

EE439 Discussions

How do Uncertainty Impact Economic Activity?

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Reactions!



Writing a Paper (Last week)



Listening to my talk! (today)

How do Uncertainty Impact Economic Activity?

- Economic Uncertainty Before and After Covid-19

Goal: Look at uncertainty measures before and after Covid-19

- Impact of Policy Uncertainty on Economy












Goal: Survey methodology used for estimating the impact

- Economic Policy Uncertainty (EPU) Index

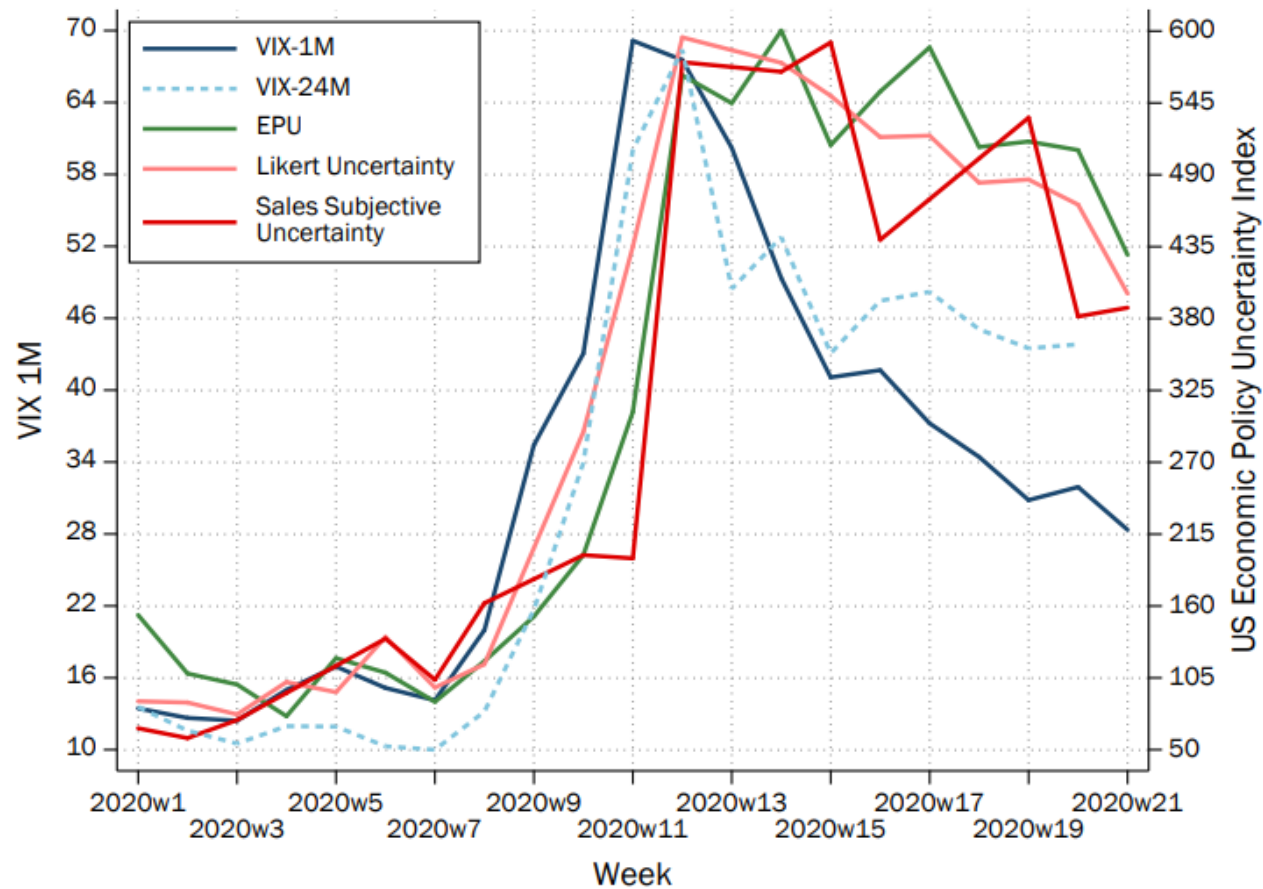
Goal: Construct a toy example on EPU



Measures Used to Characterize Uncertainty

1. **VIX**: forward-looking volatility using options on S&P500   
2. **Newspaper-Based (EPU)**: reflect uncertainty perceived by journalists   
3. **Business-Expectation Surveys**: subjective opinions on sales growth   
4. **Forecaster Disagreement**: use disagreement in surveys 
5. **Time-Series Model**: GARCH Model 

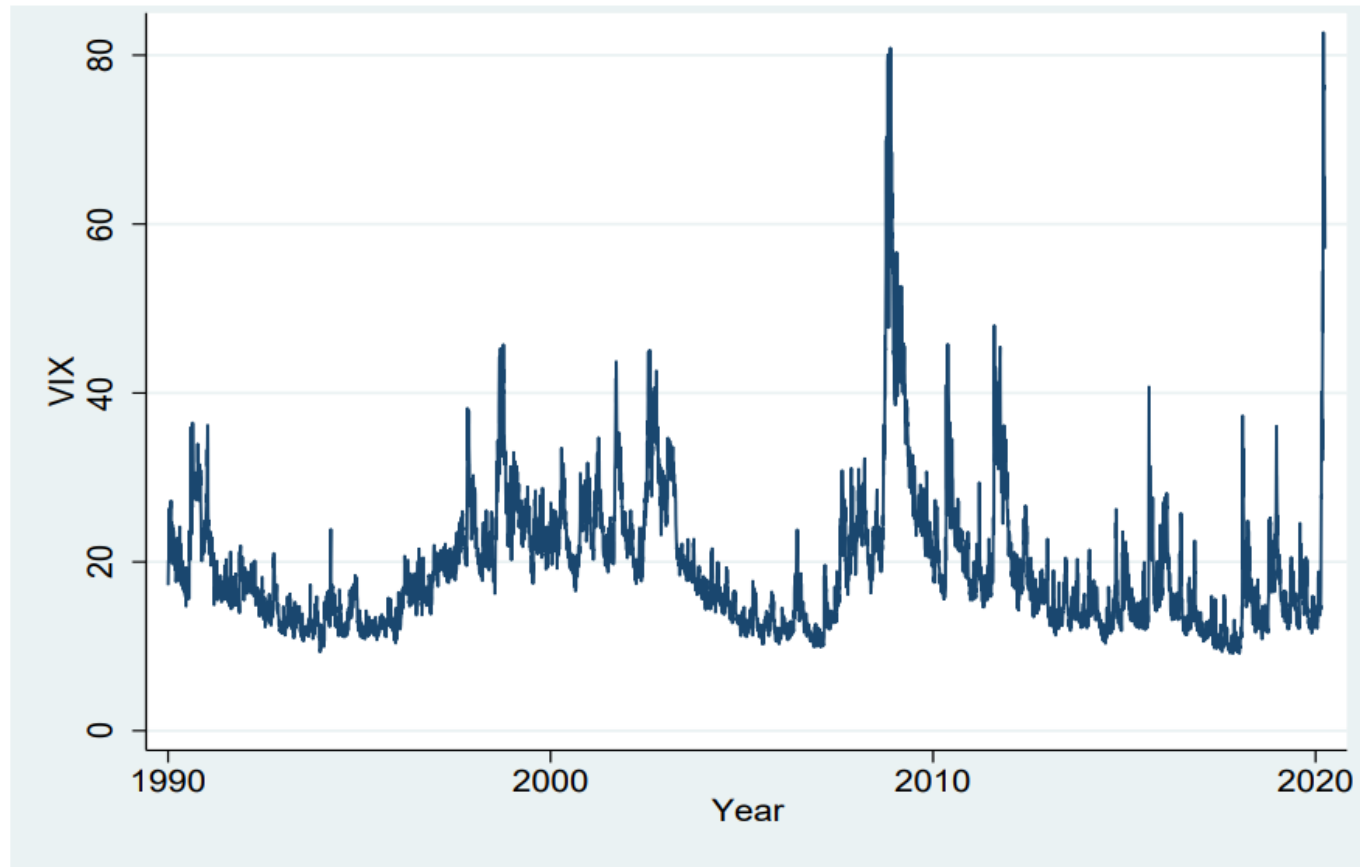
Uncertainty Spiked!



Source: Altig, D., Baker, S., Barrero, J.M., Bloom, N., Bunn, P., Chen, S., Davis, S.J., Leather, J., Meyer, B., Mihaylov, E. and Mizen, P., 2020. Economic uncertainty before and during the COVID-19 pandemic. *Journal of Public Economics*, 191, p.104274.

VIX Spiked in 2020

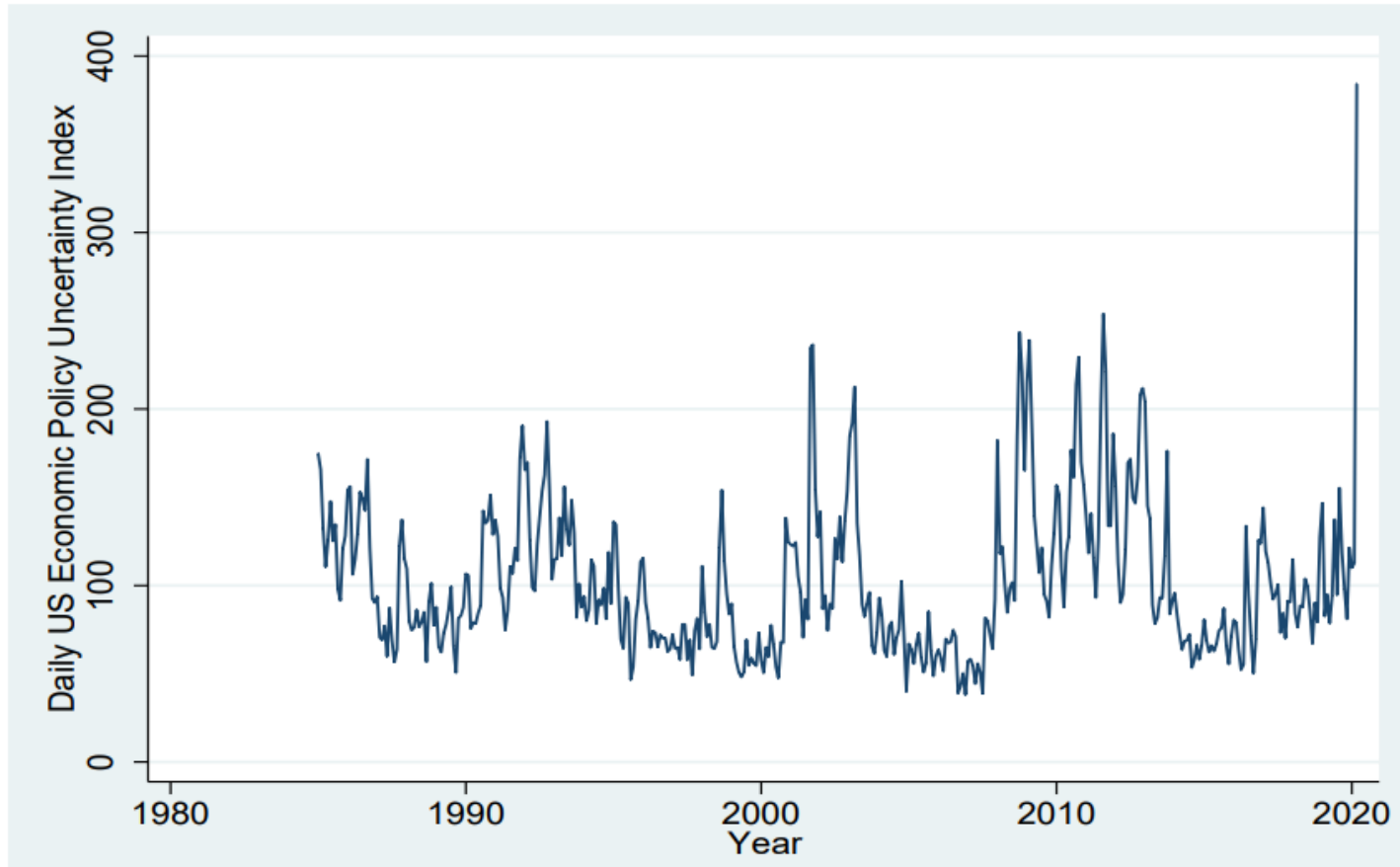
Figure 1: VIX, Implied Stock Returns Volatility, Daily Since 1990



Source: Baker, S.R., Bloom, N., Davis, S.J. and Terry, S.J., 2020. *Covid-induced economic uncertainty* (No. w26983). National Bureau of Economic Research.

EPU Spiked in 2020

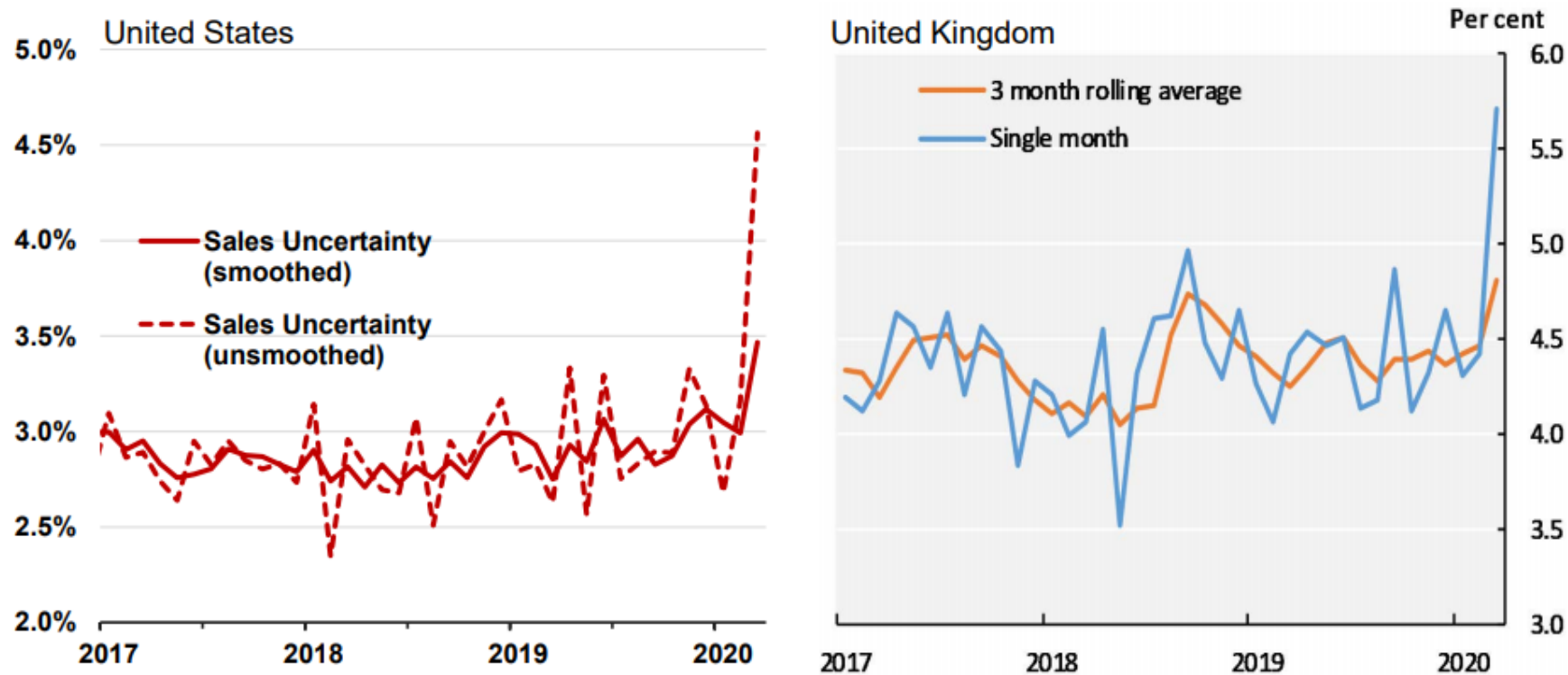
Figure 2: U.S. Economic Policy Uncertainty Index, Monthly Averages of Daily Index Values, January 1985 to March 2020



Source: Baker, S.R., Bloom, N., Davis, S.J. and Terry, S.J., 2020. *Covid-induced economic uncertainty* (No. w26983). National Bureau of Economic Research.

Survey-Based Measures Spiked in 2020

Figure 3: Survey-Based Measures of Uncertainty about Sales Growth Rates at a Four-Quarter Look-Ahead Horizon for the United States and United Kingdom, Monthly from January 2017 to March 2020.



Source: Baker, S.R., Bloom, N., Davis, S.J. and Terry, S.J., 2020. *Covid-induced economic uncertainty* (No. w26983). National Bureau of Economic Research.

Effects of Policy Uncertainty on Economy

The main question is how policy uncertainty affects economic outcomes.

Two approaches used by Baker, Bloom and Davis (2016):

1. Use firm-level data to capture government purchases

Results: Policy uncertainty affects stock price uncertainty

2. Use macro-level data to capture multiple channels

Results: Policy uncertainty affects macro-variables such as
industrial production, employment growth.

Firm-Level Data

Dependent Variable: option-implied stock price volatility

Main independent variables: EPU index

Other control variables: VIX, Federal purchase per GDP, Exposure to Government purchases

Approach: Panel-data method, controlling for entity-fixed effect and time-fixed effect

Models

$$1) \text{ Vol} = f(\overset{+}{\log(\text{EPU})}; \overset{-}{\text{Fed Purchase/GDP}})$$

$$2) \text{ Vol} = f(\overset{+}{\log(\text{EPU}) * \text{intensity}}; \overset{-}{(\text{Fed Purchase/GDP}) * \text{intensity}}; i, t)$$

$$3) \text{ Vol} = f(\overset{-}{\log(\text{EPU})}; \overset{+}{\log(\text{VIX})}; \overset{-}{\text{Fed Purchase/GDP}})$$

$$4) \text{ Vol} = f(\overset{+}{\log(\text{EPU}) * \text{intensity}}; \overset{-}{\log(\text{VIX}) * \text{intensity}}; \overset{-}{(\text{Fed Purchase/GDP}) * \text{intensity}}; i, t)$$

Baker, S.R., Bloom, N. and Davis, S.J., 2016. Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4), pp.1593-1636.

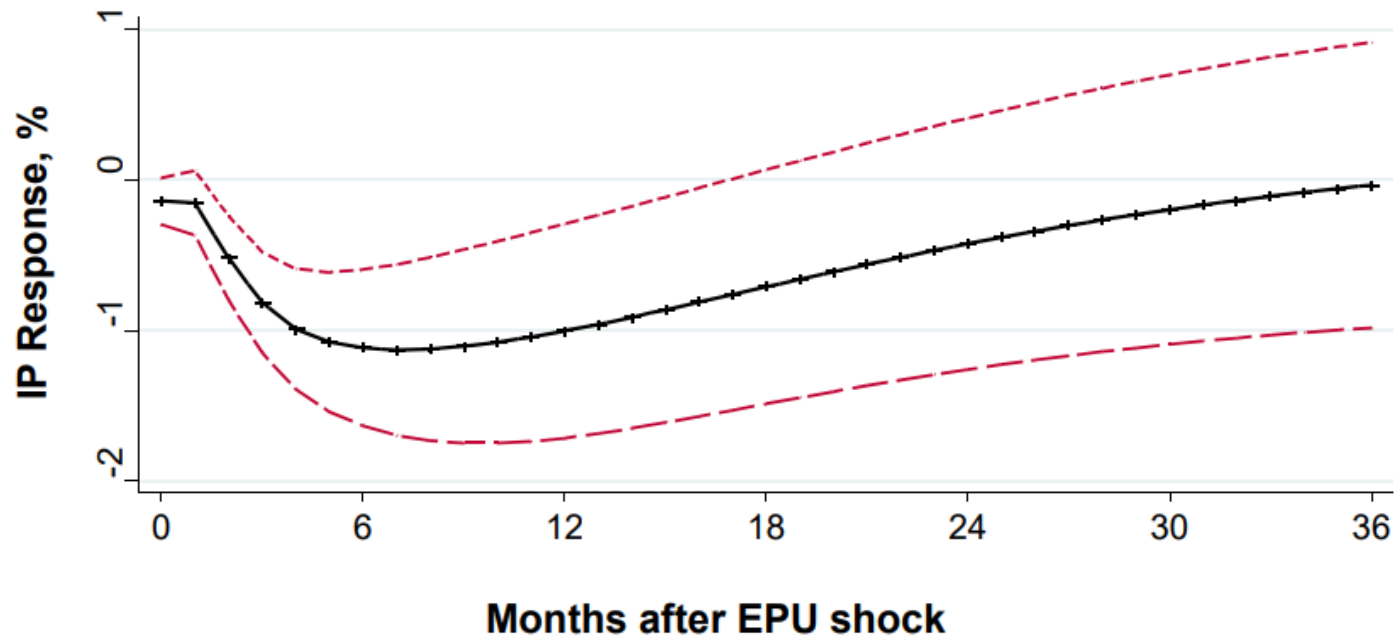
Macro-Level Data

Approach: Use VAR with Cholesky decomposition

Variables: EPU index, $\log(\text{S\&P500})$, federal funds rate, \log employment, \log industrial production (each for 3 lags)

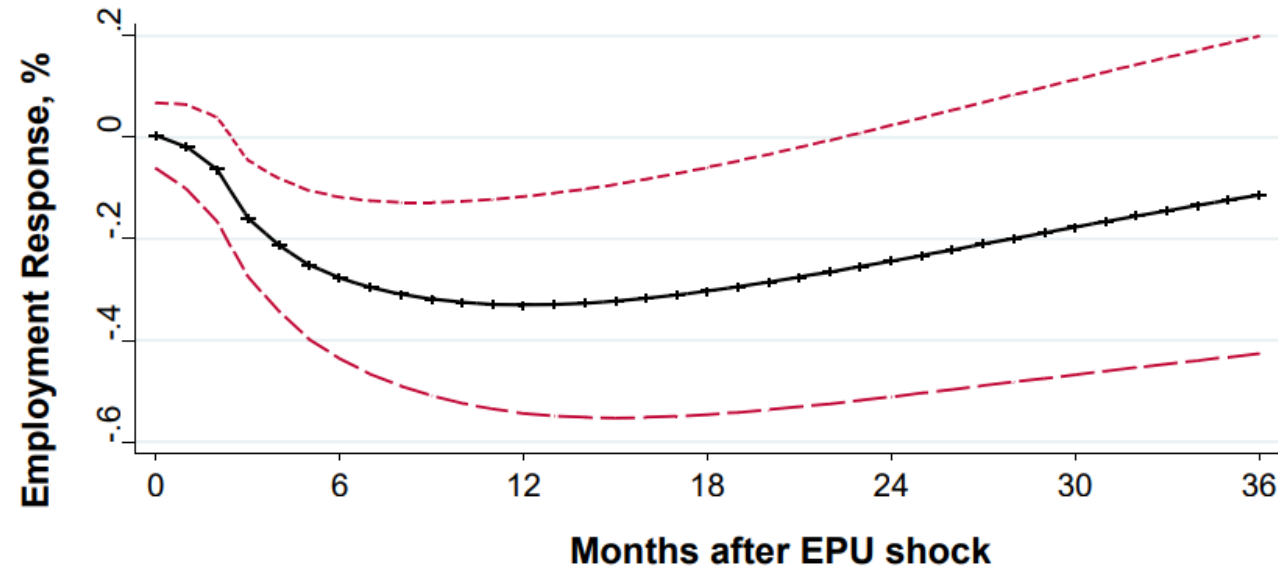
Visualization: Impulse response function of industrial production and employment to 90-point EPU innovation

IP Response to 90-point EPU Shocks



Baker, S.R., Bloom, N. and Davis, S.J., 2016. Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4), pp.1593-1636.

Employment Response to 90-point EPU Shocks



Baker, S.R., Bloom, N. and Davis, S.J., 2016. Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4), pp.1593-1636.

Economic Policy Uncertainty Index

Data Source: Newspaper Articles

Process: Count the number of articles related to economic policies

Index: Scale the raw count by the number of newspaper articles

Ref: <https://www.policyuncertainty.com/>

EPU Index -> E-P-U

Three buckets of words contain E-P-U buckets.

- U buckets = (uncertainty, uncertain),
- E buckets = (economic, economy)
- P buckets = (congress, deficit, Federal Reserve, legislation)

Note that the P words are selected by audit and pilot study.

Training Process

Audit study: get labels from human

Pilot study: refine the training process

Selecting P term set: obtain classification report

(false positive & false negative)

False Positive & False Negative



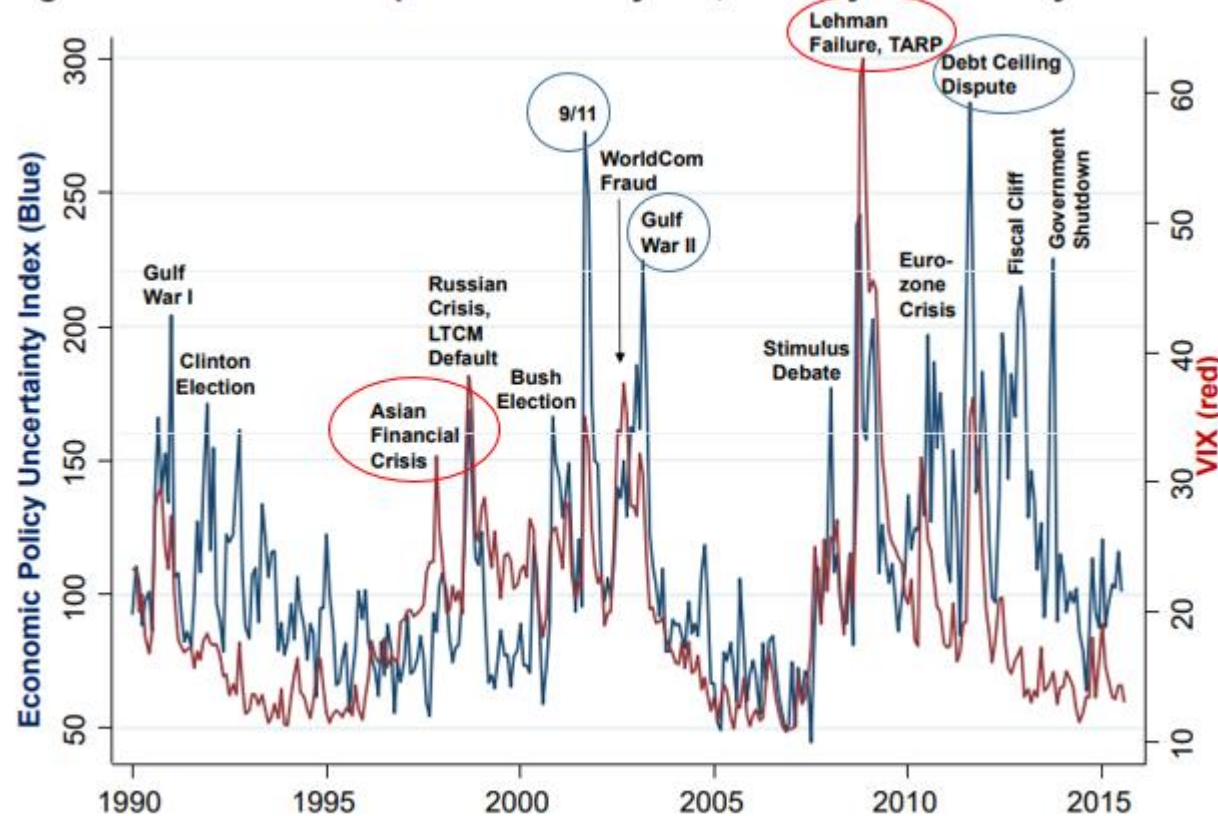
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Evaluation: EPU vs VIX

Figure 6: U.S. EPU Compared to 30-Day VIX, January 1990 to July 2015



Notes: The figure shows the U.S. EPU Index from Figure 1 and the monthly average of daily values for the 30-day VIX.

EPU: Policy-focused, no explicit horizon

VIX: Stock-focused, 30-day horizon

Activities

Motivation: There is no EPU index for Thailand, so let's try making one.

Data Source: Internet Articles

Buckets: Think about what words should represent Thailand, land of smile!

(USA) Three buckets of words contain E-P-U buckets.

- U buckets = (uncertainty, uncertain),
- E buckets = (economic, economy)
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References

- Altig, D., Baker, S., Barrero, J.M., Bloom, N., Bunn, P., Chen, S., Davis, S.J., Leather, J., Meyer, B., Mihaylov, E. and Mizen, P., 2020. Economic uncertainty before and during the COVID-19 pandemic. *Journal of Public Economics*, 191, p.104274.
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- Baker, S.R., Bloom, N. and Davis, S.J., 2016. Measuring economic policy uncertainty. *The quarterly journal of economics*, 131(4), pp.1593-1636.

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Discussion Materials:

https://github.com/GoodDee/EE439_Discussion