GOVERNMENT SPENDING MULTIPLIERS IN GOOD TIMES AND IN BAD: EVIDENCE FROM U.S. HISTORICAL DATA

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- A handful of recessions in the post-WWII data & relatively little variation in G
  - RZ: construct long, quarterly time series: 1880-2013.
    - Post-WWII data: standard
    - Pre-WWII data: many sources + interpolate annual series into quarterly

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- Nonlinear models: sensitive estimates + how to model feedback/dynamics?
  - RZ: Use Jorda (2005) projection method as in AG (2012)

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Why are the RZ results different from the results in Auerbach-Gorodnichenko and others?

- Measurement
- Specification
- Estimation
- Identification

RZ APPROACH

$$Y_t = \alpha_0 shock_t + error_t$$

$$Y_{t+1} = \alpha_1 shock_t + error_{t+1}$$

$$Y_{t+2} = \alpha_2 shock_t + error_{t+2}$$

$$\dots$$

$$Y_{t+h} = \alpha_h shock_t + error_{t+h}$$

$$IRF^Y = \{\alpha_h\}_{h=0}^{H}$$

RZ APPROACH

$$Y_{t+h} = \alpha_h shock_t + error_t \Rightarrow IRF^Y = \{\alpha_h\}_{h=0}^H$$

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The logic extends to state-dependent multipliers

$$Y_{t+h} = M_h^R G_{t+h} \times \mathbf{I}(recession_t) + M_h^E G_{t+h} \times \mathbf{I}(expansion_t) + error_t$$

$shock_t \times \mathbf{I}(recession_t)$ and $shock_t \times \mathbf{I}(expansion_t)$ as IVs.

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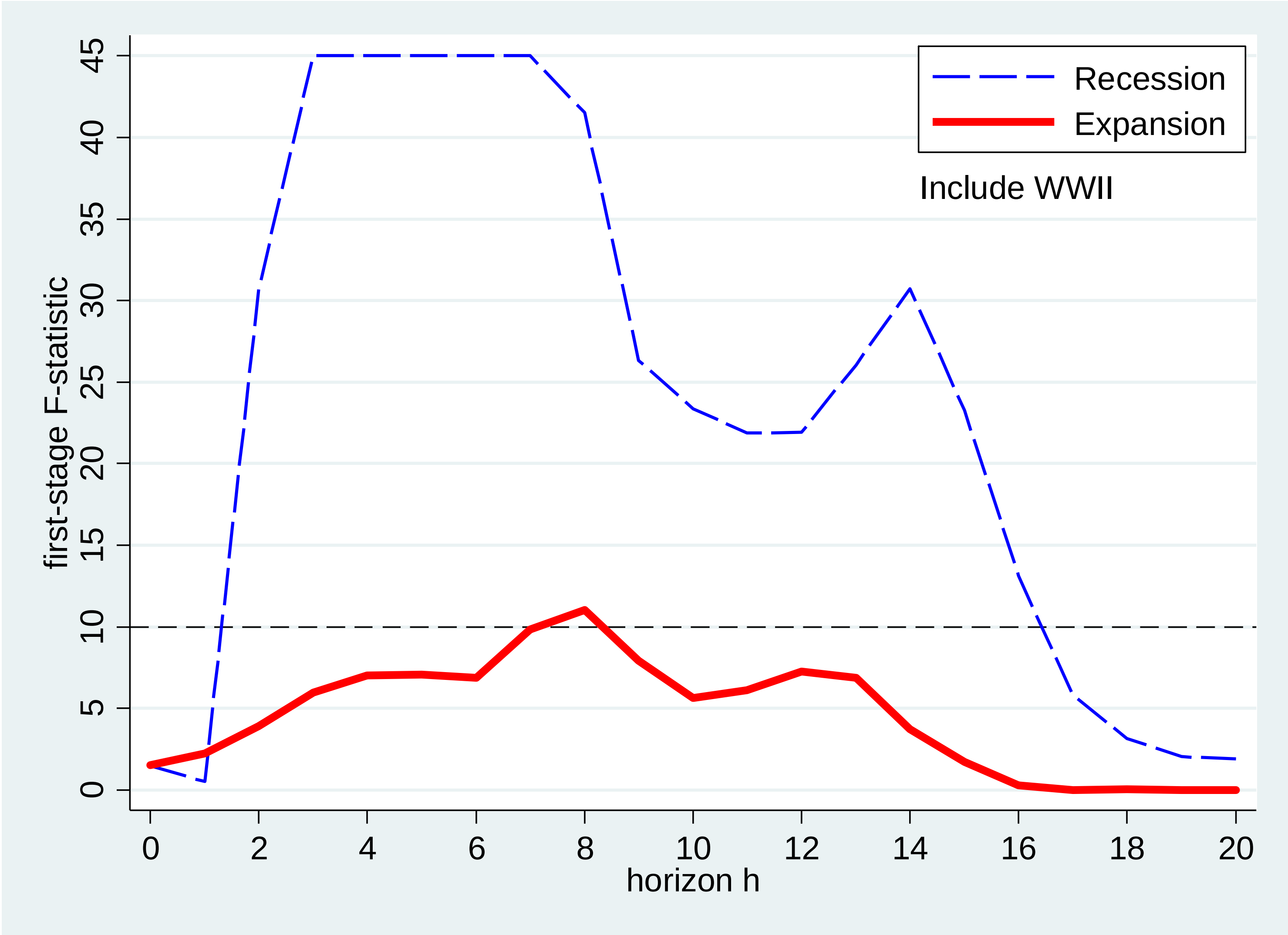
Single equation approach

$Y_{t+h} = M_h^R G_{t+h} \times \mathbf{I}(recession_t) + error_t$ $\quad IV: shock_t \times \mathbf{I}(recession_t)$

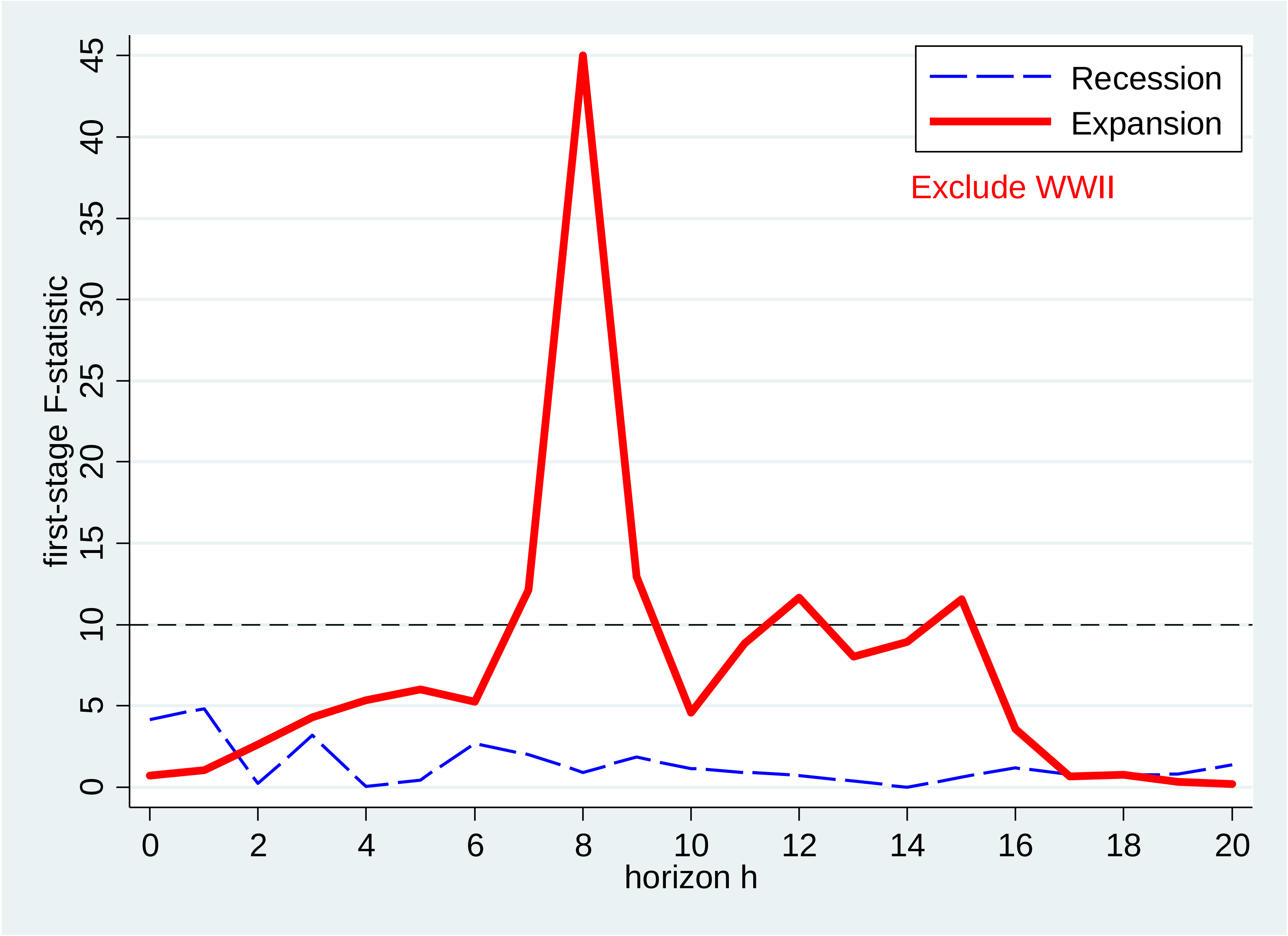
$Y_{t+h} = M_h^E G_{t+h} \times \mathbf{I}(expansion_t) + error_t$ $\quad IV: shock_t \times \mathbf{I}(expansion_t)$

FIRST STAGE FIT: FULL SAMPLE



Note: controls are included. F-stat in the figure is capped at 45.

FIRST STAGE FIT: EXCLUDE WWII



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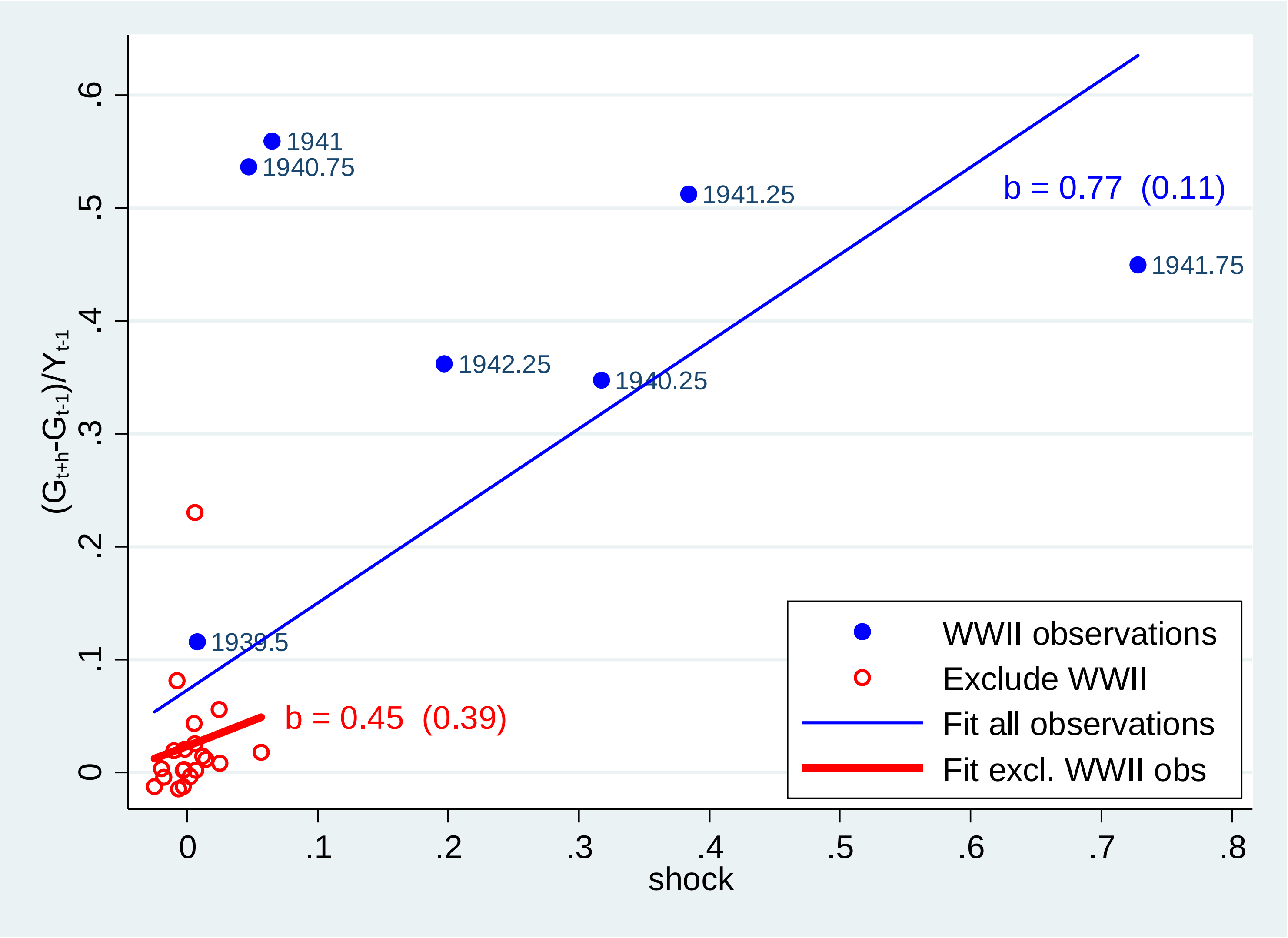
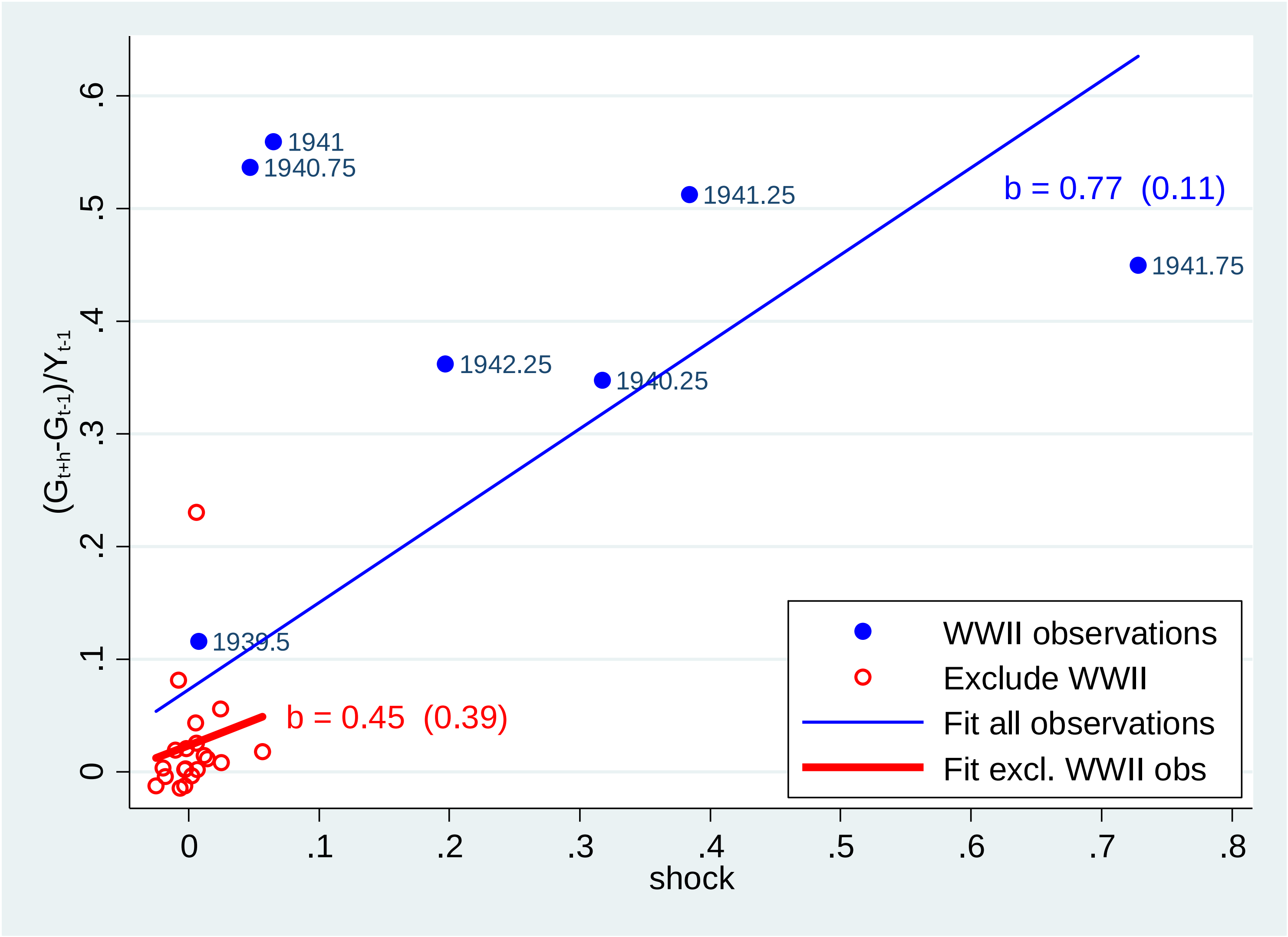
First stage fit: Recession



Horizon $h = 8$

FIRST STAGE FIT: RECESSION



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Question: which shocks should one use to design/assess the fiscal stimulus in 2009?

Ramey-Zubairy vs. Blanchard-Perotti

Ramey-Zubairy:

- $Y_{t+h} - Y_{t-1} = M_h(G_{t+h} - G_{t-1}) + controls + error_t$
- use military spending shocks as the instrument

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Strength of 1st stage: RZ vs. BP

- BP (AG) instrument is nearly impossible to beat over short horizons.
- RZ can perform better over longer horizons b/c it measures present values.

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    ⇒ Attenuate differences between recession/expansion

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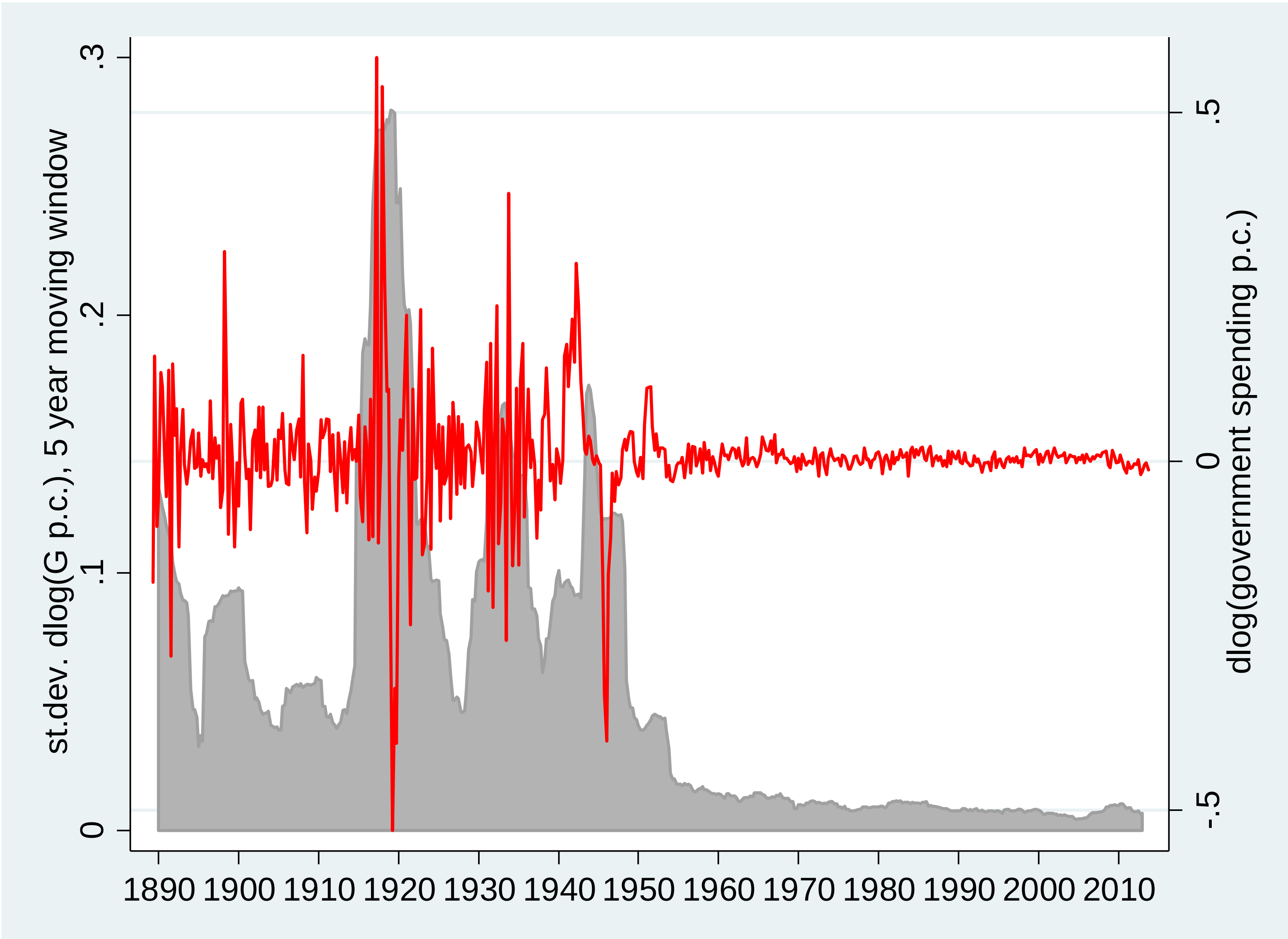
  - Changes in the volatility of government spending

% CHANGE IN REAL PER CAPITA GOVERNMENT SPENDING



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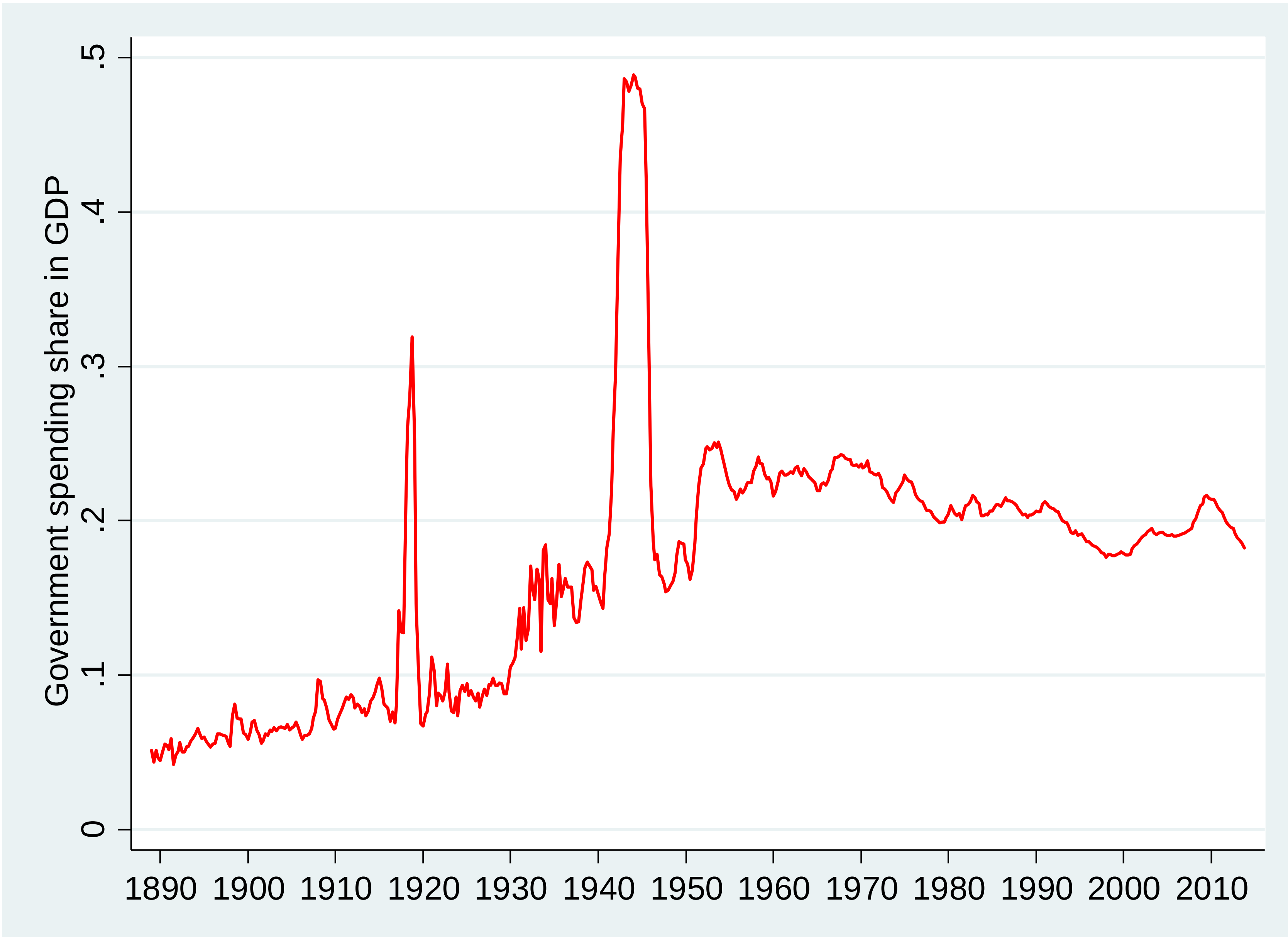
Share of government spending in GDP



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  ⇒ avoid using variables in levels, use differences or/and growth rates

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Alt.: $\frac{Y_{t+h}-Y_{t-1}}{Y_{t-1}} = M_h \frac{G_{t+h}-G_{t-1}}{Y_{t-1}} + \sum_k \psi_k \Delta \ln Y_{t-k} + \sum_q \gamma_q \Delta \ln G_{t-q} + \sum_s \phi_s t^s + error$

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Potential concerns

- $\frac{Y_t - Y_{t-1}}{Y_{t-1}}$ and $\frac{G_t - G_{t-1}}{Y_{t-1}}$ are correlated because Y_{t-1} shows up in the denominator
- $\frac{G_t}{Y_t}$ varies systematically over the business cycle

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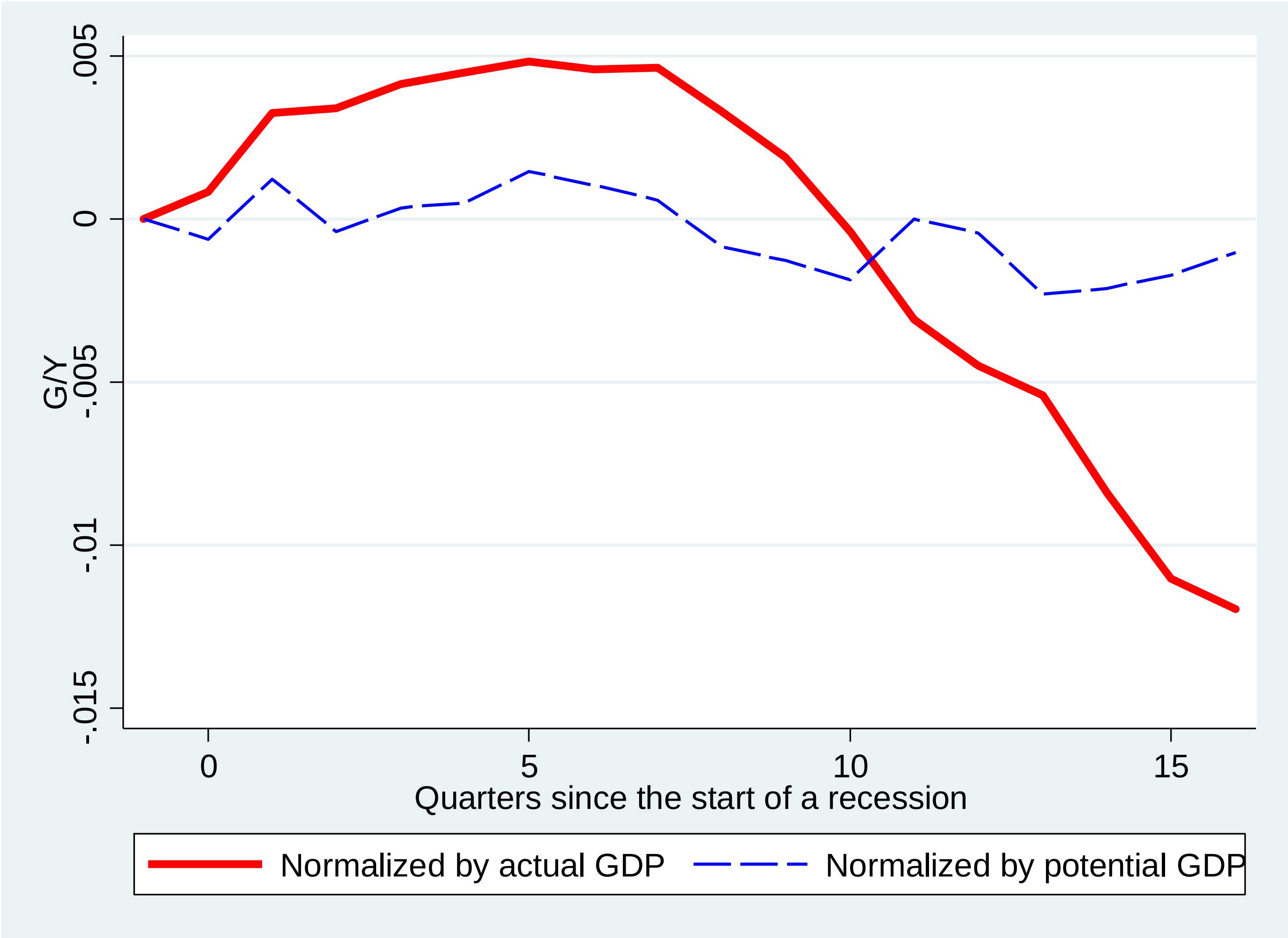
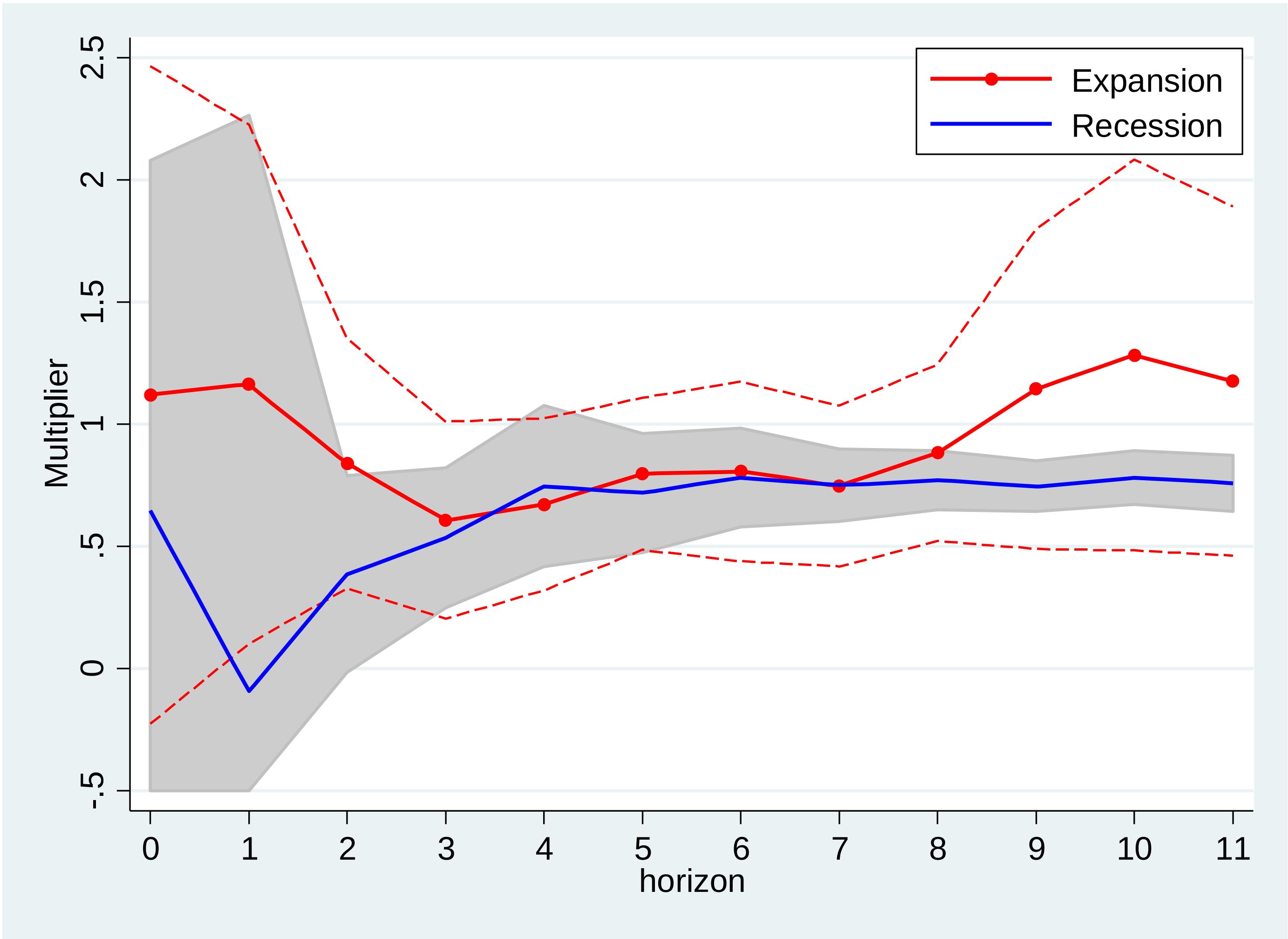


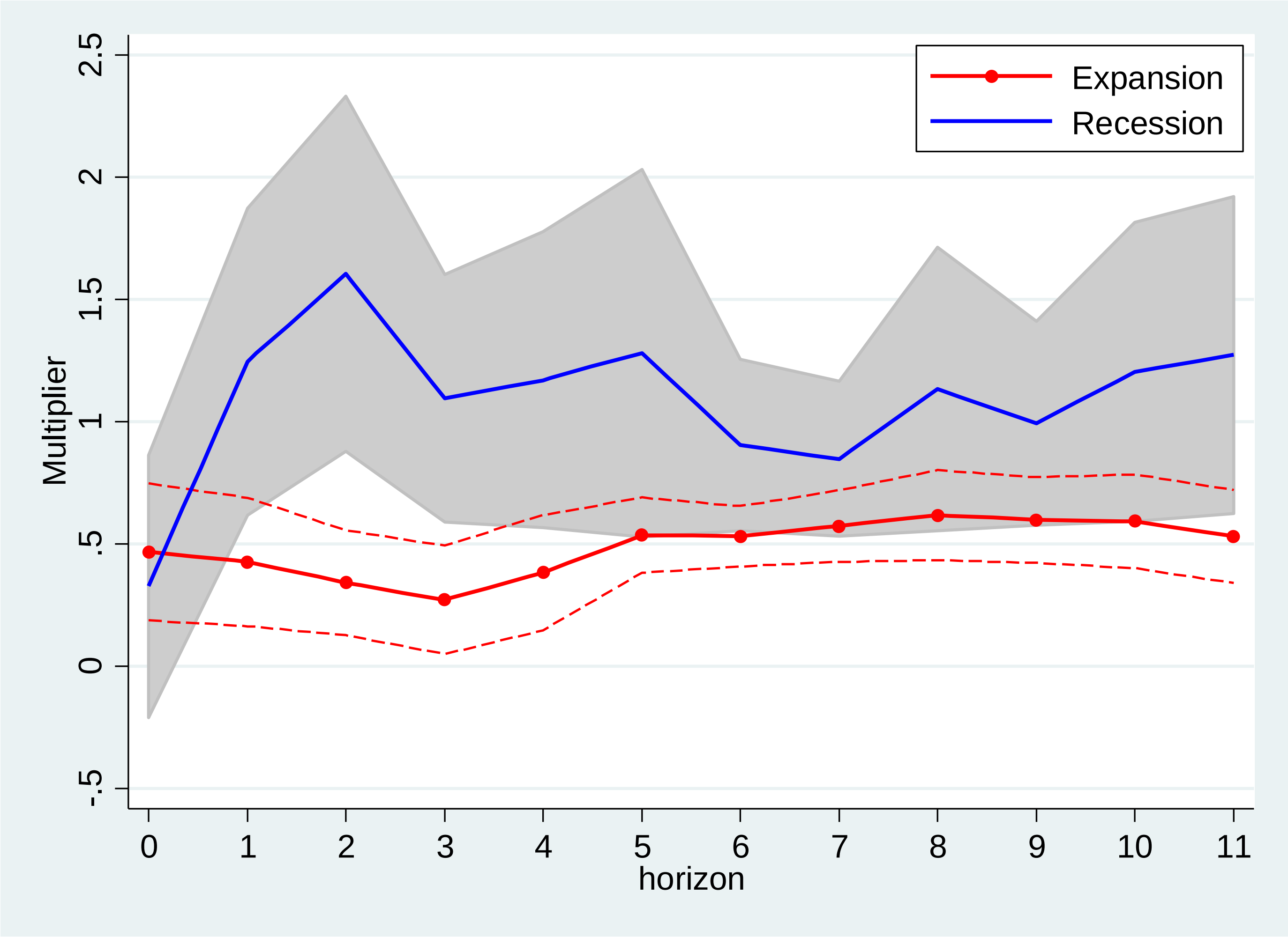
Notes: post 1960 data; potential GDP is from the CBO.

MULTIPLIERS: RAMEY-ZUBAIRY



Spec: baseline, IV implementation

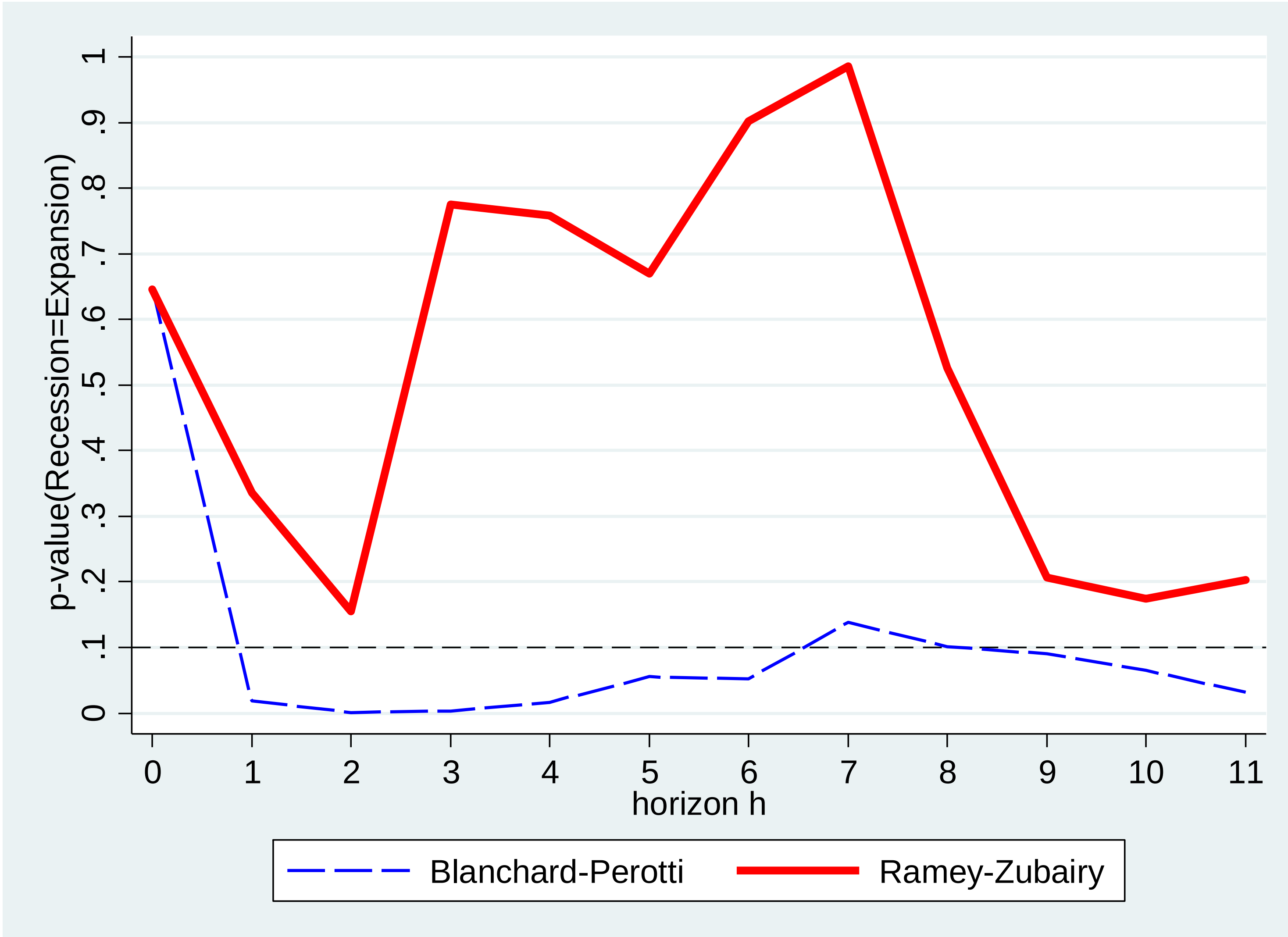
MULTIPLIERS: BLANCHARD-PEROTTI



Spec: IV implementation, include more lags, normalize by potential GDP, controls include variables in *growth rates* rather than levels.

These estimates are similar to the Auerbach-Gorodnichenko results.

EQUALITY OF MULTIPLIERS OVER THE BUSINESS CYCLE



CONCLUDING REMARKS

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"The problem with QE is it works in practice but it doesn't work in theory." – Bernanke