A THEORY OF COUNTERCYCLICAL GOVERNMENT MULTIPLIER

Pascal Michaillat

Advanced Macroeconomics– March 2024

GOVERNMENT SPENDING MULTIPLIER

- The effectiveness of government spending has been one of the central topics in macroeconomics since Keynes established macroeconomics
- When a country faces deep recession, the debate of government spending multiplier heats up
- I show three strands of the literature of government spending multiplier and document the literature of state-dependency of the effectiveness

GOVERNMENT SPENDING MULTIPLIER

1. Neoclassical narrative approach (e.g., Ramey 2011)
2. New Keynesian time-series approach (e.g., Blanchard and Perotti 2002)
3. Regional analysis approach (e.g., Nakamura and Steinsson 2014)

RAMEY (2011)-TYPE

- Time-series data with news of military spending in the U.S.
- Use VAR/local projection to estimate the effectiveness of government spending
- Military spending is believed to be independent of business cycles
- Use news to control anticipation effect
- Consumption and wages decrease to the government spending shock
- Observation before Korean War is crucial

- Time-series data with general government spending in the U.S.
- The shocks are estimated from VAR structure (so, it is a deviation from the trend)
- Easy to implement in other countries with less military spending
- Endogeneity?
- Consumption and wages increase to the government spending shock

NAKAMURA AND STEINSSON (2014)-TYPE

- Use military spending data at state-level
- There is a huge variation of state-level military spending
- The observation increases (51 states!)
- Regression: $\frac{Y_{it} - Y_{it-2}}{Y_{it-2}} = \alpha_i + \gamma_t + \beta \frac{G_{it} - G_{it-2}}{Y_{it-2}} + \epsilon_{it}$
- This is "relative multiplier"
- The point is time-effect: monetary policy and other effects are absorbed
- Relative multiplier is not aggregate multiplier
- They construct a model consistent with relative multiplier

STATE-DEPENDENCY OF GOVERNMENT SPENDING

- There are two strands of state-dependency of government spending
  1. Auerbach and Gorodnichenko (2012): government spending multiplier is larger in the recession than in the boom
  2. Ramey and Zubairy (2018): there is no significant difference of the gov-multipliers between in the recession and boom
- So, that's why theoretical model is important!!
- Michaillat (2014) is a seminal theoretical work in this field
- This research shows that government spending unemployment rate multiplier is higher in the recession
- Why? → In the recession, labor market is less tighter. So, less crowding out effect!!

SETTING: LABOR SUPPLY

- A measure 1 of identical labor force
- $n_t = l_t$ (private sector) $+ g_t$ (gov workers)
- The unemployed people at the start of t, $u_t = 1 - (1-s)n_{t-1}$
- Matching function: $h_t = m u_t^{\eta} v_t^{1-\eta}$
- Define $\theta_t \equiv v_t/u_t$ (tightness), $f(\theta_t) = h_t/u_t$, and $q(\theta_t) = h_t/v_t$
- Labor supply curve: $n_t = (1-s)n_{t-1} + (1-(1-s)n_{t-1})f(\theta_t)$
- Labor demand curve: $n^d(\theta_t, w_t, g_t) = g_t + l^d(\theta_t, w_t)$

GOVERNMENT

- The government employs g_t workers
- A public good production function: $z_t = \sigma g_t^\alpha$
- The budget constraint consists of wage payment, cost for hiring, and labor income tax:

$$g_t w_t + [g_t - (1-s)g_{t-1}]\frac{ra_t}{q(\theta_t)} + \frac{b_t}{p_t} = \tau_t w_t n_t + \frac{R_{t-1}}{p_t}b_{t-1}$$

- Government spending is not a waste! Actually about 60-70% of gov-spending is personnel expenses
- Monetary policy rule:

$$R_t = \frac{1}{\beta}(1+\pi_t)^{\mu_\pi(1-\mu_R)}(\beta R_{t-1})^{\mu_R}$$

HOUSEHOLD AND FIRM

- Household objective function and budget constraint:

$$E_0 \sum_{t=0}^{\infty} \beta^t (ln(c_t) + \chi ln(z_t))$$

$$p_t c_t + b_t = p_t n_t (1 - \tau_t) w_t + R_{t-1} b_{t-1} + p_t T_t$$

- Final good firms' production function

$$y_t = \left[\int_0^1 y_t(i)^{(\epsilon-1)/\epsilon} di \right]^{\epsilon/(\epsilon-1)}$$

INTERMEDIATE-GOODS FIRM

- The production function: $y_t(i) = a_t l_t(i)^\alpha$
- Facing Rotemberg's (1982) adjustment cost
- The monopolistic firms choose $l_t(i)$ and $p_t(i)$ to maximize,

$$E_0 \sum_{t=0}^{\infty} \frac{\beta^t}{c_t} \left\{ \frac{p_t(i)}{p_t} y_t(i) - w_t l_t(i) \right.$$
$$\left. - \frac{\phi}{2} \left(\frac{p_t(i)}{p_{t-1}(i) - 1} \right)^2 c_t - [l_t(i) - (1-s)l_{t-1}(i)] \frac{ra_t}{q(\theta_t)} \right\}$$
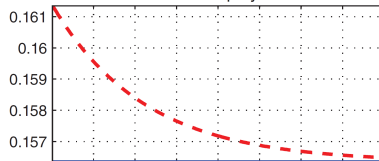
- Wage is rigid: $w_t = \omega a_t^\gamma, \gamma < 1$

- Does the effectiveness of government spending depend on recession/boom?
- First, give a positive/negative TFP shock to the economy
- Second, give a positive/negative TFP shock and positive government employment shock simultaneously
- Compare the two results for the boom and recession!
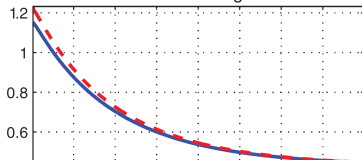
UNDER POSITIVE TFP SHOCKS (BOOM)
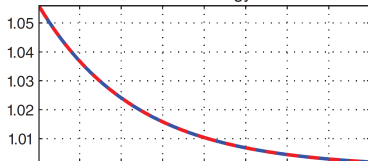
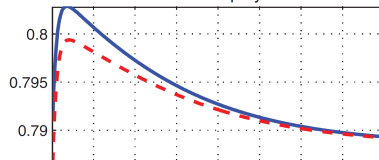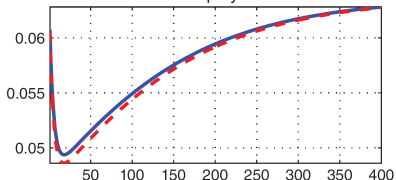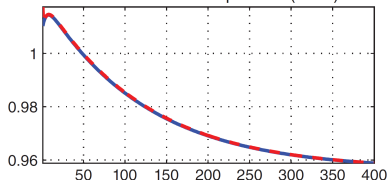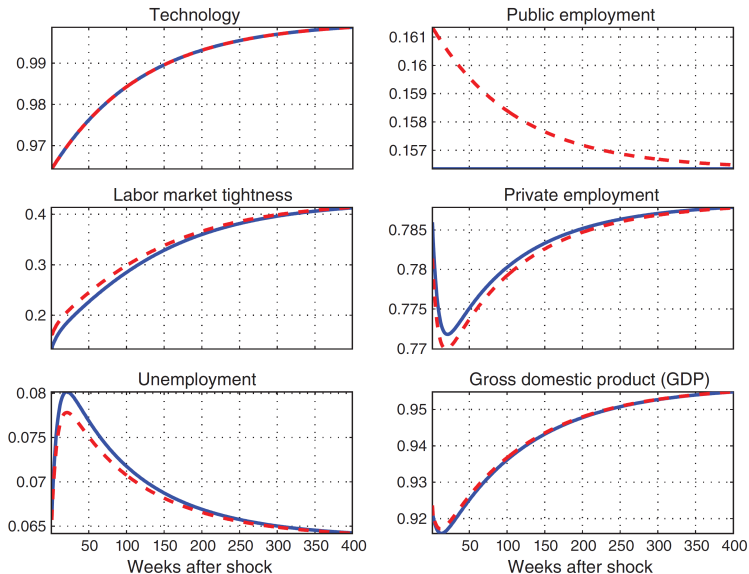# UNDER NEGATIVE TFP SHOCKS (RECESSION)

Figure 3. Responses to a Negative Technology Shock

CONCLUSION

- The effectiveness of government spending shock for unemployment is higher in the recession than in the boom
- Reason: labor market is tighter in the boom (higher hiring cost)
- Seminal paper for the state-dependency of government spending multiplier
- Other literature, for example, focuses on the effectiveness under zero lower bound, the progressivity of taxation, and signs of government spending
- Classical topic, but we have a lot to do