Endogenous Technology, Scarring and Fiscal Policy

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1. Analyzes **scarring following economic crises** by means of a DSGE model with **endogenous technology growth**:
   - Scarring mechanisms (demand-driven, supply-driven, demand-and supply-driven (f.ex. COVID crisis) )
   - Long-run TFP scars and role of cycle-trend interaction

2. Studies **fiscal policy** under **endogenous technology-enhancing investment and TFP growth**:
   - Government spending
   - Novel fiscal policy tool in DSGE setup: growth policies
   - Role of ELB and monetary-fiscal interaction

3. Derives **fiscal multipliers** under **endogenous growth**:
   - Accounts for spillovers to the technology stock and hence aggregate supply
   - Short- and long-run multipliers and permanent effects of fiscal stimulus
Model

- New Keynesian model with endogenous technology growth through productivity-enhancing investment
- Medium-scale DSGE model:
  - Calvo price and wage rigidities
  - Monetary policy rule
  - ELB constraint
- Endogenous technology growth mechanism (Comin and Gertler (2006)):
  - Endogenous technological frontier: entrepreneurs’ investment in R&D
  - Endogenous technology adoption choice: technological diffusion on the firm-level
- Fiscal policy:
  1. Government spending
  2. Growth-promoting fiscal policy tools: fiscal support to R&D and technology adoption
  3. Role of and interaction with ELB
Endogenous scarring effects following recessions

- Scarring effects on long-term aggregate supply: permanent losses in technology stock and aggregate output
- Cycle-trend interaction: permanent costs of recessions
- Scarring effects can occur both in demand- and supply-driven recessions (key difference: inflation response)

Scarring: demand-driven recession
LONG-RUN NON-NEUTRALITY: INTENSIFICATION OF SCARRING EFFECTS AT THE ELB
GOVERNMENT SPENDING CROWDS OUT INVESTMENT IN TECHNOLOGY OUTSIDE THE ELB

Response to a gov’t spending shock (1 % of GDP)
Growth policies

- Endogeneity of technology growth opens possibility for different type of fiscal policy tools → fiscal growth policies
- Well-established role of growth-promoting policies in long-run endogenous growth literature, changed role in the DSGE setup:
  - Short-run demand stabilization tool
  - Reduction of spillovers from cycle to trend and scarring effects
- Various options (owed to two-stage technology process):
  1. Fiscal support to entrepreneurs’ research and development
  2. Fiscal support to firms’ technology adoption activities
    → differ in terms of timing and effect of fiscal policy
- Motive for fiscal policy mix
**Fiscal growth policies: R&D**

Response to fiscal support to R&D (1 % of GDP)
FISCAL GROWTH POLICIES: TECHNOLOGY ADOPTION

Response to fiscal support to adoption (1 % of GDP)
Fiscal multipliers

- Fiscal policy influences the technology stock and hence the long-run trend

- Short- and long-run implications of fiscal stimulus

- Fiscal multipliers of subsidies to R&D and technology adoption can be considerable
Conclusions

1. Scarring effects in TFP can occur endogenously following both demand- and supply-driven recessions

2. Increased importance of monetary-fiscal interaction:
   - Intensification of scarring effects at the ELB
   - Fiscal tools can reduce depth of recession and long-run scars

3. Growth policies as novel fiscal tools in the DSGE context: support to R&D and adoption
   - Short-run demand stabilization and boost to long-run trend
   - Fiscal policy mix (simultaneous support to R&D + technology adoption) most effective

4. New insights on fiscal multipliers:
   - Short- and long-run dimension, permanent effects of fiscal stimulus
   - Impact of fiscal policy more far-reaching than conventionally assumed