Discussion of “Monetary Policy for the Energy Transition”

by Luca Fornaro, Veronica Guerrieri and Lucrezia Reichlin

Andrea Ferrero

University of Oxford

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Question and Motivation

- **How will green transition impact monetary policy tradeoffs?**

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- **Extremely topical** $\rightarrow$ Climate change becoming growing concern for (some) central bankers

"The new environment sets the stage for larger relative price shocks than we saw before the pandemic. If we face both higher investment needs and greater supply constraints, we are likely to see stronger price pressures in markets like commodities…

And relative prices will also need to adjust to ensure that resources are reallocated towards growing sectors and away from shrinking ones. Large-scale reallocations can also lead to rising prices in growing sectors that cannot be fully offset by falling prices in shrinking ones, owing to downwardly sticky nominal wages. So the task of central banks will be to keep inflation expectations firmly anchored at our target while these relative price changes play out."

ECB President Christine Lagarde
Jackson Hole Symposium 2023

Approach and Results

- Two steps
  1. Develop two-sector **model** with nominal rigidities, supply constraints and endogenous innovation
  2. **Estimate** effects of financial shocks on R&D and investment of **green** and **brown** firms

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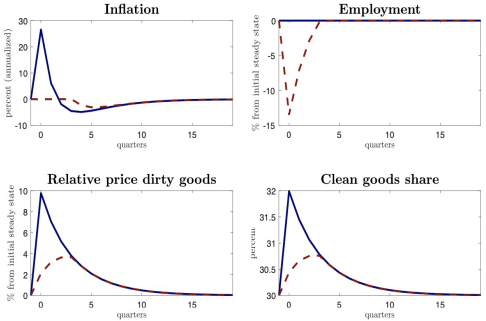
R#1: Temporary tightening of supply constraint on production of **dirty** goods



- Increase in relative price of **dirty** goods
  - ★ Endogenous cost-push shock
- Inflation-employment tradeoff
  - ★ Severity depends on monetary policy rule

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R#2: Permanent tightening of supply constraint on production of **dirty** goods

- With aggressive inflation stabilization
  - ★ Large and persistent employment losses
  - ★ Slower **green** transition
- Similar results with endogenous **green** innovation (less persistence)

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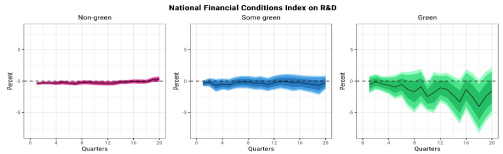
R#3: Tighter financial conditions reduce R&D and investment



- Effect on R&D explained by **green** innovators
- Effect on investment explained by non-green companies

Comments

1. Mechanism and related literature

2. Lessons from the model

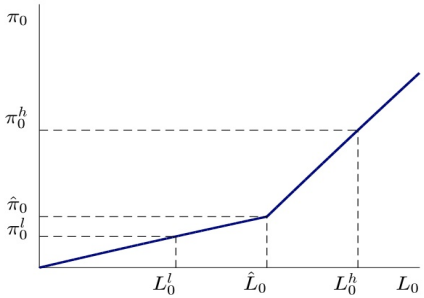
3. Link between model and empirics

Comment #1: Mechanism

- Occasionally binding supply constraint on intermediate goods

$$Y_t = L_t^{1-\alpha} \int_0^1 A_{j,t}^{1-\alpha} x_{j,t}^{\alpha} dj \qquad \text{with} \qquad x_{j,t} \leq \bar{x}_{j,t}$$

  - Gives rise to **non-linear Phillips curve**



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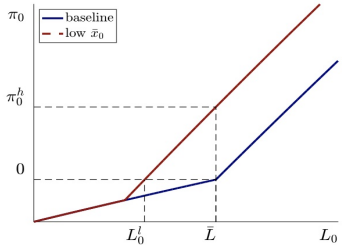
- Tighter regulation on **brown** sectors $\rightarrow$ Supply constraints become binding more often



  - Phillips curve becomes steeper at lower level of employment
  - Higher inflation volatility and more difficult inflation-employment tradeoff

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- Several examples of **non-linear Phillips curve frameworks** following recent inflation surge
  - E.g. Benigno and Eggertsson (2023) $\rightarrow$ Search-and-matching + downward wage rigidities

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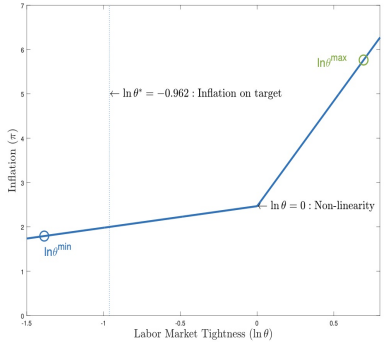

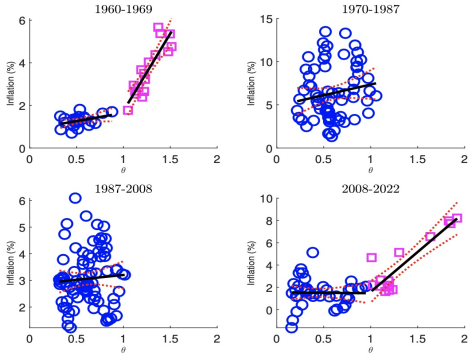

- See also Iwasaki, Muto and Shintani (2021) and Harding, Lindé and Trabandt (2022)

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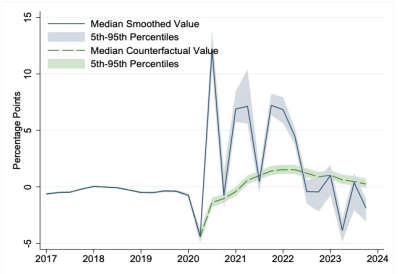
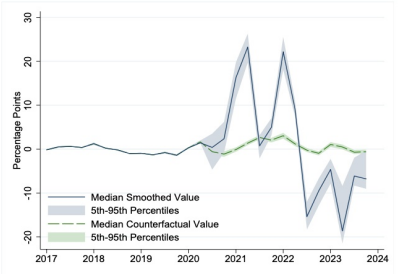
- Comin, Johnson and Jones (2024) $\rightarrow$ Multi-sector open economy with **supply constraints**
  - Supply constraints particularly important to explain intermediate inputs inflation

(c) Domestic Goods Price Inflation ($\pi_t(1)$)



(d) Imported Goods Input Inflation ($\pi_{Mt}(1)$)



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- This paper's **contribution** $\rightarrow$ Extend idea to **green** transition
  - Results #1 and #2 extremely informative for current policy debate (Lagarde, 2023)

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- This paper's contribution → Extend idea to **green** transition
  - Results #1 and #2 extremely informative for current policy debate (Lagarde, 2023)
- **Are results quantitatively too extreme?**
  - **Brown** firms could undertake **green** innovation to relax their supply constraint
  - Do supply constraints appropriately capture tighter regulation (short vs. medium/long-run)?

Comment #2: Lessons from the Model

- Interesting **connection between cycle and trend** (builds upon Benigno and Fornaro, 2018)
  - Also similar to Moran and Queralto (2018) and Anzoategui, Comin, Gertler and Martinez (2019)

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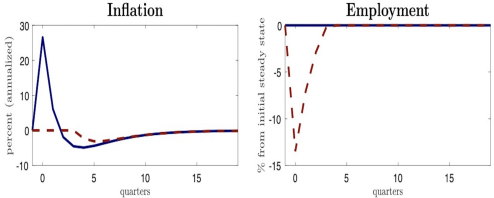
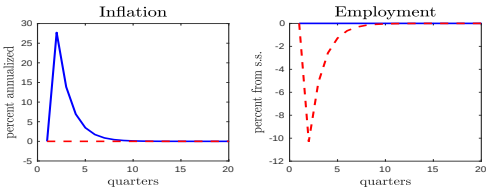
- Temporary tightening of supply constraint (**R#1**) = Cost-push shock in baseline NK model





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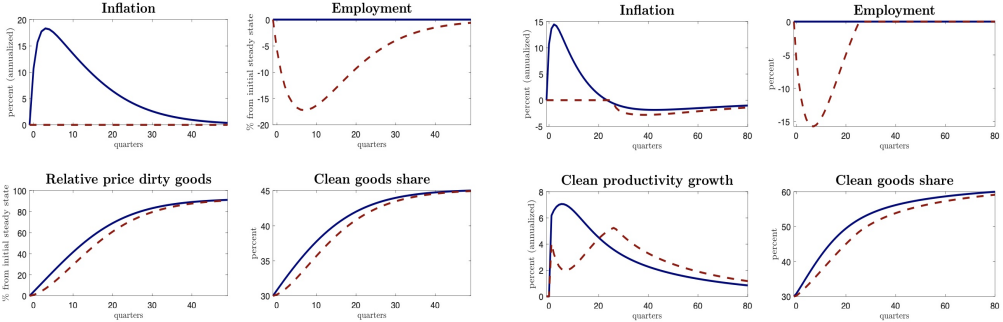
- Permanent tightening of supply constraint (**R#2**) more closely related to **green** transition
  - Endogenous innovation $\rightarrow$ Monetary policy affects **green** productivity growth



Comment #3: Link between Model and Empirics

- **Empirics felt somewhat disconnected from theory** $\rightarrow$ Provide more supportive evidence
  - Is Phillips curve steeper in sectors with tighter climate-related restrictions?
  - Have **brown** firms increased prices by more in response to climate-related tighter constraints?

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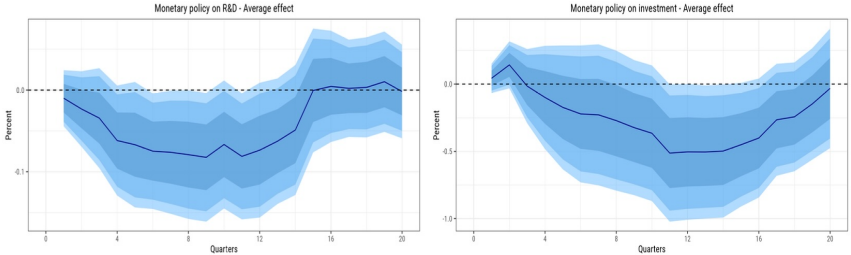

  - **No result by group** because *"...very imprecisely estimated"*

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    - Monthly instrument with quarterly data $\rightarrow$ All literature aggregates up (e.g. Ottonello and Winberry, 2020)
    - Instrument availability (until 2016) $\rightarrow$ Updates available (e.g. Choi, Willems and Yoo, 2024)
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- Focus on **effects of financial conditions on R&D and investment** because

  "Policy rate may miss important relevant factors for innovation financing such as risk and leverage"

  - **Financial frictions more important than monetary policy for green transition?**

Other Comments, Questions, and Suggestions

- Do supply constraints give rise to **brown** premium (Bolton and Kacperczyk, 2021)?
- Probably not easy to substitute **brown** inputs with labor over short run
  - Different short and long-run elasticity of substitution
- **Green** firms likely smaller and younger $\rightarrow$ More financially constrained?
  - Could financial channel offset supply constraints?
- Döttling and Lam (2023) $\rightarrow$ Monetary policy shocks affect more stock prices of **brown** firms
  - Also reduce emissions more than **green** firms
- Could EU regulation be exploited more directly for empirical analysis?
  - Europe also more exposed to recent energy price shock and geo-political turmoil

Conclusions

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  - Temporary tightening of supply constraints $\rightarrow$ Endogenous cost-push shocks
  - Permanent tightening $\rightarrow$ Aggressive inflation stabilization slows down transition
  - Tighter financial conditions reduce R&D of **green** innovators

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- **Main findings:**
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- **Three comments:**
  1. Results very relevant for current policy debate (but perhaps too extreme)
  2. Connection between cycle and trend nicely captures some key features of transition risk
  3. Empirics suggest important role for financial frictions