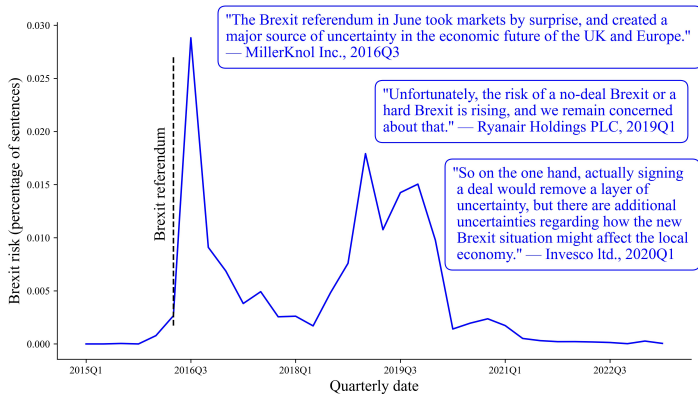
% of Sentences containing synonyms for risk/uncertainty.



- Think of this as similar to the VIX with two major differences:
 1. Graphs generated from text are **self-labeling** – just read text snippets driving each spike!
 2. Decompose by country, sector, firm, **and topic**.

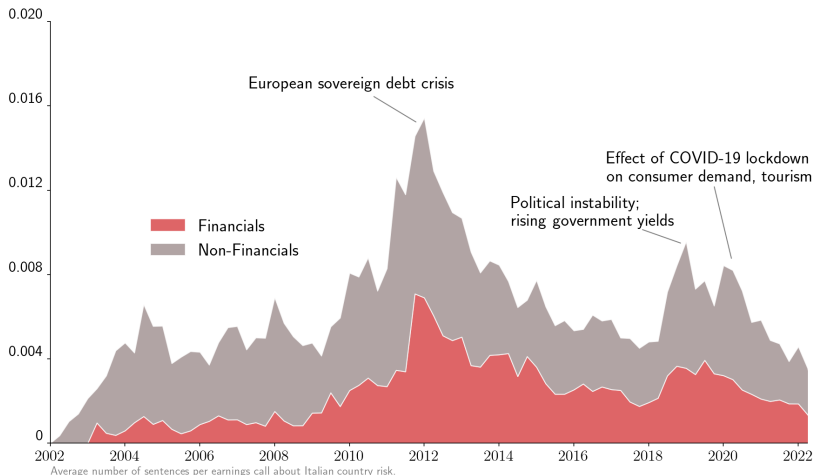
Example: Brexit Risk

(Hassan, Hollander, van Lent, and Tahoun, 2024 JF)



- Think of this like conducting a survey, but at very little cost and on historical as well as real-time data.

Example: Foreign Firm's Perception of Italy Risk

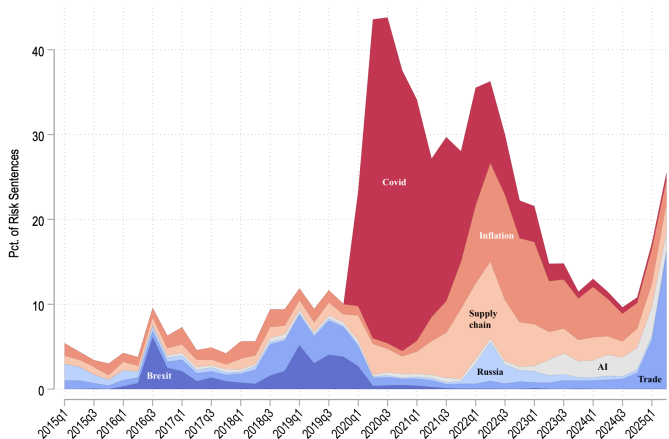


- Measure differential perceptions by foreign firms, financial firms, firms in specific sectors, etc.

Decompose Overall Risk by Topic

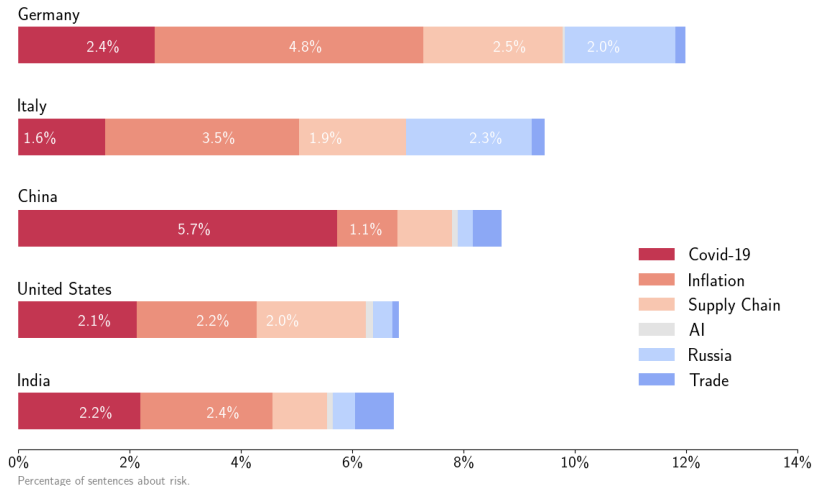
(Hassan, Hollander, Kalyani, van Lent, Schwedeler, and Tahoun, 2025, JEP)

- Share of risk sentences relating to each major topic



- Cardinal comparison of different sources of risk.

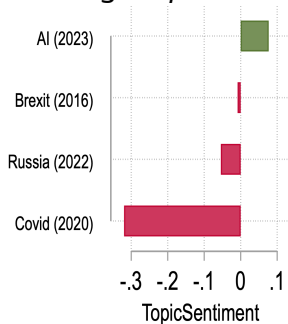
Compare Countries' Risk Profiles – 2022



Assess Positive/Negative Impact of Major Shocks

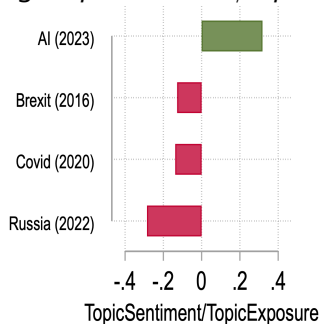
...on World Economy

Average TopicSentiment



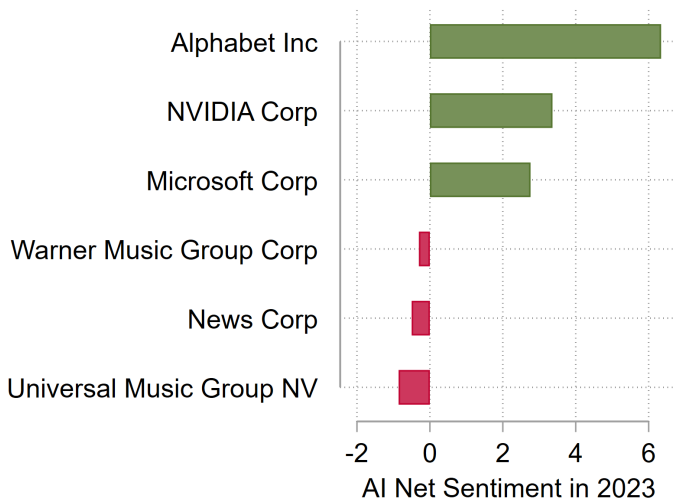
...on Affected Firms

Average TopicSentiment/TopicExposure



Firms Expecting to Benefit/Suffer from AI

AI (LLMs) in 2023

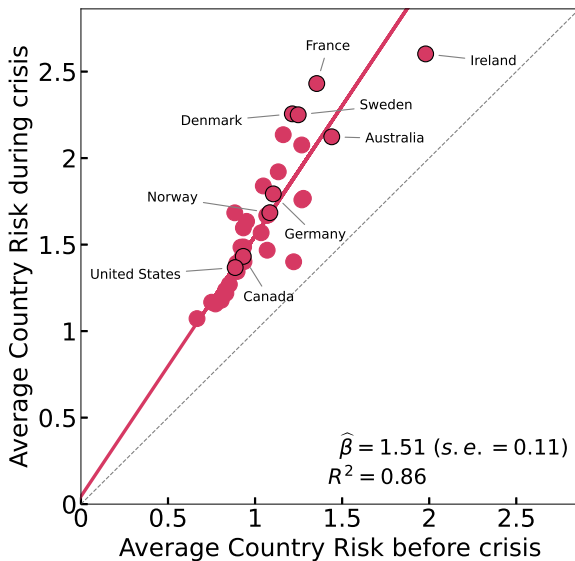


Transmission of Risk During Crises

(Hassan, Schreger, Schwedeler, and Tahoun, 2024, RESTUD)

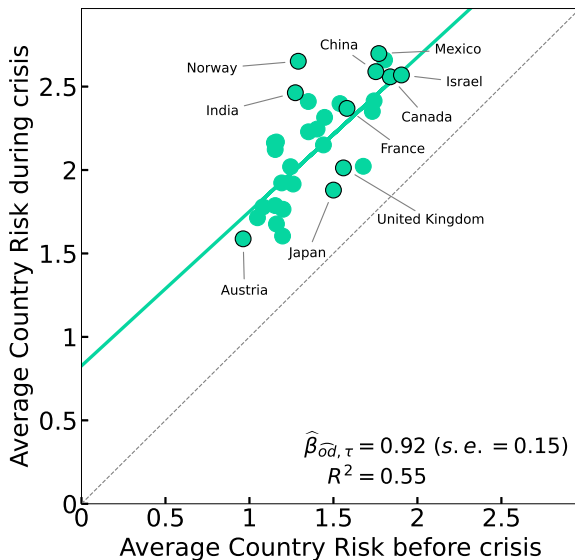
- ▶ Quantify transmission of risk across borders by analyzing how firms from different countries discuss risks relating to a specific foreign country that is in crisis.
- ▶ Example: $UKRisk_{i,2016}$ – number of sentences mentioning UK and risk synonyms during Brexit crisis in 2016.
- ▶ Average across all firms headquartered in a given country and plot over $UKRisk_{i,t}$ in normal times.

Transmission of UK risk during Brexit



Global Impact: 1.38 Bilateral Transmission: 1.51 Regularity: 86%

Transmission of US risk during GFC

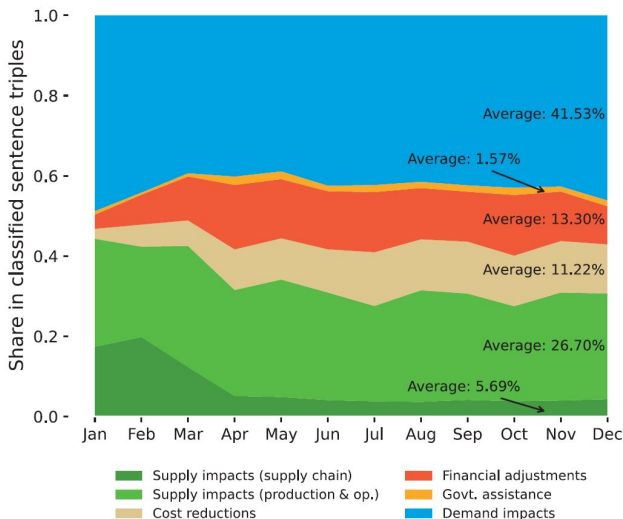


Global Impact: 2.27 Bilateral Transmission: 0.92 Regularity: 55%

Merge Topics: Demand vs. Supply Impacts of Covid

(Hassan, Hollander, van Lent, Schwedeler, and Tahoun, 2023 RFS)

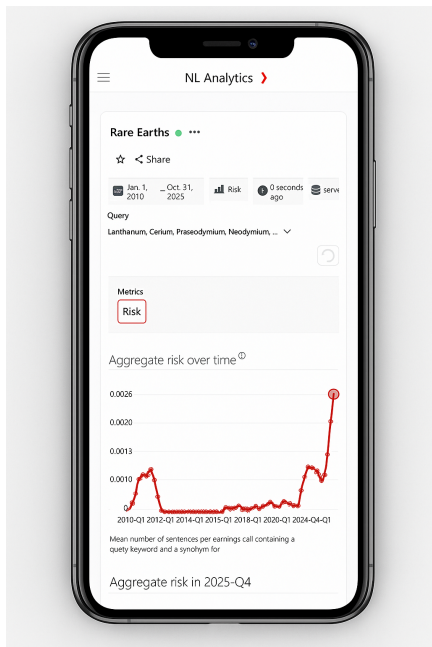
- Sentences Mentioning both Covid in 2020 split up by and Supply, Demand, and Financial Impacts



Do Most of this on your Phone

NL Analytics >

- ▶ Startup providing tools for earnings call analysis to researchers.
- ▶ Clients include ECB, Bank of England, Bank of Italy, Boston Fed, IMF, and major universities.
- ▶ Low-cost access for government, students and academics.
- ▶ www.nlanalytics.tech



Conclusion

- ▶ Texts firms produce as part of their daily business activities represent a sea change in our ability to track and understand economic shocks.
- ▶ Earnings calls are rapidly becoming a standard dataset for macro analysis.
- ▶ Frontier is new data, rather than new methods.
- ▶ Exciting research opportunities combining information from multiple text sources.

Resources

- ▶ NL Analytics No-code platform for earnings call analysis.
- ▶ Sample Python code for researchers
- ▶ Tutorial Package for teaching.
- ▶ Problem Set

Appendix

Other Successful Applications

Politics

- ▶ Brexit
- ▶ Environmental regulations
- ▶ Trade policy
- ▶ Fiscal / tax policy
- ▶ Specific regulations (emissions caps, ...)

Economics

- ▶ Interest rate / monetary policy
- ▶ Wage rises
- ▶ Overall risk and sentiment
- ▶ Liquidity risk

Technologies

- ▶ Crypto
- ▶ Fracking
- ▶ Cloud computing
- ▶ Solar power

Crises and Disasters

- ▶ Epidemic diseases
- ▶ Global financial crisis
- ▶ Greek sovereign debt
- ▶ Fukushima

Megatrends

- ▶ Climate change

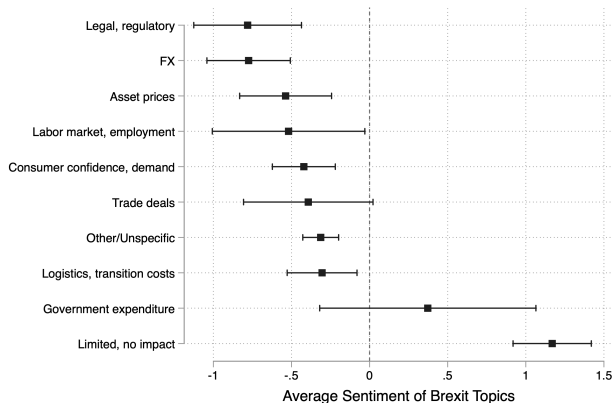
- ▶ ESG
- ▶ Work from home
- ▶ Labor relations
- ▶ Digitization

Security

- ▶ Patent infringements
- ▶ Cybersecurity
- ▶ National security
- ▶ Syrian war
- ▶ Corruption
- ▶ Compliance risk

Systematic human audit

► Topics driving negative Brexit Sentiment outside of UK:



Hassan, Hollander, van Lent, and Tahoun (2022)

Examples of Recent Policy Publications

Jackson Hole Economic Policy Symposium 2023:

- ▶ Monetary Policy and Innovation (Ma and Zimmerman)
- ▶ Global Supply Chains: The Looming “Great Reallocation” (Alfaro)

IMF World Economic Outlook:

- ▶ WEO October 2022 – Chapter 1 on Global policies and prospects
- ▶ WEO April 2023 – Chapter 4 on Geoeconomic fragmentation
- ▶ WEO October 2023 – Chapter 2 on inflation expectations

ECB Policy Bulletin, Issue 4/2023 on corporate profits, investment, and financing conditions

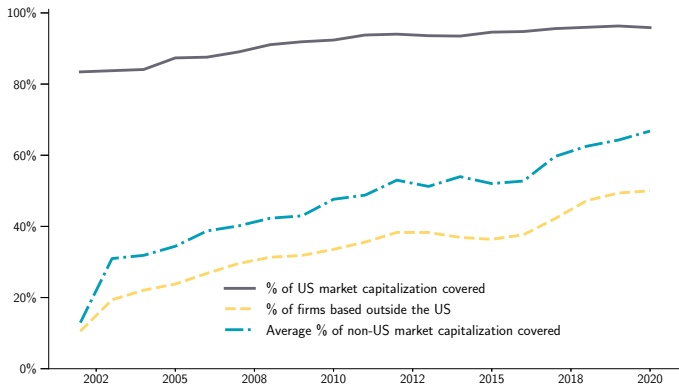
EBRD 2023 Transition Report on global supply chains

Many recent academic working papers

Main References

- ▶ Hassan, Hollander, van Lent & Tahoun, "Firm-level political risk: Measurement and effects." QJE (2019)
- ▶ Hassan, Schreger, Schwedeler & Tahoun, "Sources and Transmission of Country Risk" RESTUD (2024)
- ▶ Hassan, Hollander, van Lent & Tahoun, "The Global Impact of Brexit Uncertainty" JF (2024)
- ▶ Hassan, Hollander, van Lent, Schwedeler & Tahoun "Firm-level Exposure to Epidemic Diseases" RFS, (2023)
- ▶ Sautner, van Lent, Vilkov, & Zhang "Firm-level Climate Exposure" JF (2023)
- ▶ Bloom, Hassan, Kalyani, Lerner & Tahoun, "The Diffusion of Disruptive Technologies" QJE (2025)
- ▶ Jamilov, Rey & Tahoun, "The Anatomy of Cyber Risk" (CEPR WP)

Data coverage



Data coverage for 2019 (part 1/2)

	# of firms in our sample	# of firms in Compustat	% of firms in Compustat	% of market capitalization
Argentina	16	77	20.8%	51.2%
Australia	302	1,976	15.3%	84.3%
Austria	28	79	35.4%	85.1%
Bahamas	1	3	33.3%	83.8%
Bahrain	1	38	2.6%	9.1%
Belgium	28	142	19.7%	72.9%
Bermuda	43	94	45.7%	78.1%
Brazil	130	445	29.2%	92.5%
Canada	421	1,469	28.7%	92.9%
Cayman Islands	12	118	10.2%	50.7%
Chile	24	189	12.7%	61.5%
China	157	5,731	2.7%	35.1%
Colombia	16	55	29.1%	86.4%
Costa Rica	1	1	100.0%	100.0%
Cyprus	10	71	14.1%	91.9%
Czech Republic	6	23	26.1%	88.0%
Denmark	49	196	25.0%	95.8%
Egypt	3	211	1.4%	31.2%
Finland	46	187	24.6%	96.7%
France	119	700	17.0%	89.2%
Georgia	1	1	100.0%	100.0%
Germany	152	730	20.8%	90.5%
Greece	22	190	11.6%	61.6%
Guernsey	2	10	20.0%	46.0%
Hong Kong	67	1,631	4.1%	64.4%
Hungary	4	34	11.8%	97.4%
Iceland	2	27	7.4%	66.2%
India	260	4,135	6.3%	52.3%
Indonesia	9	742	1.2%	11.8%
Ireland	51	93	54.8%	95.7%
Israel	51	548	9.3%	45.8%
Italy	71	427	16.6%	91.8%
Japan	145	4,089	3.5%	43.2%
Jersey	3	10	30.0%	98.5%
Kazakhstan	2	30	6.7%	93.7%
Kenya	1	50	2.0%	50.6%
Kuwait	3	175	1.7%	35.4%
Luxembourg	34	66	51.5%	85.2%

Data coverage for 2019 (part 2/2)

	# of firms in our sample	# of firms in Compustat	% of firms in Compustat	% of market capitalization
Malaysia	15	1,025	1.5%	27.9%
Malta	3	36	8.3%	16.4%
Mauritius	1	78	1.3%	0.4%
Mexico	65	149	43.6%	79.2%
Monaco	5	9	55.6%	14.0%
Morocco	1	75	1.3%	35.4%
Netherlands	64	151	42.4%	86.1%
New Zealand	47	158	29.7%	81.0%
Nigeria	10	141	7.1%	50.5%
Norway	75	312	24.0%	89.5%
Oman	1	110	0.9%	4.4%
Panama	2	3	66.7%	100.0%
Papua New Guinea	1	5	20.0%	93.4%
Peru	10	107	9.3%	32.5%
Philippines	12	272	4.4%	19.6%
Poland	24	738	3.3%	66.1%
Portugal	9	52	17.3%	90.5%
Qatar	3	48	6.2%	48.1%
Romania	2	121	1.7%	40.5%
Russia	35	253	13.8%	92.4%
Saudi Arabia	2	230	0.9%	1.2%
Singapore	34	662	5.1%	56.8%
South Africa	75	291	25.8%	88.2%
South Korea	30	2,088	1.4%	76.1%
Spain	57	210	27.1%	92.6%
Sweden	155	966	16.0%	83.7%
Switzerland	92	290	31.7%	92.2%
Taiwan	26	2,041	1.3%	75.7%
Thailand	18	848	2.1%	31.7%
Turkey	23	430	5.3%	43.5%
Ukraine	2	28	7.1%	18.7%
United Arab Emirates	13	142	9.2%	43.0%
United Kingdom	379	1,658	22.9%	89.6%
United States	3,102	5,490	56.5%	96.3%
Uruguay	1	2	50.0%	100.0%
Overall	6,687	44,012	20.2%	65.3%