Text-Based Methods

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Measuring Uncertainty with Text

Monday, August 31, 2020
Practical motivation view that uncertainty matters
But for some people the best evidence that uncertainty is important that....
Paul Krugman thinks it is not important
Measuring Uncertainty

- Stock Market Volatility
- Newspapers
- Surveys
VIX (1 month ahead implied S&500 volatility) – the classic stock market uncertainty measure

Pros: Daily (available real-time) back to 1990
Cons: Mainly recessions and financials crisis, few LDCs
Measuring Uncertainty

- Stock Market Volatility

- Newspapers

- Surveys
Part of a group working on using Newspapers (and other text) as another measure of uncertainty

www.policyuncertainty.com
This proxy for Economic Policy Uncertainty (EPU) comes from computer searches of newspapers

- US index: 10 major papers get monthly counts of articles with:
  - E {economic or economy}, and
  - P {regulation or deficit or federal reserve or congress or legislation or white house}, and
  - U {uncertain or uncertainty}

- Divide the count for each month by the count of all articles

- Normalize and sum 10 papers to get the U.S monthly index
Constructing the US News-Based EPU Index

Newspapers:
- Boston Globe
- Chicago Tribune
- Dallas Morning News
- Los Angeles Times
- Miami Herald
- New York Times
- SF Chronicle
- USA Today
- Wall Street Journal
- Washington Post

Note: We use Access World News Newsbank Service when constructing a daily EPU Index, because the daily index requires a higher density of news (3,000+ papers).
US News-based economic policy uncertainty index

Validation: Running Detailed Human Audits

10 undergraduates read ≈ 10,000 newspaper articles to date using a 63-page audit guide to code articles if they discuss “economic uncertainty” and “economic policy uncertainty”
Find humans and computers give similar results in large samples (in fact both make mistakes)
Flexible: Can focus on narrower areas of uncertainty, e.g. Health

Notes: Weekly values for Economic Policy Uncertainty (EPU) index categories from www.policyuncertainty.com. See Baker, Bloom and Davis (2016) for details of EPU index construction. We plot data from 1 January 2015 to 30 July, with categories showing large rises in 2020 or 2019 plotted. Note that the average of the four plotted categories from 1985-2019 is as follows: Fiscal Policy=45.7, Health=17.7, Monetary Policy=27.1, and Trade Policy=5.7. This highlights how the rise in health policy in 2020 and trade policy in 2019 are particularly striking given their otherwise relatively low level.
Can also use time series of newspaper to create a Historical EPU

Notes: Index reflects scaled monthly counts of articles in 6 major newspapers (Washington Post, Boston Globe, LA Times, NY Times, Wall Street Journal, and Chicago Tribune) that contain the same triple as in Figure 1, except the economy term set includes "business", "commerce" and "industry" and the policy term set includes "tariffs" and "war". Data normalized to 100 from 1900-2011.
UK Policy Uncertainty Index

India Economic Policy Uncertainty Index (free press)

Source: www.policyuncertainty.com. Data from 7 Indian newspapers (Economic Times, Times of India, Hindustan Times, Hindu, Statesman, Indian Express, and Financial Express)
North Korean Economic Policy Uncertainty Index

Source: www.policyuncertainty.com. Data from 0 North Korean newspapers
EPU index used by Central Banks, Government Agencies and firms (e.g. on Bloomberg, FRED etc)
Newspapers:

Pros: Daily (real-time) back to 1900, provides sub-categories

Cons: Uses newspapers (bias?, focus on interesting events)
Second approach - generated a Twitter text uncertainty measures

Third Approach – working with the IMF to generate a “world uncertainty index” covering 143 countries from Economist Intelligence Unit text

The World Uncertainty Index

Hites Ahir*, Nicholas Bloom* and Davide Fuceri

May 30, 2019
(Preliminary)

We construct a new index of uncertainty—the World Uncertainty Index (WUI)—for 143 individual countries on a quarterly basis from 1996 onwards, and for 34 large advanced and emerging market economies from 1955. This is defined using the frequency of the word “uncertainty” in the quarterly Economist Intelligence Unit country reports. Globally, the Index spikes near the 9/11 attack, the SARS outbreak, the Gulf War II, the failure of Lehman Brothers, the Euro crisis. El Niño, the European border crisis, the UK Brexit vote, the 2016 US election and the recent US-China trade tensions. Uncertainty spikes tend to be more synchronized within advanced economies and between economies with tighter trade and financial linkages. The level of uncertainty is significantly higher in developing countries and is positively associated with economic policy uncertainty and stock market volatility, and negatively with GDP growth. In addition, there is an inverted U-shaped relationship between uncertainty and democracy. In a panel vector autoregressive setting, we find that innovations in the WUI foreshadow significant declines in output. This effect varies across countries and across sectors within the same country: across countries, the effect is larger and more persistent in those with lower institutional quality; across sectors, the effect is stronger in those more financially-constrained.

JEL No. D80, E22, E66, G18, I50

Keywords: uncertainty; political uncertainty; economic uncertainty; volatility.

Acknowledgements: We would like to thank the National Science Foundation for their financial support.

* We are grateful to Jan行くmann from the Economist Intelligence Unit (EIU) for useful discussions about the EIU reports. Alex Chui and Serena Davis for comments on an earlier draft. We also thank Tobias Adrian, Gita Gopinath, Paolo Mauro and other participants of the IMF Surveillance Meeting. The views expressed in this paper are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

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The global economy hit by higher uncertainty

Hites Ahir, Nicholas Bloom, Davide Fuceri 11 May 2019

According to the latest IMF projections, the global economy is now projected to grow at 3.3% in 2019, down from 3.6% in 2018. This is partly due to rising uncertainty in many parts of the world. This column shows how these statements are in line with the latest reading of the World Uncertainty Index, which shows a sharp increase in the first quarter of 2019. The increase in uncertainty observed in the first quarter could be enough to knock up to 0.5% of global growth over the course of the year.

The global economy is now projected to grow at 3.3% in 2019, down from 3.6% in 2018, according to the April 2019 edition of the IMF’s World Economic Outlook (IMF 2019). The IMF points out several developments that have prompted the downward revision of the global economy. This includes the escalation of US-China trade tensions, the need for credit tightening in China, economic stress in countries such as Argentina and Turkey, and disruptions to the auto sector in Germany caused by the introduction of new emissions standards.

Behind all the different reasons for the downward revision of global growth, there is one thing in common: rising uncertainty. Chapter 1 of the World Economic Outlook—a chapter that focuses on the prospects and policies for the global economy—contains the word “uncertain” and its variants 36 times. Some of the references discuss the impact of uncertainty on global economic growth. For instance, the report notes that “amid high policy uncertainty and weakening prospects for global demand, industrial production decelerated…The slowdown was broad based, notably across advanced economies”. The report also points out that political uncertainties “add downside risk to global investment and growth. These include policy uncertainty about the agenda of new
EUI quarterly reports standard format, mean (and median) of 29 pages.
Global average of all 143 countries – rising recently

- World Uncertainty Index
  - 1990Q1 to 2020Q2
  - GDP weighted average

- Events:
  - Gulf War I
  - US recession and 9/11
  - US fiscal cliff and sovereign debt crisis in Europe
  - Financial credit crunch
  - Sovereign debt crisis in Europe
  - US-China trade tensions and Brexit
  - US presidential elections
  - FED tightening and political risk in Greece and Ukraine
  - Brexit
  - Coronavirus
  - US-China trade tensions, and Brexit

- Timeline:
  - 1990q1 to 2020q2
Some example countries – including LDCs

Uncertainty in Democratic Republic of Congo, Gabon, Ireland, and South Africa (World Uncertainty Index, 1996Q1 to 2020Q2)
Can Also Examine the Share of Uncertainty Globally that comes from the United States

![Graph showing the ratio of uncertainty related to the US to overall uncertainty (excluding the US), GDP weighted average.](image)

- Ratio of uncertainty related to the US to overall uncertainty (excluding the US), GDP weighted average

Key Events:
- 9/11 and US recession
- Iraq war
- Rejection of the EU constitution
- Uncertainty over US monetary policy
- Financial credit crunch
- Uncertainty over Fed tightening
- US presidential elections
- US-China trade tensions
Can Also Examine the Share of Uncertainty Globally that comes from the United Kingdom

Ratio of uncertainty related to the UK to overall uncertainty (excluding the UK), GDP weighted average

- Brexit deadline and parliamentary votes
- EU rejects Brexit Chequers plan
- Brexit vote

Can Also Examine the Share of Uncertainty Globally that comes from the United Kingdom
Can also look at uncertainty in different types of countries – here we see developing countries have higher overall uncertainty.

Figure 3. Average WUI by income group

Note: The World Uncertainty Index (WUI) is computed by counting the frequency of uncertain (or the variant) in EIU country reports. The WUI is then normalized by total number of words and rescaled by multiplying by 1,000. A higher number means higher uncertainty and vice versa. For the list of countries in each income group, see Table 1.
Can Also Look at Pandemic Uncertainty - COVID is a clear outlier


Notes: Data are from the World Uncertainty Index website’s World Pandemic Uncertainty Index (WPUI), which measures discussions about pandemics at the global and country level in the Economist Intelligence Unit’s approximately 140 country reports which are produced quarterly (or monthly for some larger countries, although we use only the quarterly updates for consistency). The underlying data are at https://worlduncertaintyindex.com/data/ (see Ahir, Bloom and Furceri, 2020)
Recently examined how words matter – for example, for uncertainty

*WUI counts the word uncertainty

**Neutral synonyms count the following keywords: ambiguous ambivalent dubious erratic hazy hesitant unclear undecided undetermined unpredictable unreliable unsettled unsure vague questionable insecure

***Negative synonyms count the following keywords: risk risks risky precarious unresolved
Measuring Uncertainty

- Stock Market Volatility
- Newspapers
- Surveys
Running Monthly SBU survey with the Atlanta Fed and Chicago

Looking ahead, from now to four quarters from now, what approximate percentage sales revenue growth rate would you assign to each of the following scenarios?

| The LOWEST percentage sales revenue growth rate would be about: | -2 % |
| A LOW percentage sales revenue growth rate would be about:      | -1 % |
| A MIDDLE percentage sales revenue growth rate would be about:   | 0 %  |
| A HIGH percentage sales revenue growth rate would be about:    | 1 %  |
| The HIGHEST percentage sales revenue growth rate would be about:| 2 %  |

Please assign a percentage likelihood to the sales revenue growth rates you entered. (Values should sum to 100%)

- LOWEST: The likelihood of realizing a -2% sales revenue growth rate would be: 15 %
- LOW: The likelihood of realizing a -1% sales revenue growth rate would be: 25 %
- MIDDLE: The likelihood of realizing a 0% sales revenue growth rate would be: 30 %
- HIGH: The likelihood of realizing a 1% sales revenue growth rate would be: 25 %
- HIGHEST: The likelihood of realizing a 2% sales revenue growth rate would be: 5 %

Total: 100 %
The SBU is Spread Across the US Geographically
The SBU is Spread Across the US by Firm Size and Industry

By Number of Employees:
- 1-4 employees: 488
- 5-9 employees: 242
- 10-19 employees: 216
- 20-49 employees: 352
- 50-99 employees: 281
- 100-249 employees: 377
- 250-499 employees: 144
- 500-999 employees: 33
- 1000 or more employees: 34

By Sector:
- Construction: 308
- Durable goods manufacturing: 441
- Educational services: 135
- Finance and insurance: 77
- Health care and social assistance: 1281
- Information: 60
- Leisure and hospitality: 55
- Mining and utilities: 1201
- Nondurable goods manufacturing: 55
- Other services except government: 77
- Other services excluding government: 342
- Professional and business services: 382
- Real estate and rental and leasing: 44
- Retail and wholesale trade: 316
- Transportation and warehousing: 90

Number of panel members
Very Similar DMP Survey in the UK of around 3,000 firms Monthly
UK & US Firm subjective sales uncertainty doubled due to COVID

The pandemic generated extensive downside tail-risk for firms.

The chart shows the US Future Sales Growth Distribution and the UK Future Sales Growth Distribution. Each graph displays quantiles of the aggregate distribution of firm's distributional expectations of future sales growth, looking ahead at a four-quarter horizon. In each month, we aggregate individual firms' five-point subjective distributions by weighting a given firm's five support points by their probabilities and then weigh the support points for each firm by its employment. US data are from the Survey of Business Uncertainty conducted by the Federal Reserve Bank of Atlanta, Stanford University, and the University of Chicago Booth School of Business (https://www.frbatlanta.org/sbu) (see Altig et al. 2020). UK data from the Decision Maker Panel Survey conducted by the Bank of England, Nottingham University and Stanford University (see Bloom et al. (2019) and www.decisionmakerpanel.com).
Data available online at the DMP and SBU websites

Brexit Uncertainty
Percentage of respondents who see Brexit as one of the current sources of uncertainty

Next month's Decision Maker Panel

DECISION MAKER

Latest News: Nick Bloom President

In partnership with Steven Davis of the University of Chicago Booth School of Business and Nicholas Bloom of Stanford University, the Federal Reserve Bank of Atlanta has created the Atlanta Fed/Chicago Booth/Stanford Survey of Business Uncertainty (SBU). This innovative panel survey measures the one-year-ahead expectations and uncertainties that firms have about their own employment, capital investment, and sales. The sample covers all regions of the U.S. economy, every industry sector except agriculture and government, and a broad range of firm sizes.

Stay informed of all Survey of Business Uncertainty updates by subscribing to our mailing list, downloading our EconomyNow app, or following the Atlanta Fed on Twitter.

Interactive Data | Researcher Biographies | About the Survey | About the Panel | Resources | SBU in the Media

Updated on July 29, 2020

Business Expectations

- Capital Investment Rate
- Sales Growth Rate
- Employment Growth Rate

Export chart and data
Summary on measuring uncertainty

A) Uncertainty appears a major issue, much of this from politics

B) But measuring uncertainty is tricky

C) Text-based approaches very promising:
   1. Fast to produce (real-time)
   2. Long time series (e.g. US news back to 1900)
   3. Flexible – can drill down on topics

D) Can also use surveys – but expensive and slow to get going