

Auerbach-Gorodnichenko

“Measuring the Output Responses
to Fiscal Policy”

AEJ-Economic Policy, 2012

Overview

- Investigate whether multipliers are higher during recessions.
- Use BP framework, but use a regime switching model.
- Find large differences in multipliers.

Econometric Specification

Use Granger-Teravirta STAR Smooth Transition Autoregressive Model.

Allows smooth transitions across states

Our basic specification is:

$$(1) \quad \mathbf{X}_t = (1 - F(z_{t-1}))\mathbf{\Pi}_E(L)\mathbf{X}_{t-1} + F(z_{t-1})\mathbf{\Pi}_R(L)\mathbf{X}_{t-1} + \mathbf{u}_t,$$

$$(2) \quad \mathbf{u}_t \sim N(0, \mathbf{\Omega}_t),$$

$$(3) \quad \mathbf{\Omega}_t = \mathbf{\Omega}_E(1 - F(z_{t-1})) + \mathbf{\Omega}_R F(z_{t-1}),$$

$$(4) \quad F(z_t) = \frac{\exp(-\gamma z_t)}{1 + \exp(-\gamma z_t)}, \quad \gamma > 0,$$

$$(5) \quad \text{var}(z_t) = 1, \quad E(z_t) = 0.$$

As in Blanchard and Perotti (2002), we estimate the equation using quarterly data and set $\mathbf{X}_t = [G_t \ T_t \ Y_t]'$ in the basic specification where G is log real government (federal, state, and local) purchases (consumption and investment),⁵ T is log real government receipts of direct and indirect taxes net of transfers to businesses and individuals, and Y is log real gross domestic product (GDP) in chained 2000 dollars.^{6,7} This ordering of variables in \mathbf{X}_t means that shocks in tax revenues and

More details

- Allow 2 differences across states:

(a) Contemporaneous impacts via differences in covariance matrices for disturbances.

(b) Via differences in lag polynomials $\Pi_R(L)$ and $\Pi_E(L)$

- z is an index (normalized to have unit variance) of the business cycle.

- $F(z_t) = 1$ is extreme recession, $F(z_t) = 0$ is extreme boom.

- They use z_{t-1} to avoid contemporaneous feedbacks from policy actions.

They measure Z_t is a 7-quarter MA of output growth.

But it's centered!!

They calibrate Υ .

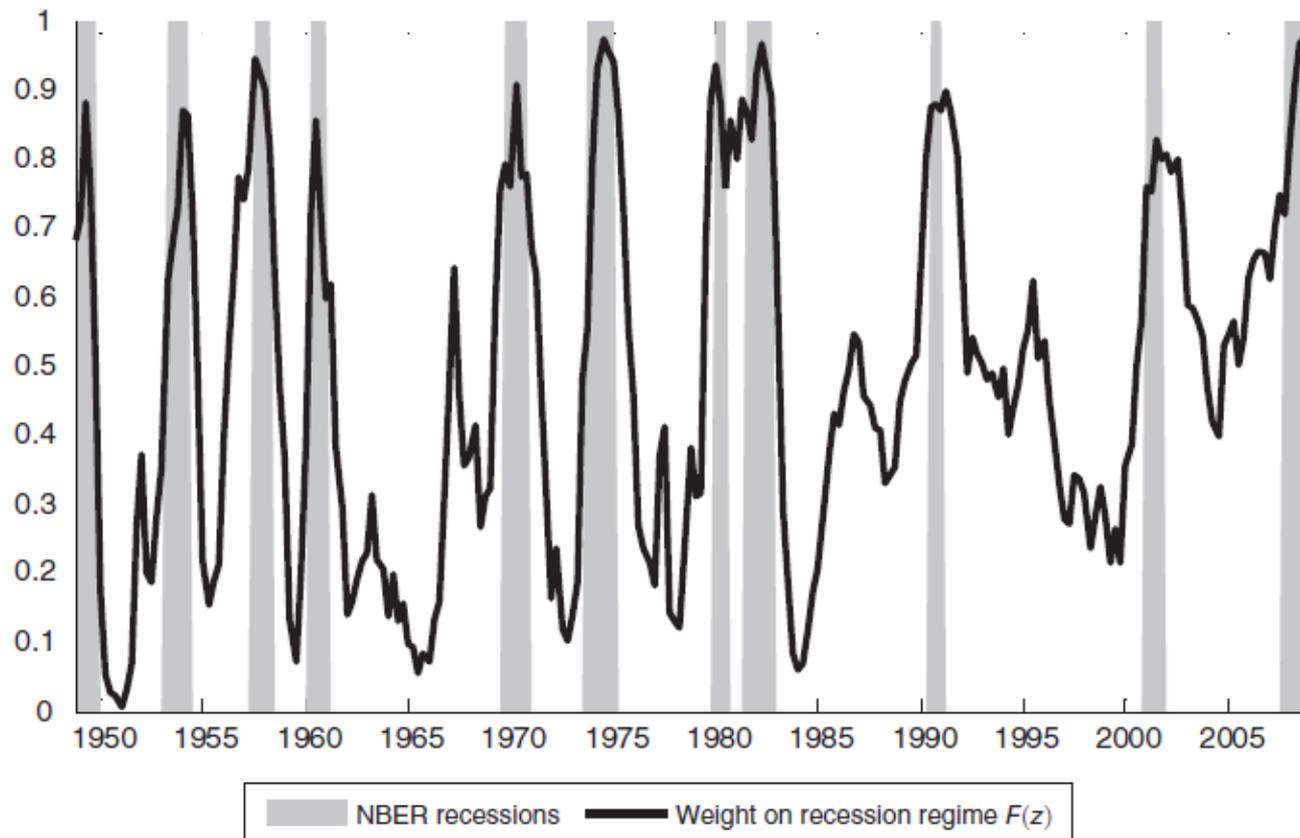


FIGURE 1. NBER DATES AND WEIGHT ON RECESSION REGIME $F(z)$

Notes: The shaded region shows recessions as defined by the NBER. The solid black line shows the weight on recession regime $F(z)$.

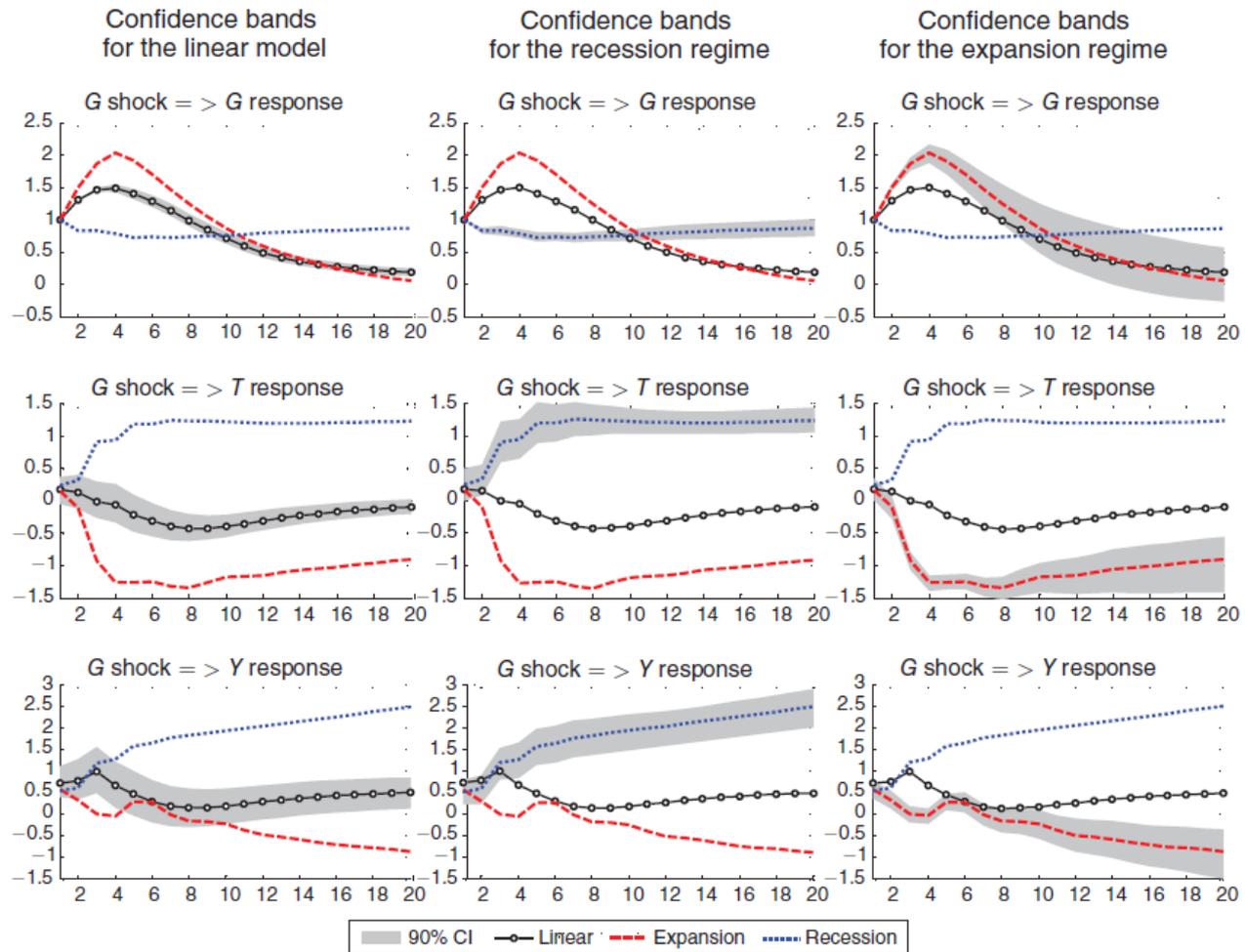


FIGURE 2. IMPULSE RESPONSES IN THE LINEAR MODEL, EXPANSIONS, AND RECESSIONS

Notes: The figures show impulse responses to a \$1 increase in government spending. Shaded region is the 90 percent confidence interval. Dashed lines show the responses in expansionary (long dash) and recessionary (short dash) regimes. The solid line with circles shows the response in the linear model.

TABLE 1—MULTIPLIERS

	$\max_{h=1, \dots, 20} \{Y_h\}$		$\sum_{h=1}^{20} Y_h / \sum_{h=1}^{20} G_h$	
	Point estimate	Standard error	Point estimate	Standard error
Total spending				
Linear	1.00	0.32	0.57	0.25
Expansion	0.57	0.12	-0.33	0.20
Recession	2.48	0.28	2.24	0.24

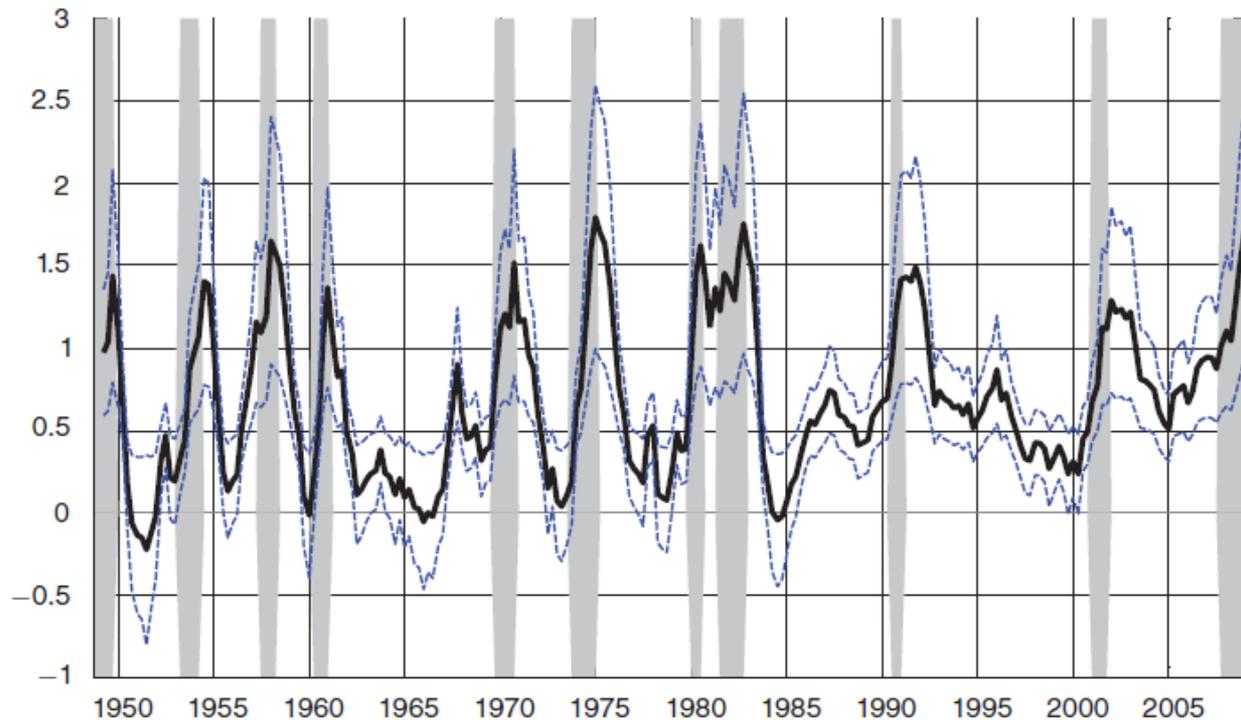


FIGURE 3. HISTORICAL MULTIPLIER FOR TOTAL GOVERNMENT SPENDING

Notes: Shaded regions are recessions defined by the NBER. The solid black line is the cumulative multiplier computed as $\sum_{h=1}^{20} Y_h / \sum_{h=1}^{20} G_h$, where time index h is in quarters. Blue dashed lines are 90 percent confidence interval. The multiplier incorporates the feedback from G shock to the business cycle indicator z . In each instance, the shock is one percent increase in government spending.