Simple Analytics of the Government Expenditure Multiplier
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Roadmap

- Review main argument is simple-simple model
- Implications
- Assumption that warrants further scrutiny
Setup

- Preferences:
  \[ \sum_{t=0}^{\infty} \beta^t [u(C_t) - v(H_t)] \]

  \( C_t \): CES aggregator

- Technology for variety \( i \):
  \( y_{it} = f(h_{it}) \)

- Standard monopolistic competition setup

- \[ G_t = \begin{cases} 
  G_0 \\
  0 & \text{for } t > 0 
\end{cases} \]

  \( G \) paid with lump-sum taxes.
Neoclassical (Flex Price) Equilibrium

- SS from period 1, independent of past (on real side)
- Euler equation: \( u'(C_0) = \beta(1 + r_0)u'(C^{SS}) \)
- Intratemporal (household and firm) optimization: \( \frac{\nu'(H_0)}{\mu f'(H_0)u'(C_0)} = 1 \)
- Market clearing: \( f(H_0) = C_0 + G_0 \)
- Some equations to determine nominal side
New Keynesian (Calvo Price) Equilibrium

- SS from period 1, independent of past (up to first order, on real side)
- Euler equation: \( u'(C_0) = \beta(1 + r_0)u'(C^{SS}) \)
- Intratemporal optimization: \( \frac{\nu'(H_0)}{\mu f'(H_0)u'(C_0)} = 1 \)
- Market clearing: \( f(H_0) = C_0 + G_0 \)
- Other equations to determine nominal side

\[
\pi_0 \approx \frac{(1-\alpha)(1-\alpha\beta)}{\alpha} \hat{s}_0
\]
Key insight

- In the NK model, CB can affect real rates ($r_0$);
Key insight

- In the NK model, CB can affect real rates ($r_0$);
- Given $r_0$, $C_0$ is pinned down by Euler equation:
  
  \[ u'(C_0) = \beta(1 + r_0)u'(C^{SS}) \]
  
- Other equations only matter if they affect CB’s choice of $r_0$
Effect of $G$ on $C$

\[ u'(C_0) = \beta(1 + r_0)u'(C^{SS}) \]

- If $r_0 = r^{SS}$, $C_0 = C^{SS} \implies \Delta Y = \Delta G$
- If $r_0 > r^{SS}$, $C_0 < C^{SS} \implies \Delta Y < \Delta G$
- If $r_0 < r^{SS}$, $C_0 > C^{SS} \implies \Delta Y > \Delta G$
Fiscal and Monetary Policy

- Monetary policy rule:
  \[ i_t = \bar{r}(G_t) + \phi_\pi \pi_t + \phi_y \hat{Y}_t \]

- Fiscal multiplier can be anything (1,000,000?)
Fiscal and Monetary Policy

- Monetary policy rule:

\[ i_t = \bar{\ell}(G_t) + \phi_\pi \pi_t + \phi_y \hat{Y}_t \]

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- Caveats:
  1. Zero bound
  2. Nonlinearities
Robustness

- Effect of $G$ on $C$ does not depend on sticky prices vs. sticky wages, other sources of nonneutrality, ...
- Only depends on Euler equation
- Euler equation still central when capital is included
Where to Next: Euler Equation Residuals

- Euler equation fails (Hansen and Singleton, 1983);
- When using policy rate, Euler equation residuals are cyclical (Canzoneri, Cumby and Diba, 2007; Atkeson and Kehoe, 2008);
- Euler equation residuals explain a large fraction of consumption variation in DSGE models;
- Are Euler equation residuals fixed when $G$ varies and monetary policy responds?