

# Are Temporary Oil Supply Shocks Real?

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# Motivation

- ▶ Wide interest in understanding the economic effects of oil supply shocks (e.g., stagflation of the 1970s and OPEC)
- ▶ Identification of supply shocks is non-trivial (Kilian 2009)
- ▶ Common solution: SVAR models
  
- ▶ This paper: quasi-experimental design
  - construct a series of transitory oil supply shocks using hurricanes in the Gulf of Mexico
  - investigate effect of shocks on economic outcomes

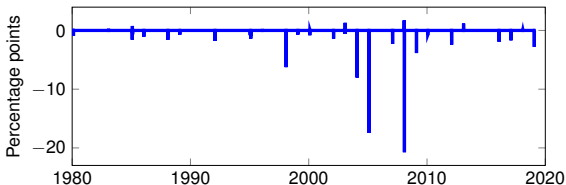
## Methodology and Key Results

- ▶ Oil platforms shut down production in advance of hurricanes
- ▶ We map rig locations with trajectories of hurricanes
  - series of (sizeable) monthly supply shocks
- ▶ Use local projections to gauge impact on US economic outcomes
- ▶ Focus on areas outside of the Gulf
- ▶ Key findings: temporary oil supply shocks have
  - only minor effects on some nominal variables
  - no real effects outside oil-related sectors

# Oil Supply Shocks

- ▶ Rig location data in the Gulf from BOEM
- ▶ Hurricane track data from NOAA

$$\Psi_t = \frac{I_t(\text{hurricane} \leq 500\text{km}) \times \Delta\text{OCS}_t}{\text{Total US Oil Production}_{t-1}},$$



## Empirical Framework

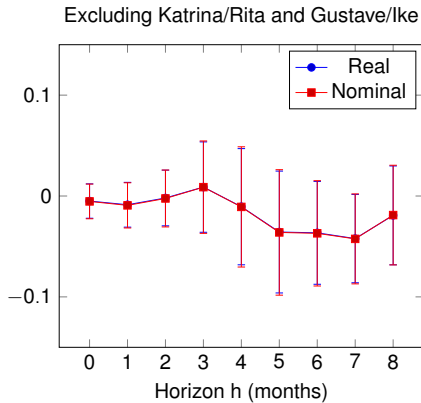
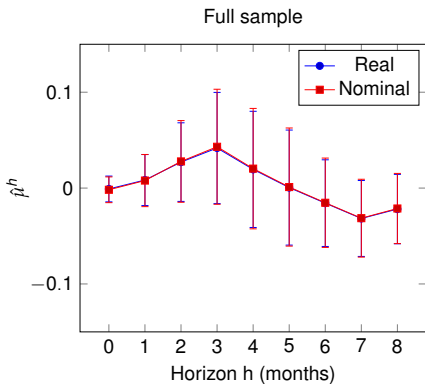
- ▶ Local projections of the oil supply shock  $\Psi_t$  on US economic data (Jordá 2005)

$$y_{t+h} = \sum_{i=1}^k \rho^{i,h} y_{t-i} + X_t \beta^h + \mu^h \psi_t + e_t$$

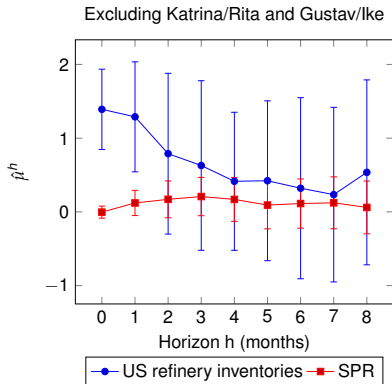
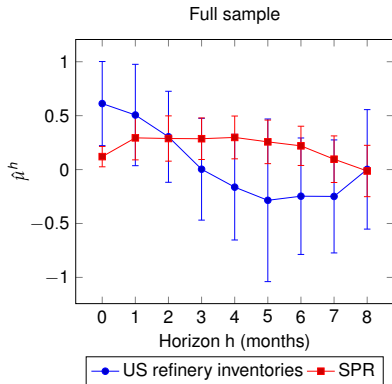
- ▶ Include lags of dependent variable as recommended by Olea and Plagborg-Møller (2021)
- ▶ Use inverse hyperbolic sine,  $\psi_t = \sinh^{-1}(\Psi_t)$ , to account for zeros and negative values

## Response of oil-market variables

# Response of Crude Oil Prices



# Response of Crude Oil Inventories



$\hat{\mu}^h$  represents the change in inventories relative to the size of the supply shock.

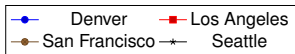
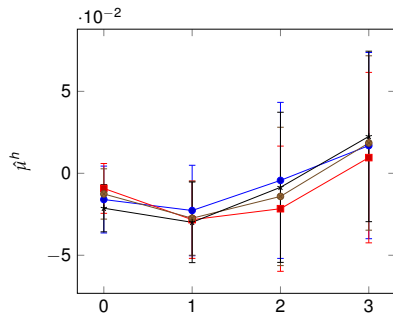
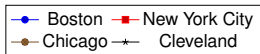
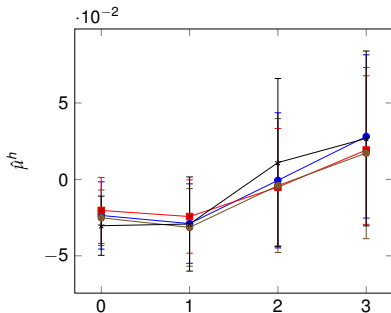


## Interpretation

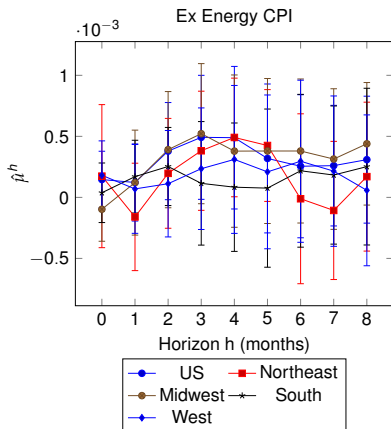
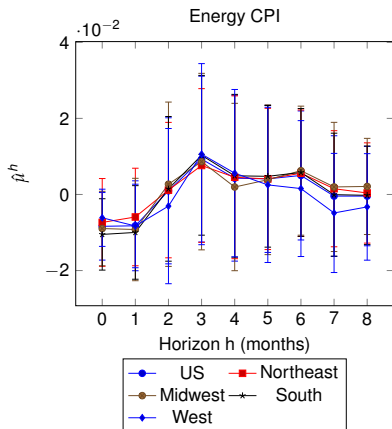
- ▶ No significant effect on crude oil prices
- ▶ Refinery inventories seem large enough to buffer typical US supply shocks

## Response of nominal variables

# Response of City-Level Gasoline Prices

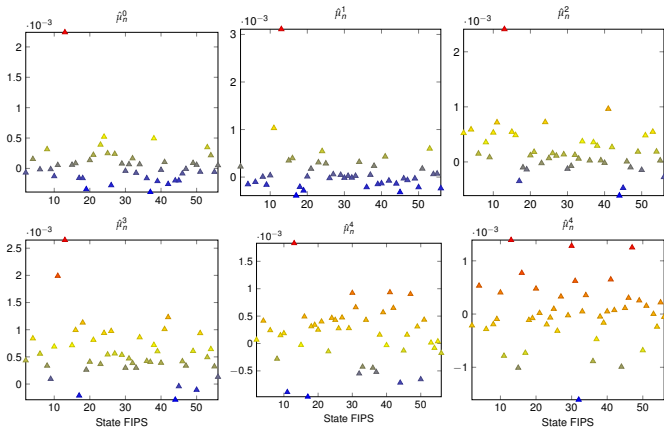


# Response of CPI by Region

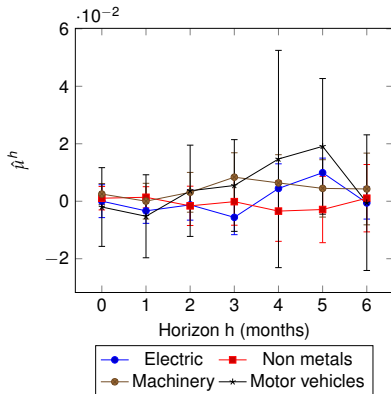
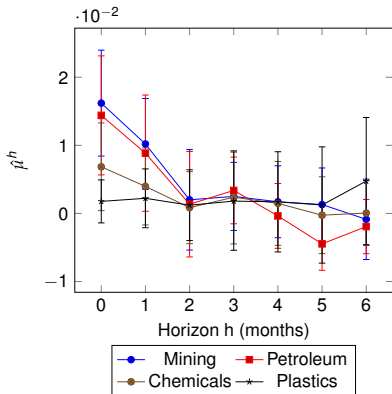


# Response of real economic variables

# Response of State-Level Employment



# Response of Industrial Production By Sector



## Takeaways

- ▶ No evidence transitory oil supply shocks spill over the real economy outside the oil sector
  - including Canadian energy exports and CAD/USD FX
- ▶ Response of inventories, prices consistent with transitory shock in *Theory of Storage* (Working 1949, Pindyck 1994, Kilian & Murphy 2014)
  - nature of supply shocks matters
  - news about futures supply or SVAR supply shocks might reflect more persistent shocks (Känzig 2021, Herrera & Rangaraju 2020)
- ▶ Generally: crude oil price data not always useful to identify temporary oil supply shocks