GLOBAL SUPPLY CHAIN PRESSURES, INTERNATIONAL TRADE, AND INFLATION

Online Workshop “Challenges and recent advances in modelling and forecasting inflation”

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November 28, 2022

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Inflation in the age of Covid-19

• Since early 2020 large swings in economic activity characterized by:
  ▶ Collapse and rebound in domestic demand, GDP, and international trade
  ▶ Consumption substitution across sectors (goods for services and back)
  ▶ Labor shortages across sectors/countries (pandemic/lockdowns and recovery)

• Result: **highest inflation of last four decades!**

• **Key question:** Can monetary policy be effective in bringing down inflation?

To answer, we need to quantify:

1. Drivers of the current inflation
2. International dimension
Quantification of Inflation Drivers based on a Structural Model

• **Approach:** Try to mimic real-life 2021 events as much as we can
  
  ▶ Co-existence of slack and inflation
  ▶ Output lower than potential ⇒ cannot be all demand shocks
  ▶ Timing and sectoral heterogeneity: Goods vs services inflation, sectoral inflation becoming broad based

**Important to focus on:**

▶ Covid is a set of disaggregated demand and supply shocks with asymmetric recovery before Russia-Ukraine war—2019q4-2021q4

▶ Linking sectoral imbalances and labor shortages—demand (slack) and supply (tight) constrained sectors

▶ Global and local supply chain disruptions—sectoral shifts in consumption demand connected with sectoral production using intermediate inputs and labor
Simultaneous Slack and Inflation

(a) Euro Area

(b) United States

Source: FRED
Larger declines in consumption, faster recovery in durables

(a) Euro Area: Decomposition

(b) United States: Decomposition

Notes: Seasonally-adjusted real private consumption. Source: OECD Quarterly National Accounts.
Inflation in goods picked up earlier than inflation in services

(a) Headline

(b) Core

(c) Services

(d) Goods

Year on Year Change

Source: FRED.

Global Supply Chain, Trade, and Inflation
di Giovanni, Kalemli-Ozcan, Silva, and Yildirim
Production Network is Global

(a) 65 Countries

(b) 45 Industries
Model
Inflation in a Network-Macro Model

• Based on Baqee and Farhi (2022, AER) (w/simplifications)
  ▶ Two period closed economy model
  ▶ Ricardian households with perfect foresight
  ▶ Multiple sectors that produce using factors and intermediate inputs
  ▶ Perfect competition in factors and good markets
  ▶ Downward nominal wage rigidity, Zero-lower bound.

• Model allows for rich set of shocks ⇒ Can run counterfactuals.
  ▶ Aggregate demand
  ▶ Sectoral demand
  ▶ Sectoral factor supply
Quantification
1. Sectoral Demand Shocks: Observed expenditure shares changes.
   - US Data: BEA sectoral personal consumption expenditure
   - Euro Area Data: Three sectors data from OECD Quarterly National Accounts

2. Sectoral Potential Supply Shocks: Observed changes in total hours worked.
   - US Data: BLS tables.
3. Aggregate Demand Shocks: Backed out from

\[
\text{Observed CPI Inflation } + \text{ Sectoral hours worked changes}
\]

- US Network Data: FRED, 2015 BEA IO Tables, BLS.
Demand and Supply Drivers of Inflation

(a) US: 66 Sectors, Obs. Inflation: 8.47

(b) EA: 45 Sectors, Obs. Inflation: 4.69

Role of Complementarities

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Open Economy
Decomposing Inflation in a Multi-Country Model

- We follow Çakmaklı, Demiralp, Kalemli-Özcan, Yeşiltaş, Yıldırım (2021).
- Model is same as the closed economy +
  - Foreign intermediate/consumption goods
  - Trade balance at the country-level.
  - Three countries: Euro Area, United States, and the Rest of the World

![Graph showing inflation with categories: Shocks Everywhere, EA Shocks Only, Outside EA Shocks Only, with values 5.34, 1.99, and 3.26 respectively.]
Conclusion

- Global health shock + limited substitutability across inputs $\Rightarrow$ supply chain bottlenecks $\Rightarrow$ rise in prices

- **Supply shocks are important!**
  - Supply shocks account for 1/2 of observed EA inflation, 1/3 of observed US inflation
  - Foreign shocks account for 2/3 of the Euro Area inflation

- **Demand stimulus in a supply constrained world has larger inflationary effects**
  - Monetary policy can tame inflation by contracting aggregate demand, however, there will remain an upward pressure on price growth with sectoral supply shocks and bottlenecks

- A network model with asymmetric sectoral supply and demand shocks $\Rightarrow$ sectoral cost-push shocks $\Rightarrow$ inflation
Thank you!

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