Measuring the Output Responses to Fiscal Policy: U.S. Fiscal Multiplier Over the Business Cycle

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Outline 1

Introduction

- Effects of government spending on output has been studied intensively for a long time, especially for the U.S case.
- Wide variety of methods (VAR, SVAR, DSGE, narrative approach) used.
- Inconclusive results.
- Theoretically:
  1. Neoclassical: multipliers are small (i.e. less than 1)
  2. Keynesian: multipliers tend to be large.
- Before Auerbach and Gorodnichenko (2012), all applied linear model.
- Fiscal multipliers may be larger in periods of slack (Parker (2011), Eggertsson (2010), Christiano et. al. (2011)).

Design

- U.S. data in 2012 dollars (all seasonally adjusted) in 1947:I–2018:IV.
- Aim for *state-dependent fiscal multipliers* by allowing for regime differences .

Specifications

Smooth Transition Vector Autoregression (STVAR)

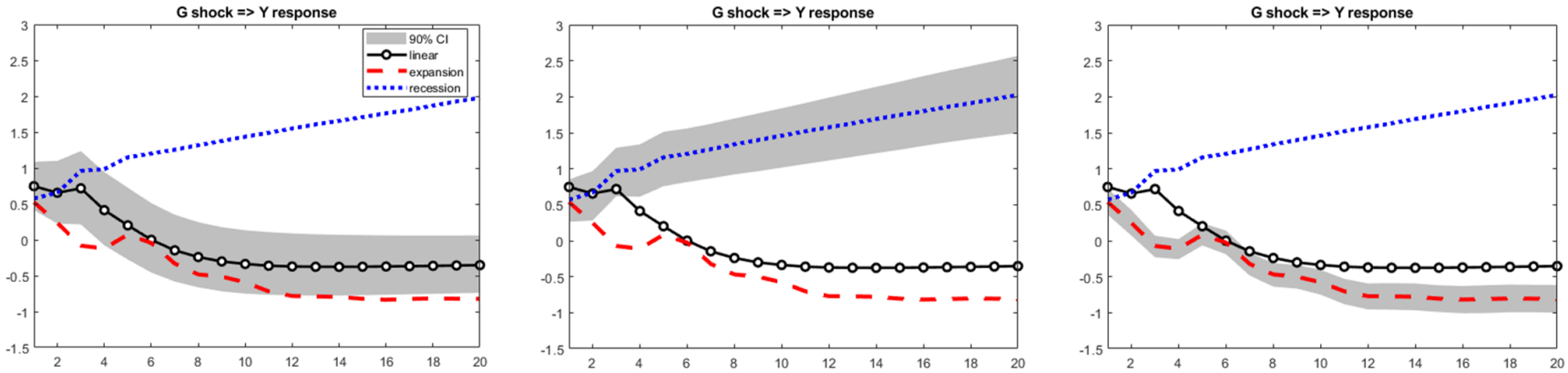
1. $\mathbf{X}_t = (1 - \mathbf{F}(z_{t-1}))\mathbf{\Pi}_E(L)\mathbf{X}_{t-1} + \mathbf{F}(z_{t-1})\mathbf{\Pi}_R(L)\mathbf{X}_{t-1} + \mathbf{u}_t$
2. $\mathbf{u}_t \sim N(0, \mathbf{\Omega}_t)$
3. $\mathbf{\Omega}_t = \mathbf{\Omega}_E(1 - \mathbf{F}(z_t)) + \mathbf{\Omega}_R\, F(z_{t-1})$
4. $\mathbf{F}(z_t) = \frac{exp(-\gamma z_t)}{1+exp(-\gamma z_t)},\ \gamma > 0$
5. $var(z_t) = 1,\ E(z_t) = 0$

Where:

- $X_t = [G_t\ T_t\ Y_t]'$,
- z_t is computed as 7-period MA of Q-to-Q growth rate of Y_t
- γ is calibrated to take value of 1.95—done to match NBER business cycle dates—that is, $P(F(z_t) \geq 0.87) \approx 0.13$.

Outline 2

Basic Aggregate Results

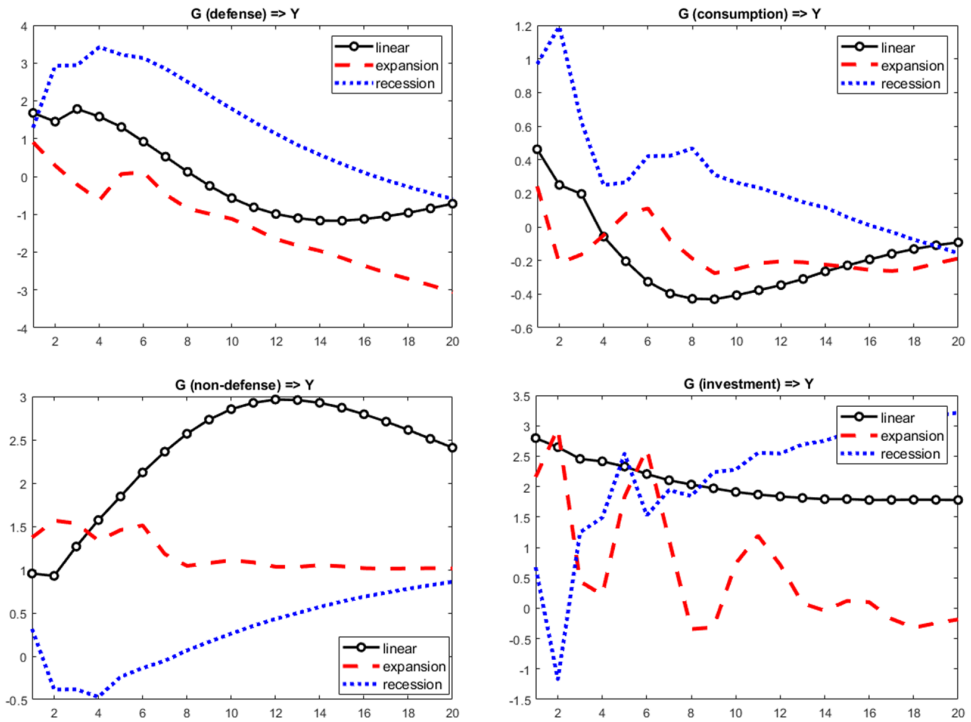


*impulse responses to a \$1 increase in government spending. IRFs are scaled by sample average values of Y/G.

Shaded gray area depict 90 percent Confidence Interval.

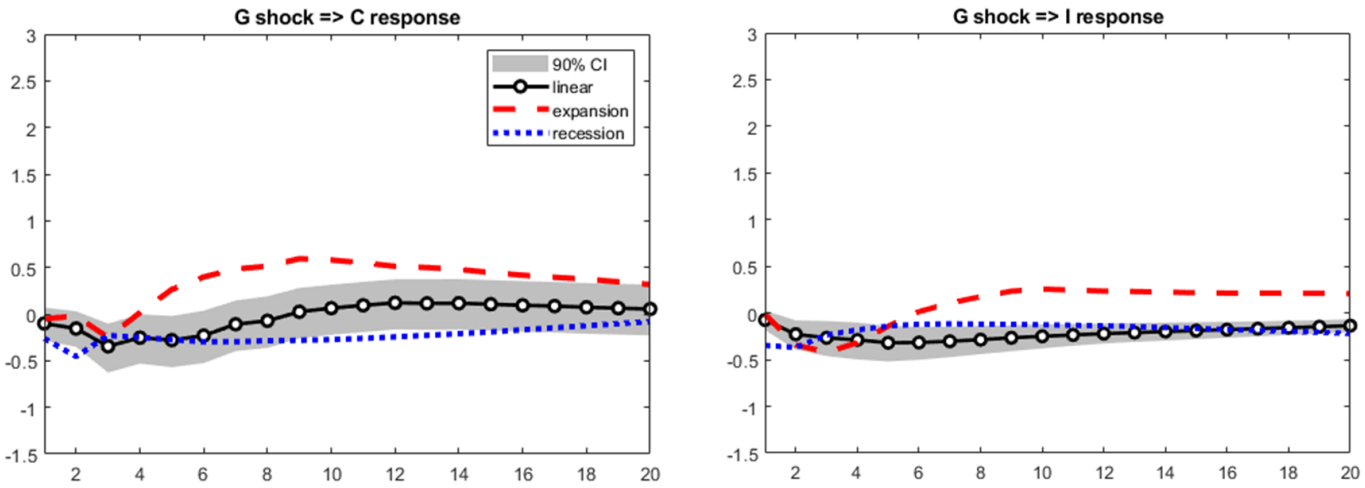
- Max. size of govt. spending multiplier in the linear model is about 0.75.
- Multiplier is much larger in recessions than in expansions–evidence of countercyclical fiscal multipliers which is consistent with Auerbach & Gorodnichenko (2012).

Shocks in Government Spending Compositions



- $X_t = [D_t ND_t G_t T_t Y_t]'$
- Linear VAR: responses of output are all positive for D, ND, C, and I with varying magnitude.
- Non-linear VAR: results differ by regime and spending component.

Effects on Components of Y_t

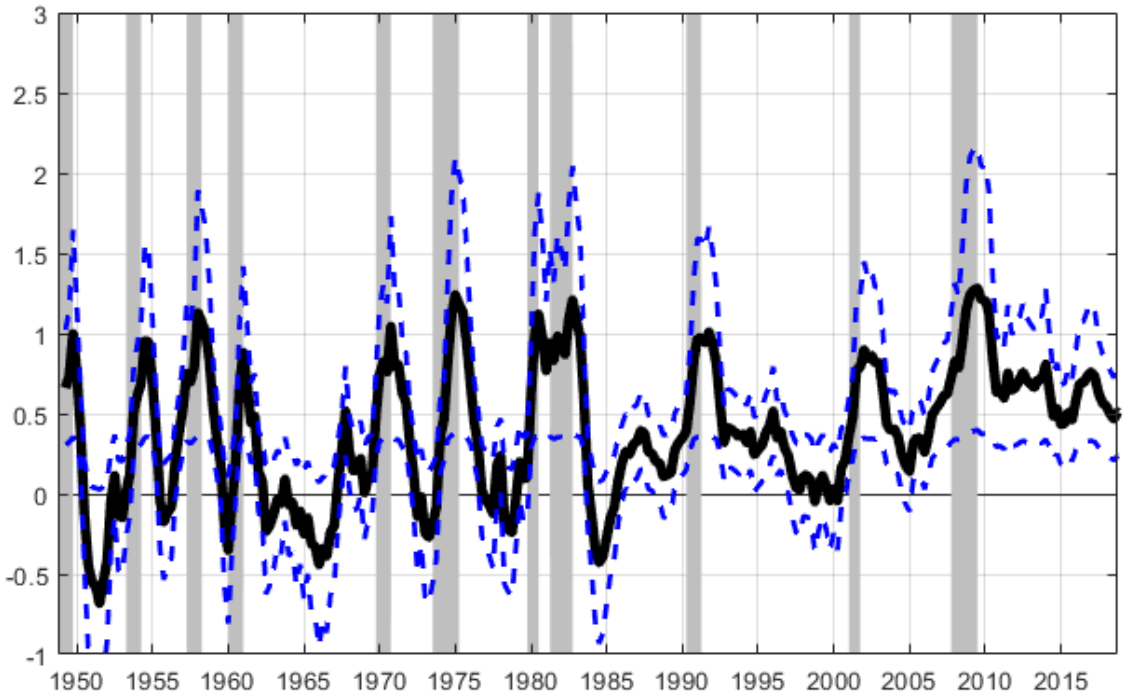


*impulse responses to a \$1 increase in government spending. IRFs are scaled by sample average values of C/G and I/G.

Shaded gray area depict 90 percent Confidence Interval.

- $X_t = [G_t\, T_t\, Y_t\, C_t\, I_t]'$
- Linear VAR: Both C and I are slightly crowded out by shocks in G_t.
- Non-linear VAR: signs of crowding-out are stronger in recessions.

Historical Multiplier



*Policy shock = 1 percent increase in G_t and a dollar increase in output per dollar increase in G_t over 20 quarters. Shaded gray area represent recession periods.

- Multiplier is between 0 and 0.5 in expansions and between 1 and 1.5 in recessions.
- Timing does matter.

Outline 3

Work in Progress & Next Step

- Incorporating 'expectations' into the model to purge expected shocks in G_t. This is to anticipate "fiscal foresight".
- Probably taking into account monetary policy indicator.

References