

# How to measure oil market uncertainty? An application of Google Trends

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## This paper

- Measuring uncertainty
  - ▶ Crude oil market
  - ▶ Application of Google Trends
- Proposal of different oil market specific uncertainty indices
- Comparison to existing (general) uncertainty measures
- Effect of uncertainty on oil market specific variables
- What exactly are we measuring?

## Recent contributions to uncertainty literature

- Oil volatility index: near-month futures price volatility.
- Jurado et al.'s (2015, AER) macro uncertainty: information in a large number of macroeconomic and financial indicators ("data-rich environment")
- Baker et al.'s (2016, QJE) economic policy uncertainty: frequency of US newspaper articles which contain terms such as "economy", "uncertainty", and "Congress" (and similar)
- Ahir et al.'s (2019, WP) world uncertainty index: frequency of term "uncertainty" in quarterly Economist Intelligence Unit country reports.

## Existing uncertainty indices

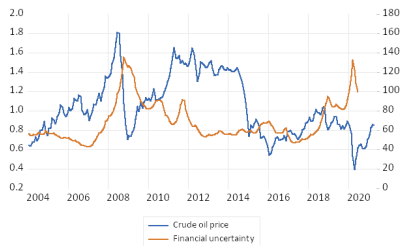
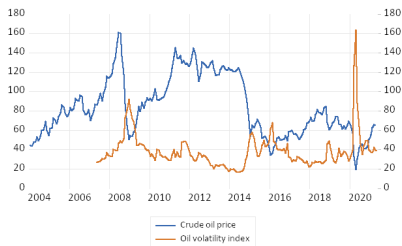


Figure 1: Oil price volatility index and Jurado et al.'s (2015) uncertainty

## Existing uncertainty indices

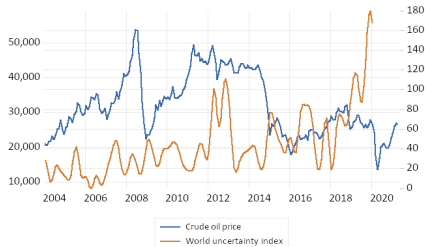
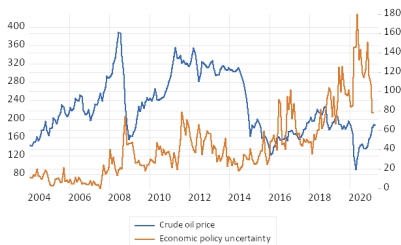


Figure 2: Baker et al. (2016) as well as Ahir et al. (2019)

## Applications of Google trend

- Castelnovo and Tran (2017, Economics Letters):
  - ▶ United States and Australia
- Tran et al. (2019, Austr. Economic Review):
  - ▶ New Zealand
- Bilgin et al. (2019, Economics Letters):
  - ▶ Turkey
- Qadan and Nama (2018, Energy Economics)
  - ▶ Google search volumes “Oil Price”
  - ▶ Interpretation as investor sentiment

## Castelnuovo and Tran's (2017) procedure

- Selection of a broad set of keywords related to uncertainties about future economic conditions
- Examples: “bankruptcy”, “stock market”, “economic reforms”, “debt stabilization”
- Aggregation of search outcomes per month into one index
- Benchmark term needs to be selected - restriction to five search terms at a time
- Resulting index interpreted as uncertainty index

## Measuring oil market uncertainty

- ▣ Measures capturing different types of oil market uncertainty
- ▣ Oil investment uncertainty
  - ▶ Oil investment, oil exploration, oil project, oil drilling
- ▣ Oil demand uncertainty
  - ▶ Recession, economic growth, global economy, industrial production
- ▣ Oil supply uncertainty
  - ▶ Oil supply, oil production, shale oil, OPEC
- ▣ Benchmark: “Oil price”
- ▣ Simple measure: Search term “Oil price”



## Measuring oil market uncertainty



Figure 3: Google searches “oil price”

## Measuring oil market uncertainty

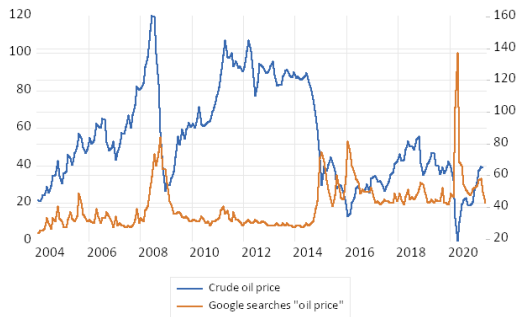


Figure 4: Google searches “oil price” and the oil price

# Measuring oil market uncertainty

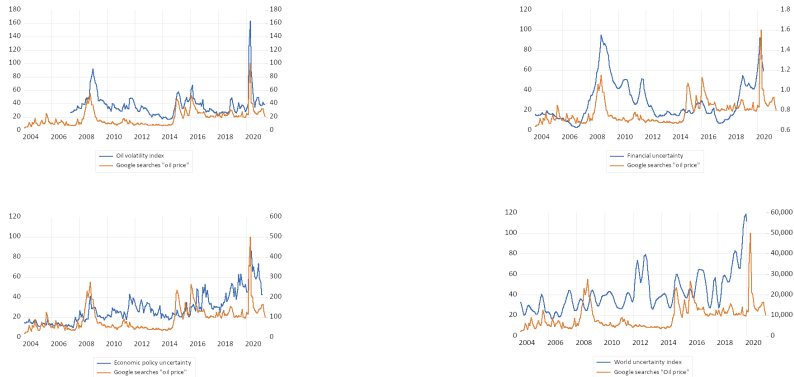


Figure 5: Comparison with existing measures

## Measuring oil market uncertainty

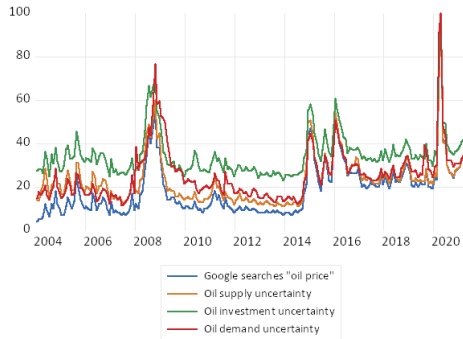


Figure 6: Oil market uncertainty indices

## Application: effect on oil market specific variables

- Key variables: oil prices and rig counts
- Crude oil production does not respond to oil price changes
- Strong relationship between oil prices and rig counts
- Rig counts are indicator of exploration activity
- Rig counts are considered “oil market sentiment indicator”

## Data overview

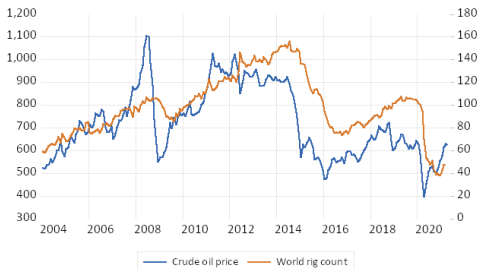


Figure 7: World rig counts and oil prices

## Empirical framework

- Monthly data, 2005-2021
- Standard VAR model
- Three endogenous variables: oil price, rig count, uncertainty measure
- Method of inference: impulse response analysis and Granger causality test

# Measuring oil market uncertainty



Figure 8: Selected impulse response results



## Conclusions

- Oil market uncertainty
- Application of Google Trends
- Oil market sentiment is affected by uncertainty
- Type of uncertainty matters
- Oil price movements: Upward vs downward
- Uncertainty vs public attention