Implications of Climate Change for Monetary Policy

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Exogenous climate change shocks, endogenous responses, and monetary policy

A. Role of monetary policy in climate arena
- Climate => monetary policy
- Monetary policy => climate policy (not Fed)

B. Three risks (Carney 2015) (exogenous disturbances)
1. Physical risks
   - Extreme weather (storms, floods, etc.)
   - Crop failures
   - Productivity, health, & mortality impacts
   - Sea level rise
   - Climate migration
   - ...

2. Transition risks
   - Asset revaluation
   - Energy price volatility
   - Sectoral reallocation/dislocation
   - Food price volatility
   - Policy risks
   - Political risks
   - ...

3. Liability risks (will not discuss)

C. Macro consequences (endogenous response)
1. Low frequency
2. Business cycle frequency
Timeline of physical and transition risks

Macro impacts

Macro consequences (endogenous response)

1. Low frequency
   - Long run productivity growth
   - Patterns & location of innovation
   - $R^*$, $u^*$, $\pi^*$

2. Business cycle frequency
   - Physical disruptions (heat waves, storms, etc.)
   - Direct effects of transition policy on real activity & inflation
     - Carbon price
       - Carbon tax
       - Cap & trade
       - Implicit carbon price (regulatory)
       - Border carbon adjustment
     - Technology policy
     - Weeds (e.g., grid reliability)
Timeline of physical and transition risks

Macro impacts

Macro consequences (endogenous response)

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3. The transition will not be easy or neat
   - Inefficient transition policy risks (policy uncertainty, ...)
   - Transitional fossil fuel price volatility (“non-transition” risk)
   - Political risk (impacted communities & populism in US; climate migrations; political economy of O&G companies...)
   - Geopolitical risk (China & metals? Petro-states (Russia) in decline? Governance of solar geo?)
   - Wild stuff: unknown unknowns
Transition policy case study #1: carbon tax*

Data set:
- EU + Iceland + Norway + Switzerland (n = 31)
  - all countries in the European ETS
  - Of which, 15 also have a carbon tax, almost entirely on emissions not covered by the ETS (surface transport)
- Annual, 1985 – 2018; World Bank, Eurostat, IEA, Norway, Ireland
  - EU ETS started in 2005

Method: LP, identified by tax rate being predetermined administratively

Key points:
- Negligible effect on GDP or employment
  - Some evidence of benefits higher if CT is accompanied by revenue recycling
- Small effect on emissions
  - Consistent with other studies (Green [2021])
  - In line with elasticity of demand for petroleum
  - But emissions effect would be much larger in US power sector
- Monetary policy implication:
  - Boring (but effective) climate policy lets monetary policy be boring too.

Caveats:
- Aggregate effect masks sectoral & regional reallocation & job loss/gain
- Possibly greater macro costs from cap & trade system (EU ETS – Känzig 2021), perhaps b/c of price volatility, perhaps sectoral coverage

Transition policy case study #2: Climate policy uncertainty*

*Gavriliis, D. Känzig, & JH Stock, work in progress
Transition policy case study #2: Climate policy uncertainty

**Data set:**
- Climate policy uncertainty index (CPU): Gavriilidis (2021); cf Engel et al (2020)
  - Akin to Baker-Bloom-Davis Economic Policy Uncertainty construction
  - News articles including climate terms and policy terms and uncertainty
  - 8 (2) newspapers: 2000m1-2021m12 (1984m1-2020m12)
  - Policy news spikes include: Kyoto, Fuel economy rules, Clean Power Plan, Trump withdrawal from Paris, etc.
- Correlation with BBD EPU: 0.07 (8-paper) and 0.02 (2-paper) (!)

**Method:** LP & SVAR
- Identification: CPU is CMI given contemporaneous control variables: BBD-EPU, IP, unemployment rate, PCE inflation, WTI price, 90-day T-bill rate

**Caveats:** Usual BBD EPU caveats

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**Climate policy uncertainty indicators**
(based on 2 & 8 newspapers)
Ukraine, natural gas prices, & cyclical implications of fossil fuel price shocks for US

Three regimes in US gas markets:
I. <= ~2009: growing & large imports
II. 2010 – 2016: Fracking & “locked in”
III. 2016 – present: LNG exports

Quantities

Import share of US natural gas consumption

Brent oil price & EU natural gas price

Cheniere Sabine Pass Train 1 was placed into service May 2016.

Transition policy case study #3: “Non-transition” policy & FF price volatility
Discussion

- Henry Hub & EU gas prices are currently *not* linked
  - Liquifaction + transport + regasification ≈ $4-7/mmBTU
- But suppose:
  - Russian gas partially shut in over 5-year horizon
  - Expansion of US LNG export capacity & EU liquefaction capacity
  - $5-6 US gas?
  - Volatile oil prices for the foreseeable future?
  - Volatile US gas prices for the foreseeable future?
  - Oil price shocks will impact power & industrial sectors?
  - Greater macro (business cycle) exposure to oil price shocks?

**Correlation between n-week pct change of Brent crude & Henry Hub gas**

<table>
<thead>
<tr>
<th></th>
<th>2-week</th>
<th>4-week</th>
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<tbody>
<tr>
<td>I. 2000-2009</td>
<td>0.28</td>
<td>0.21</td>
</tr>
<tr>
<td>II. 2010-April 2016</td>
<td>0.08</td>
<td>0.03</td>
</tr>
<tr>
<td>III. May 2016-present (x 2020)</td>
<td>0.18</td>
<td>0.22</td>
</tr>
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Concluding remarks: Macro climate risks

Summary
1. The transition is likely to be neither efficient nor smooth
   - Policy choices/non-choices
   - Political/geopolitical stresses

2. These difficult-to-predict transition risks could pose significant challenges for macro management & monetary policy.