

ENDOGENOUS TECHNOLOGY, SCARRING AND FISCAL POLICY

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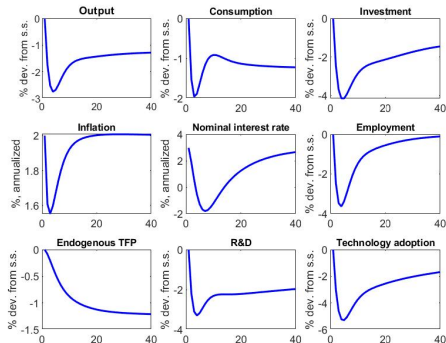
1. Analyzes **scarring following economic crises** by means of a DSGE model with **endogenous technology growth**:
 - Scarring mechanisms (demand-driven, supply-driven, demand- and supply-driven (f.ex. COVID crisis))
 - Long-run TFP scars and role of cycle-trend interaction
2. Studies **fiscal policy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

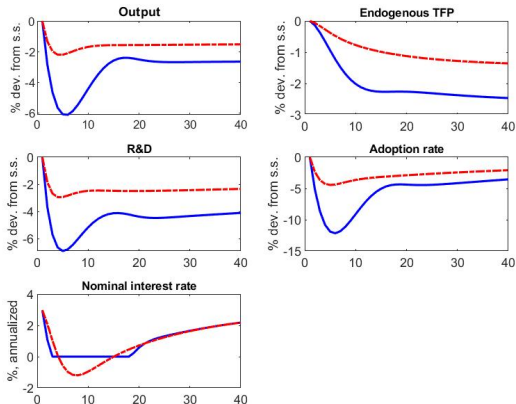
ENDOGENOUS SCARRING EFFECTS FOLLOWING RECESSIONS

- 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)

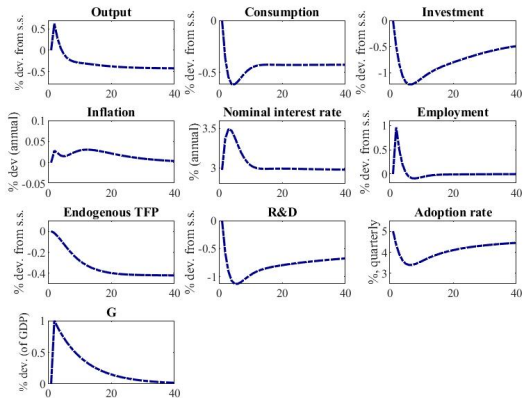


Scarring: demand-driven recession

LONG-RUN NON-NEUTRALITY: INTENSIFICATION OF SCARRING EFFECTS AT THE ELB



GOVERNMENT SPENDING CROWDS OUT INVESTMENT IN TECHNOLOGY OUTSIDE THE ELB

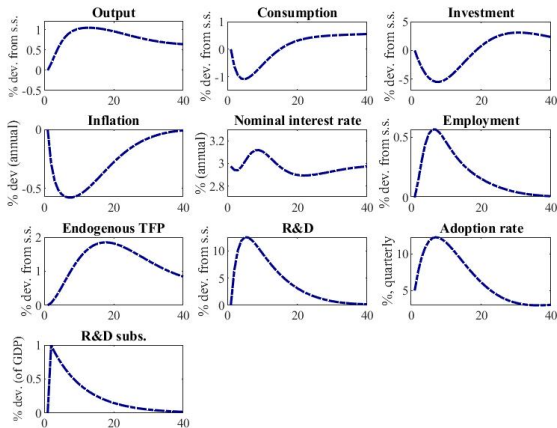


Response to a gov't spending shock (1 % of GDP)

GROWTH POLICIES

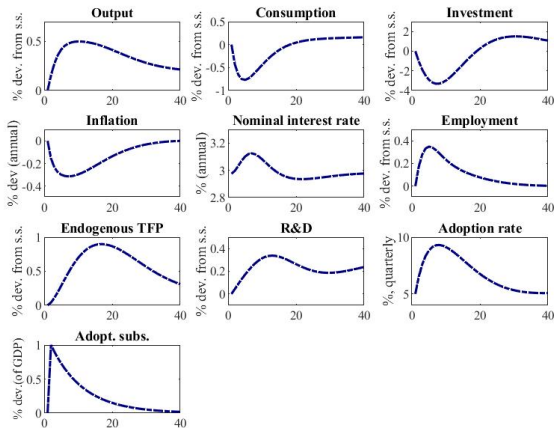
- Endogeneity of technology growth opens possibility for **different type of fiscal policy tools** → fiscal growth policies
- Well-established role of growth-promoting policies in long-run endogenous growth literature, **changed role in the DSGE setup**:
 - Short-run demand stabilization tool
 - Reduction 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