Estimating Aggregate Effects of Government Spending:

The Importance of Anticipations

(This follows my QJE 2011 paper closely.)

Empirical Evidence on the Impact of ↑ G

- **Papers using VAR techniques for identification**

  e.g. Rotemberg and Woodford (1992), Blanchard and Perotti (2002), Fatás and Mihov (2001), Perotti (2004), Montford and Uhlig (2005), Galí, López-Salido, and Vallés (2006)), Perotti(2007)

  ↑ output ↑ hours ↑ consumption ↑ real wages ↓ investment

- **Papers using Ramey-Shapiro war dates**

  e.g. Ramey and Shapiro (1998), Edelberg, Eichenbaum, and Fisher (1999), Burnside, Eichenbaum, and Fisher (2004), and Cavallos (2005)).

  ↑ output ↑ hours ↓consumption ↓ real wages ↓ or ↑ investment

- **Other Event Studies**

  e.g. Giavazzi & Pagano's (1990), Cullen & Fishback (2006), Barro & Redlick (2009)

  ↓consumption or no effect

My QJE paper “Identifying Government Spending: It’s All in the Timing” compares two leading identification methods

1. VAR method

Order government spending first in a VAR, use standard Choleski decomposition to identify shocks to government spending.

2. Ramey-Shapiro Dates

Augment system with a dummy variable that takes the value of unity at times when a major political event caused *Business Week* to begin forecasting large increases in defense spending. Shocks to the dummy variable rather than actual government spending are identified as the shock.

Ramey-Shapiro Dates: The dummy variable takes the value of unity at 4 dates.

1950:3: North Korea invaded South Korea in late June 1950.

1965:1 Johnson began air strikes against N. Vietnam in Feb. 1965.

1980:1 The USSR invaded Afghanistan on Dec. 24, 1979.

***2001:3** Terrorists struck the World Trade Center and the Pentagon on 9/11.

Framework for Comparison

$$X_t = A(L)X_{t-1} + U_t$$

X includes: total govt spending, GDP, Barro-Redlick tax rate, total hours (including military), nondurable + services consumption, private fixed investment, product wage in private business.

Log per capita (except BS tax, product wage)

Quarterly data: 1947:1 – 2008:4, 4 lags, quadratic trend

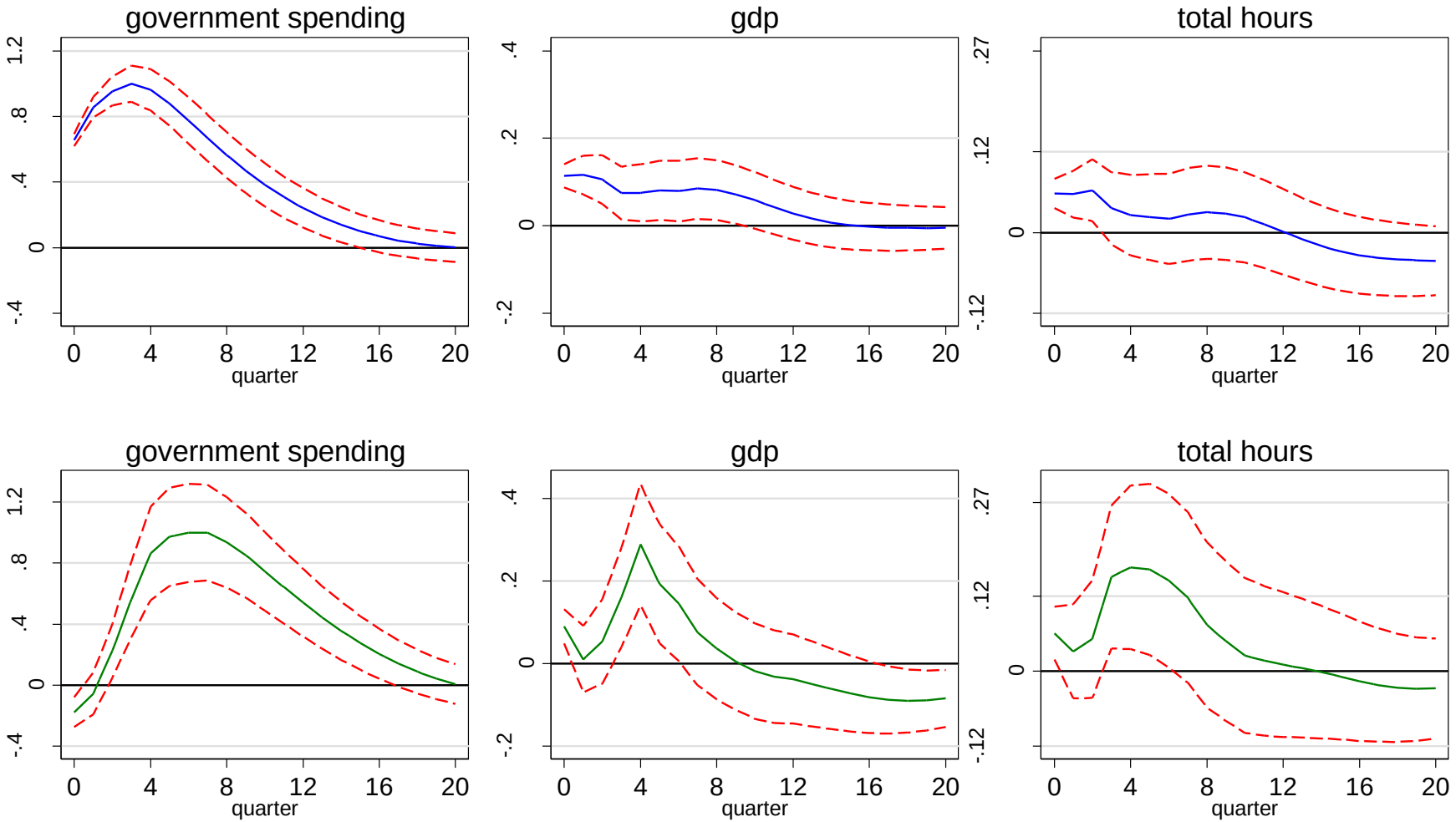
Identification

- Standard VAR: order government spending first
- War dates: also include current and 4 lags of Ramey-Shapiro war dates variable augmented with 9/11.

  1950:3, 1965:1, 1980:1, 2001:3

- Set shock size so that peak response of government spending is the same across specifications

Comparison of Identification Methods
VAR shocks in top row; War dates in bottom row
68% bands



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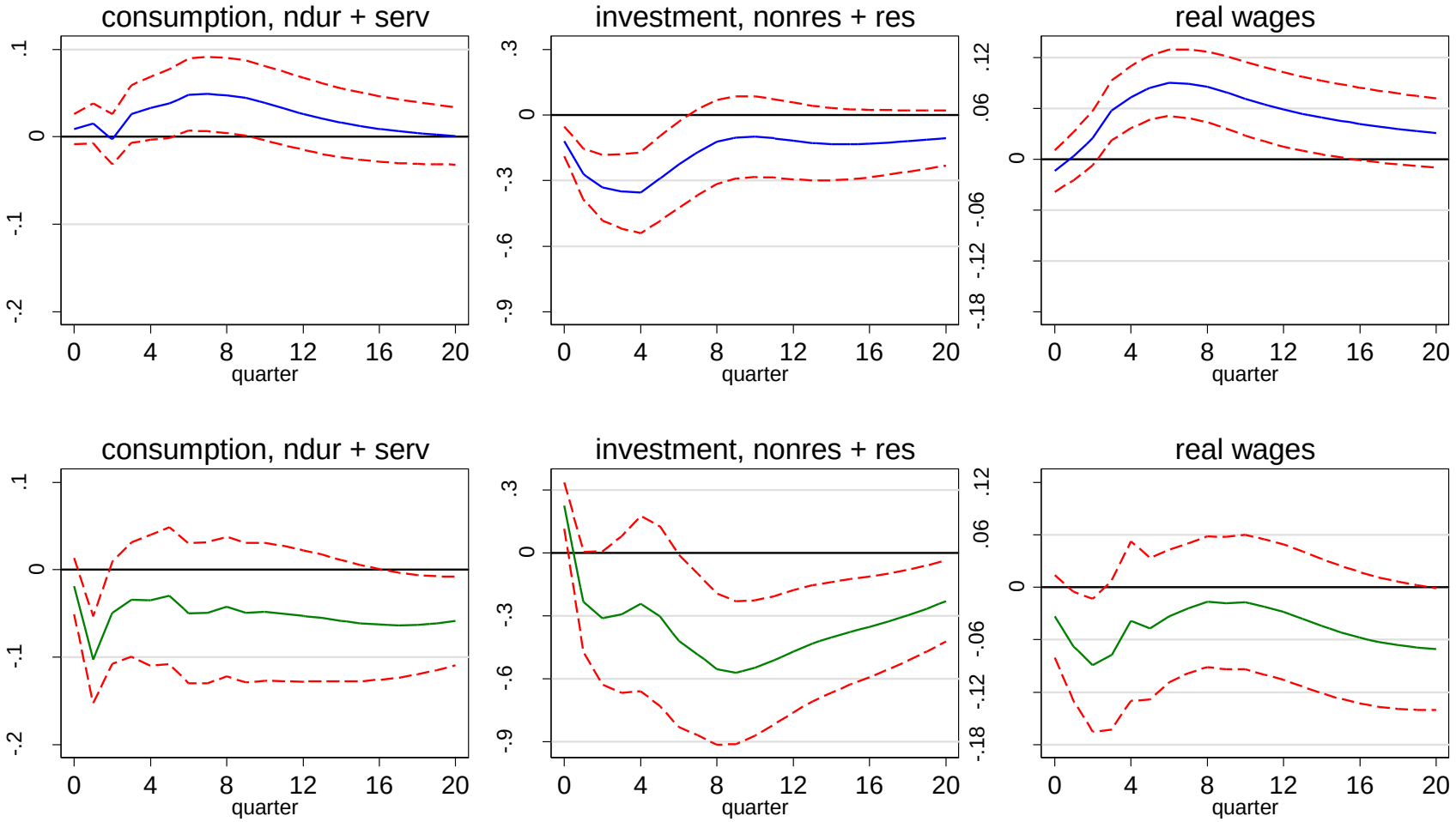
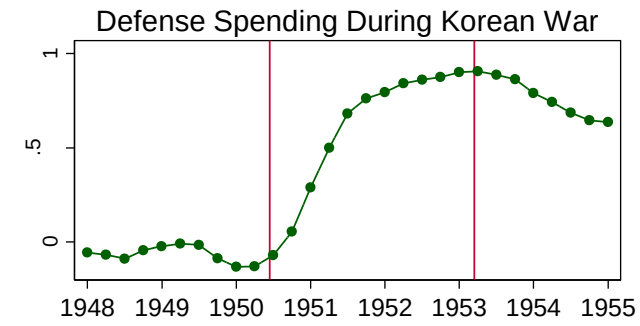
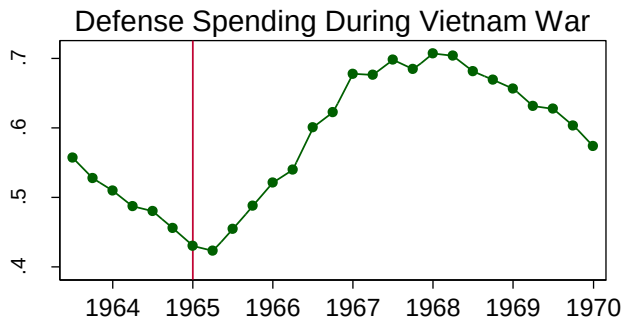


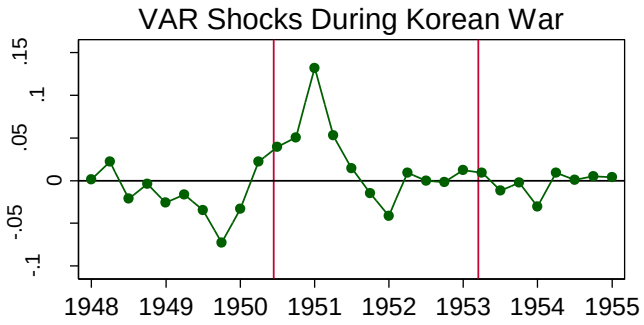
Why Do these Two Methods Give Such Different Results?

It's All in the timing

I argue that the shocks identified by the VAR are mostly anticipated and this explains all of the difference in the results.


Defense Spending During Korean War
0
.5
1
1948
1949
1950
1951
1952
1953
1954
1955


Defense Spending During Vietnam War
.4
.5
.6
.7
1964
1965
1966
1967
1968
1969
1970


VAR Shocks During Korean War
-.1
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0
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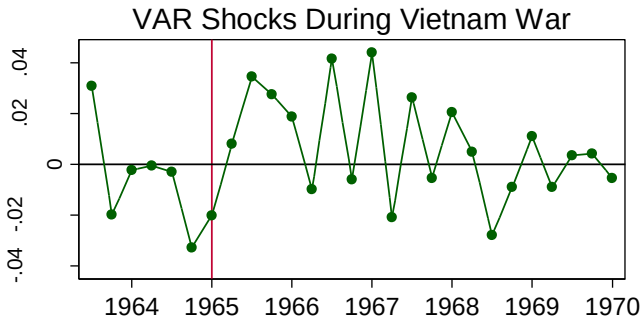
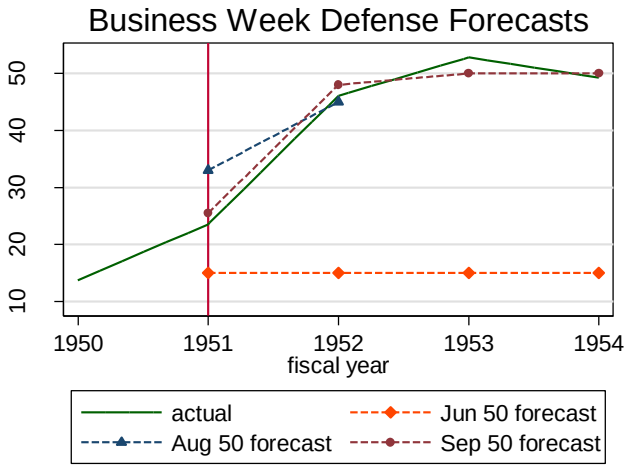
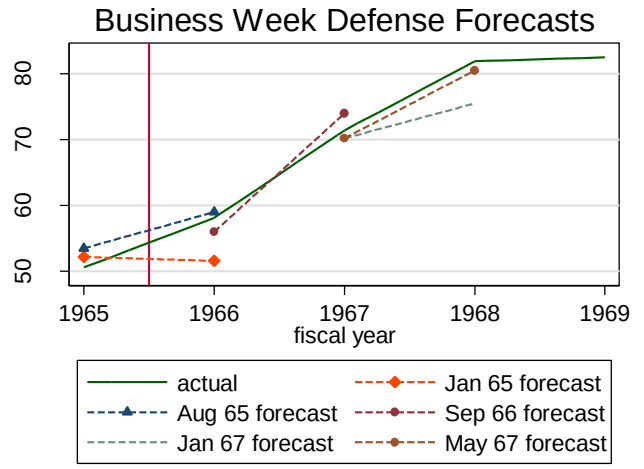
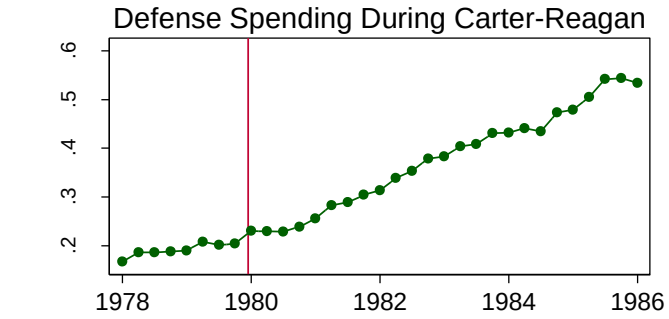
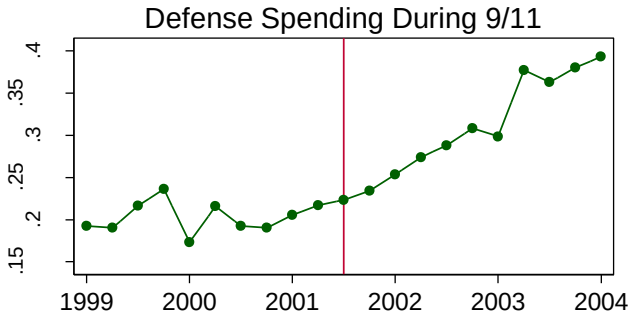
.1
.15
1948
1949
1950
1951
1952
1953
1954
1955

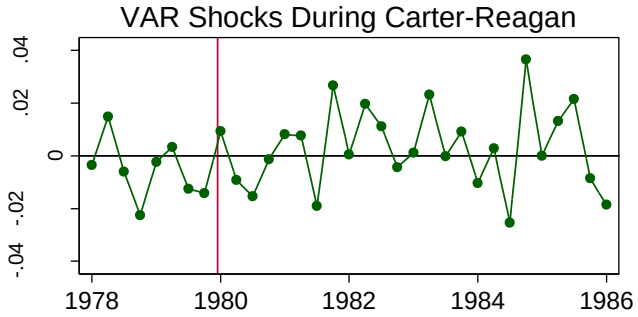

VAR Shocks During Vietnam War
-.04
-.02
0
.02
.04
1964
1965
1966
1967
1968
1969
1970


Business Week Defense Forecasts
10
20
30
40
50
1950
1951
1952
1953
1954
fiscal year
actual
Jun 50 forecast
Aug 50 forecast
Sep 50 forecast


Business Week Defense Forecasts
50
60
70
80
1965
1966
1967
1968
1969
fiscal year
actual
Jan 65 forecast
Aug 65 forecast
Sep 66 forecast
Jan 67 forecast
May 67 forecast


Defense Spending During Carter-Reagan
.2
.3
.4
.5
.6
1978
1980
1982
1984
1986


Defense Spending During 9/11
.15
.2
.25
.3
.35
.4
1999
2000
2001
2002
2003
2004


VAR Shocks During Carter-Reagan
-.04
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0
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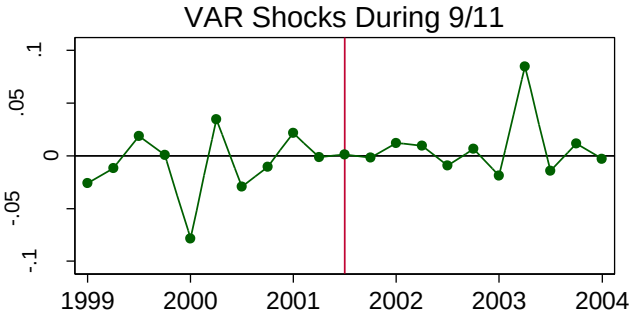
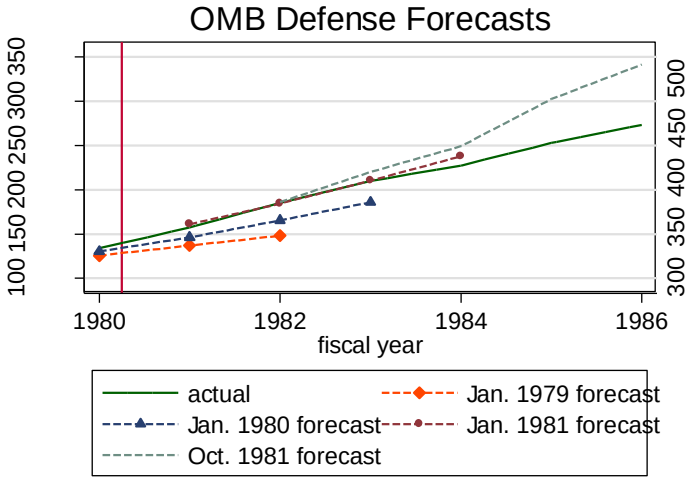
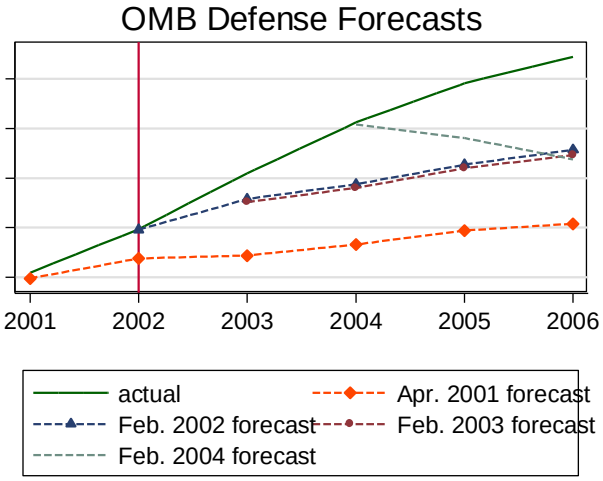
.04
1978
1980
1982
1984
1986


VAR Shocks During 9/11
-.1
-.05
0
.05
.1
1999
2000
2001
2002
2003
2004


OMB Defense Forecasts
100 150 200 250 300 350
1980
1982
1984
1986
fiscal year
actual
Jan. 1979 forecast
Jan. 1980 forecast
Jan. 1981 forecast
Oct. 1981 forecast


OMB Defense Forecasts
300 350 400 450 500
2001
2002
2003
2004
2005
2006
actual
Apr. 2001 forecast
Feb. 2002 forecast
Feb. 2003 forecast
Feb. 2004 forecast

Are VAR shocks anticipated? Yes.

Hypothesis Tests	**p-value in parenthesis**
Do War dates Granger-cause VAR shocks?	Yes (0.017)
Do one-quarter ahead Professional Forecasts Granger-cause VAR shocks? **1981:3 – 2008:4**	Yes (0.025)
Do four-quarter ahead Professional Forecasts Granger-cause VAR shocks? **1981:3 – 2008:4**	Yes (0.016)
Do VAR shocks Granger-cause War dates?	No (0.148)

Model

$$Y_t = (Z_t N_t)^{0.67} K_t^{0.33} \qquad U = \log(C_t) + \varphi_t \cdot \log(1 - N_t)$$

$$Y_t = C_t + I_t + G_t \qquad K_{t+1} = I_t + (1 - 0.023) K_t$$

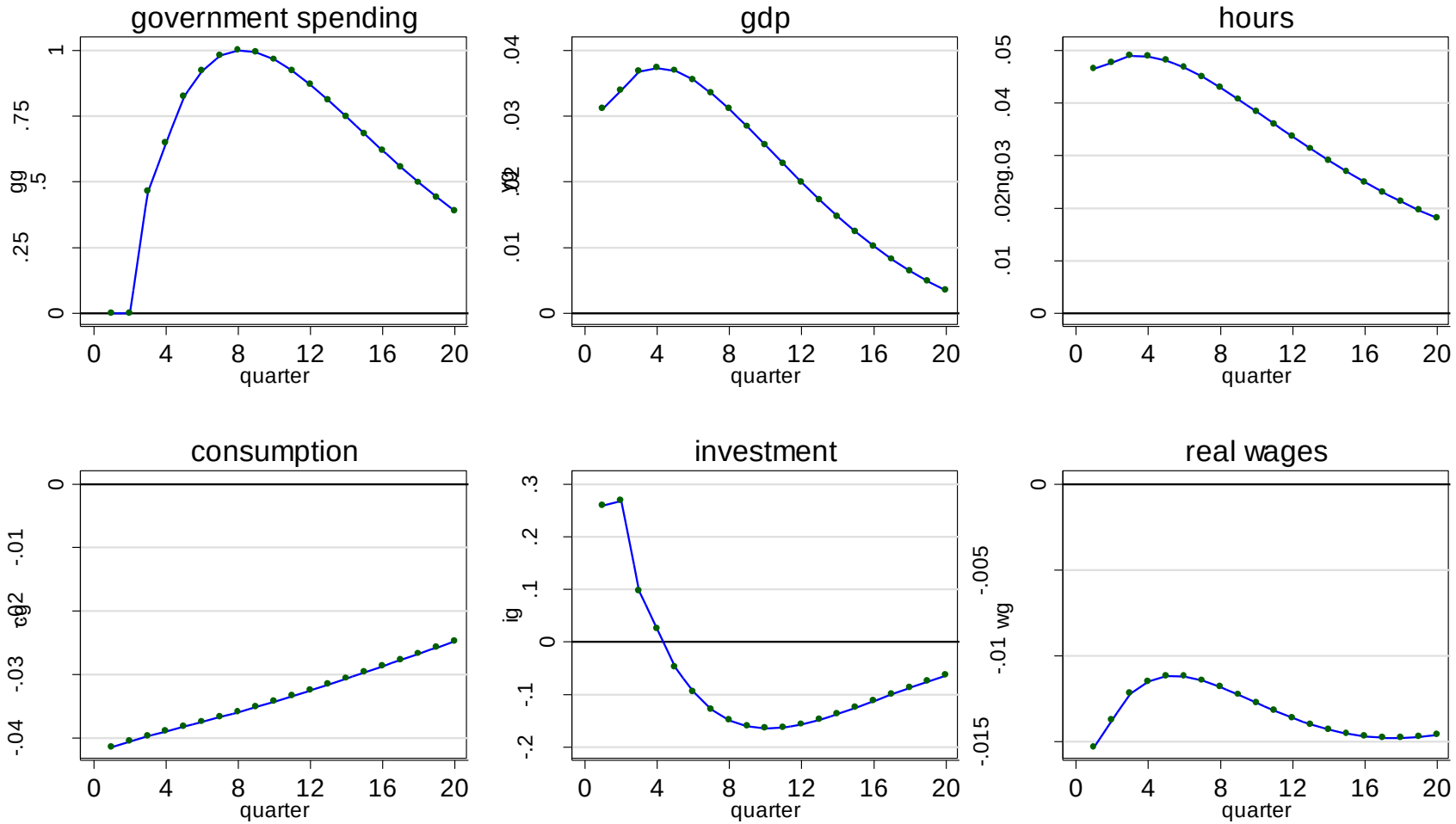
$$\ln Z_t = .95 \cdot \ln Z_{t-1} + ez_t, \quad \sigma_{ez} = 0.01$$

$$\ln \varphi_t = .95 \cdot \ln \varphi_{t-1} + e\varphi_t, \quad \sigma_{e\varphi} = 0.008$$

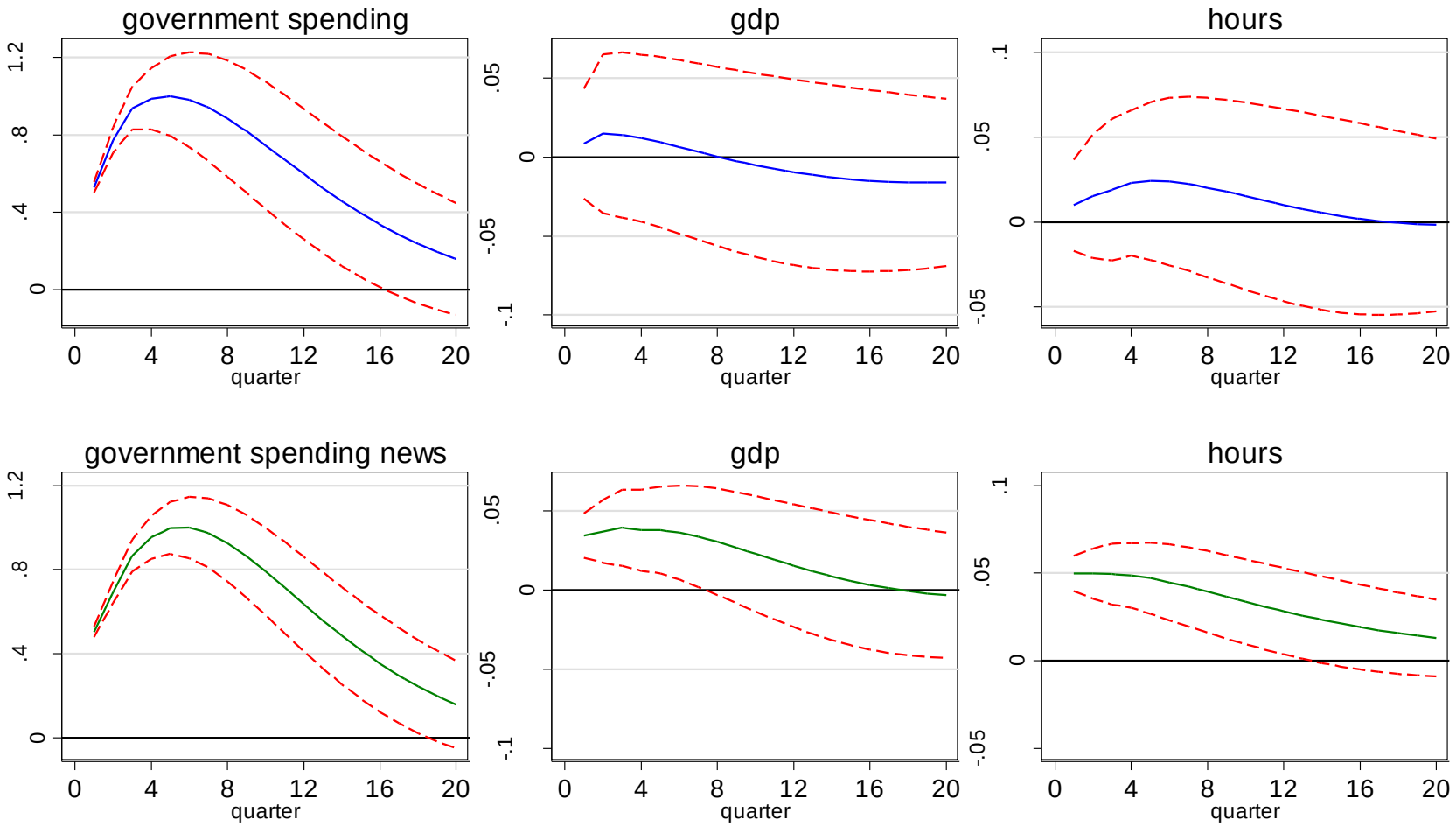
$$\ln GF_t = \text{constant} + 1.4 \ln GF_{t-1} - 0.18 \ln GF_{t-2} - 0.25 \ln GF_{t-3} + eg_t, \quad \sigma_{eg} = 0.028$$

$$\ln G_t = \ln GF_{t-2}$$

Theoretical Effect of an Increase in Government Spending (announced two quarters in advance)



Estimation of VARs on Simulated Data
BP Identification in top row; News in bottom row
68% bands



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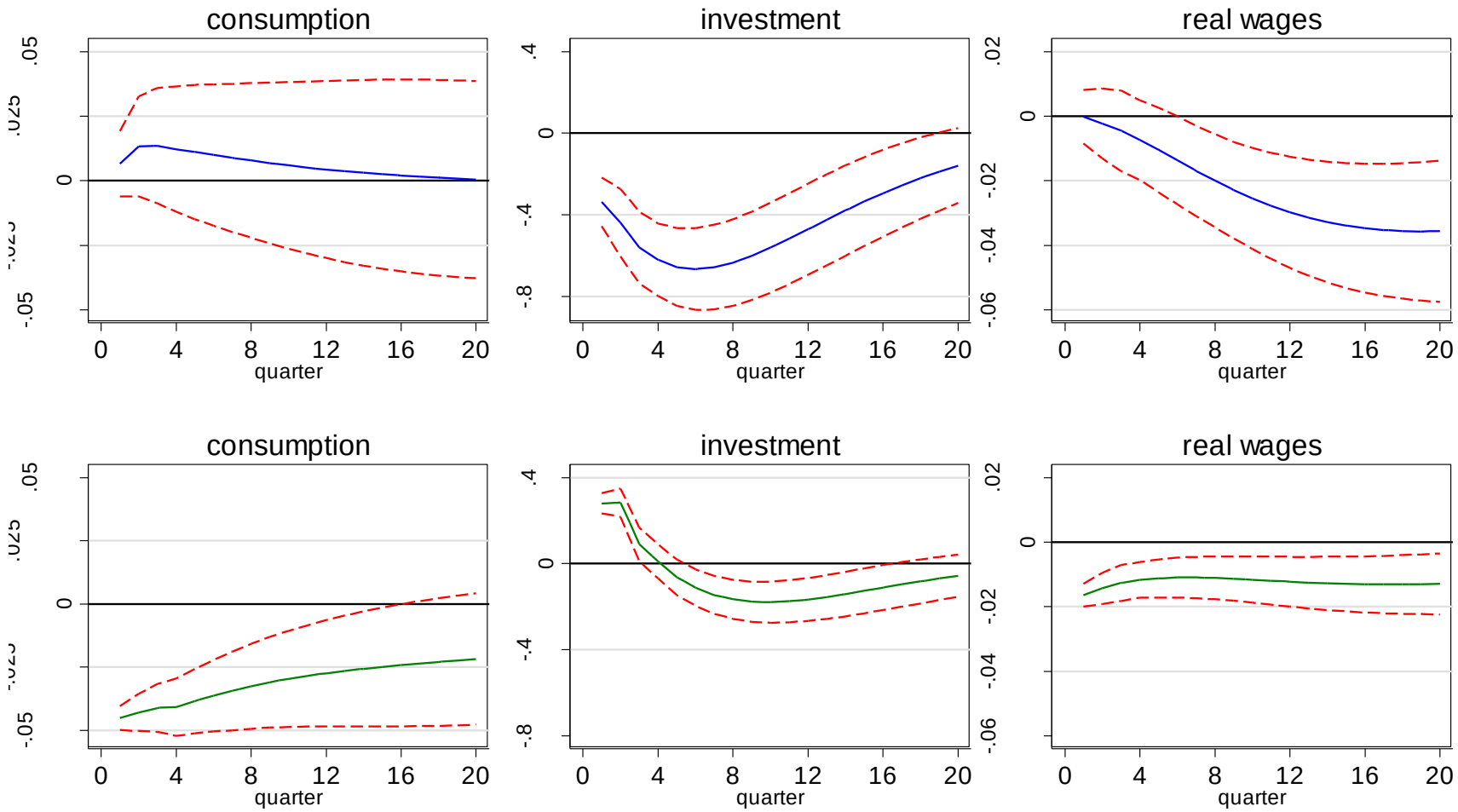


A New Measure of Defense Shocks

The simple dummy variable incorporates only a small part of the information available in the narrative record.

Thus, I created a new variable: the present discounted value of the forecasted changes in defense-related spending. This is what matters for the wealth effect.

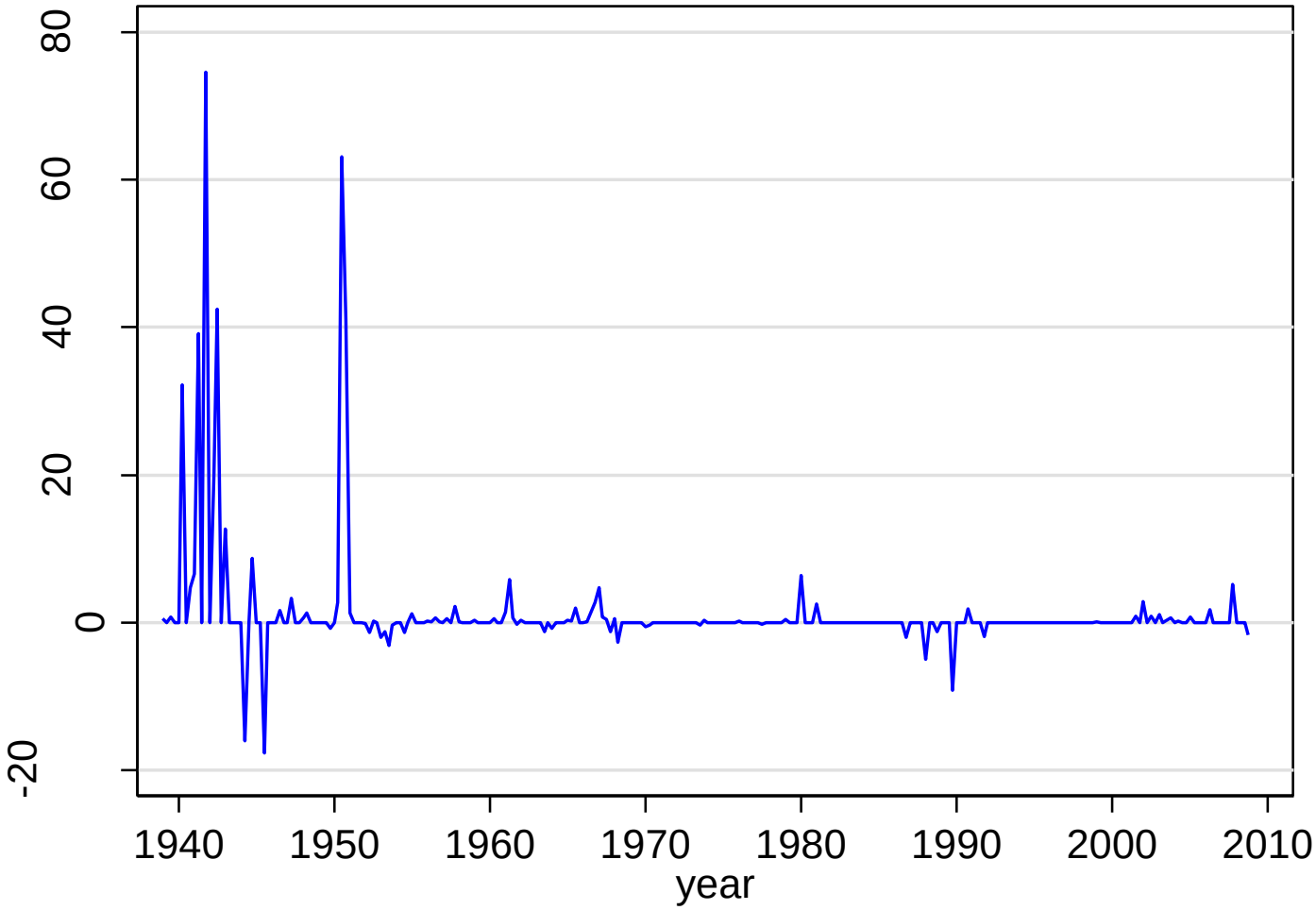
I created the variable by reading mostly Business Week, but also the New York Times, Washington Post, and Wall Street Journal from January 1939 to December 2008.

Business Week 5/25/40, p. 60: "The German drive to the English Channel this week assured quick adoption of the President's program to speed up war preparations. But the proposed expenditure of less than $3.5 billion in the coming fiscal year is only a small beginning; of that, business men can now be certain… In the 1919 fiscal year costs ran to $11 billion. A major war effort in the '40s would come higher… since we have started six years behind, a vast outlay is required if we are to attain military parity with Hitler's industrial machine. In a major war at least four times the $3.5 billion we plan to spend in 1941 would be needed, and quite conceivably five to six times that – or anywhere from 20% to 30% of the peacetime national income. However, it is not possible to jump immediately up from a $3.5 billion to a $14 billion military effort. It takes time to shift a nation from a peace economy to a war-preparation economy and thence to a war economy. Right now we are at the very beginnings of a war-preparation economy."

Business Week 10/25/41: "Expect dramatic developments in the defense program in the next few weeks. Plans were under way before the Kearny incident and the sinking of two more American ships but they have been speeded by this week's shocks and by the heartening reports on Russia's capacity to hold out, brought home by the Harriman mission. Beginning this week, war production –and it's 'war,' not 'defense' …-becomes the No. 1 item on the business docket." p. 7

"Already, Washington is taking cognizance of the imminence of a shooting war…A year ago, the government thought of armament expenditures of $10 billion a year; six months ago the goal was $24 billion; as recently as last month $36 billion was regarded as a desirable but hard-to-achieve outlay; but now an annual expenditure of $50 billion is begin seriously discussed – not as the desirable goal, but as an inescapable necessity." p. 13

Defense News:
PDV of Expected Change in Spending as a % of lagged GDP



Framework for Defense News VAR

$$X_t = A(L)X_{t-1} + U_t$$

X includes: defense news variable (as a % of lagged GDP), total govt spending, GDP, Barro-Redlick tax rate, 3-month T-bill rate

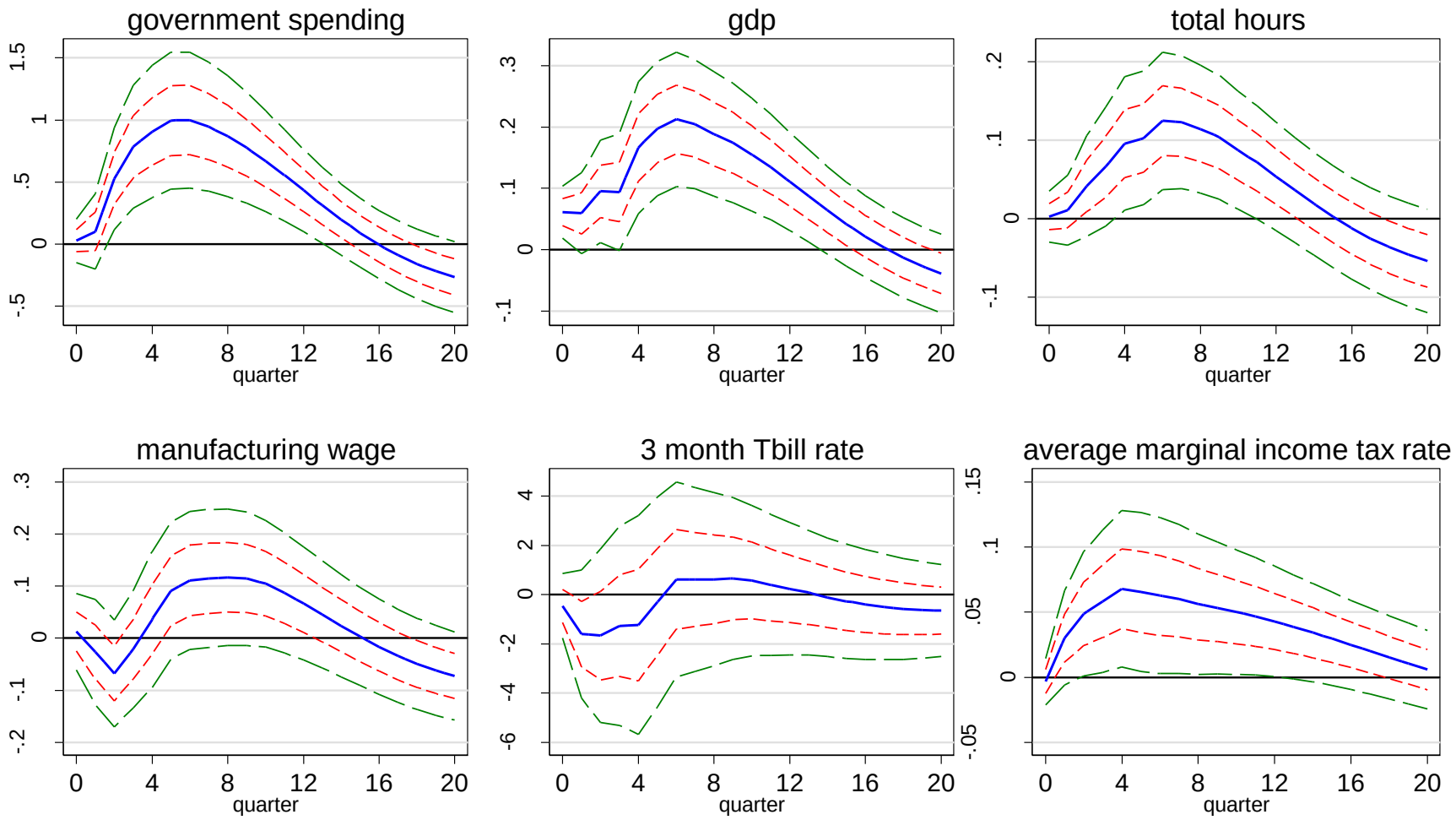
6th variable is rotated in.

Newly constructed Quarterly data: 1939:1 – 2008:4,

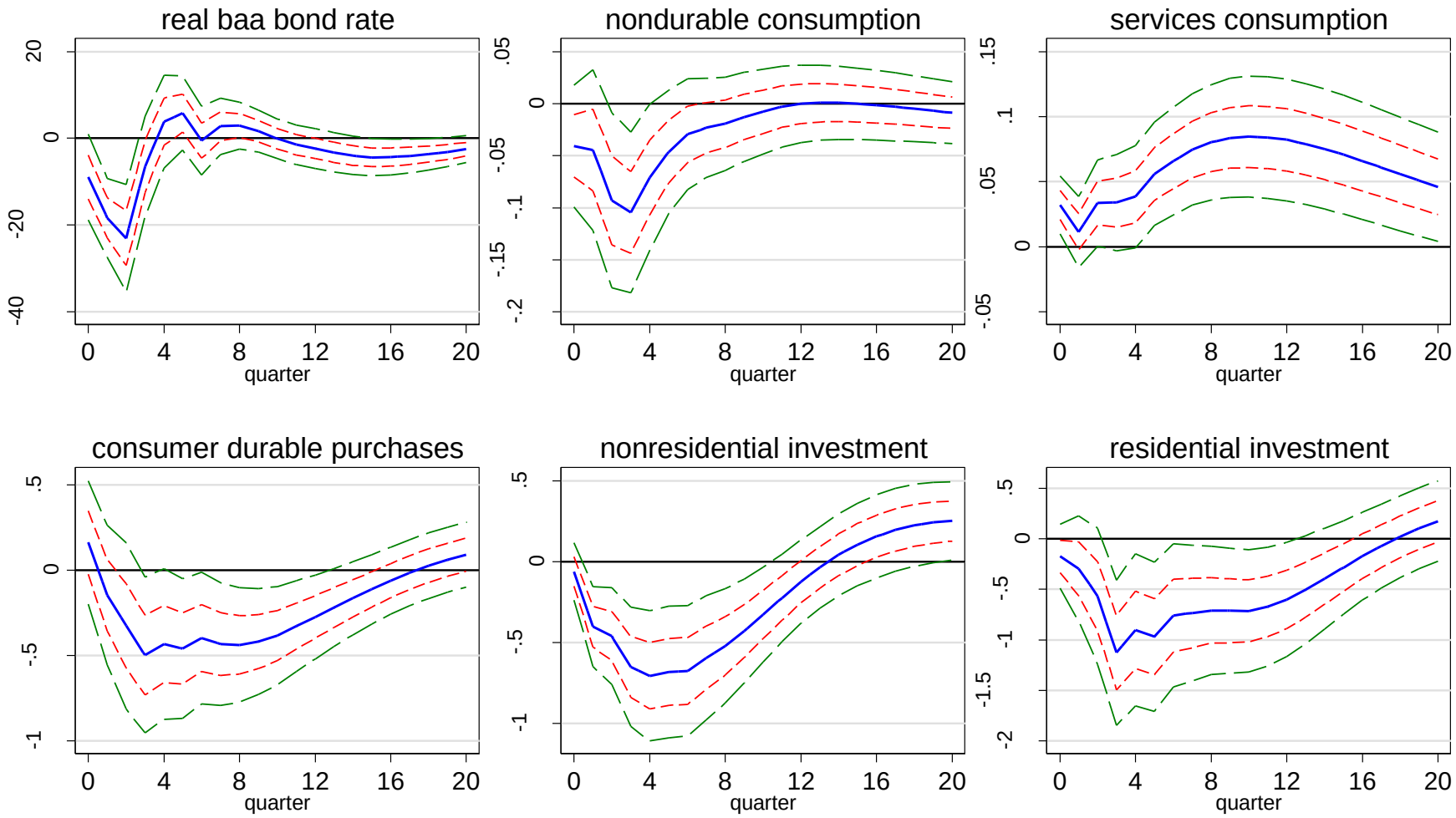
4 lags, quadratic trend

VAR with Defense News Variable: 1939-2008

(red lines: 68%; green lines: 95%)



VAR with Defense News Variable: 1939-2008
(red lines: 68%; green lines: 95%)



Less labor intensive methods for measuring news about government spending

- Professional forecasts

  - I used these in the last part of my QJE paper.
  - Auerbach-Gorodnichenko and others have used forecasts for OECD, etc.

- Stock price movements

  e.g. Fisher-Peters (2010) use defense contractor stock excess returns.

- Medium run restrictions

  Ben Zeev, Nadav and Evi Pappa, "Chronicle of a War Foretold: The Macroeconomic Effects of Anticipated Defense Spending Shocks," 2015 *Economic Journal*.

  Identify defense spending news as a shock that (i) is orthogonal to current defense spending; and (ii) best explains future movements in defense spending over a horizon of five years.

Government Spending: 3 identification methods

- Blanchard-Perotti (BP)- Cholesky Decomposition

  Assume government spending does not respond to GDP, etc. within the quarter.

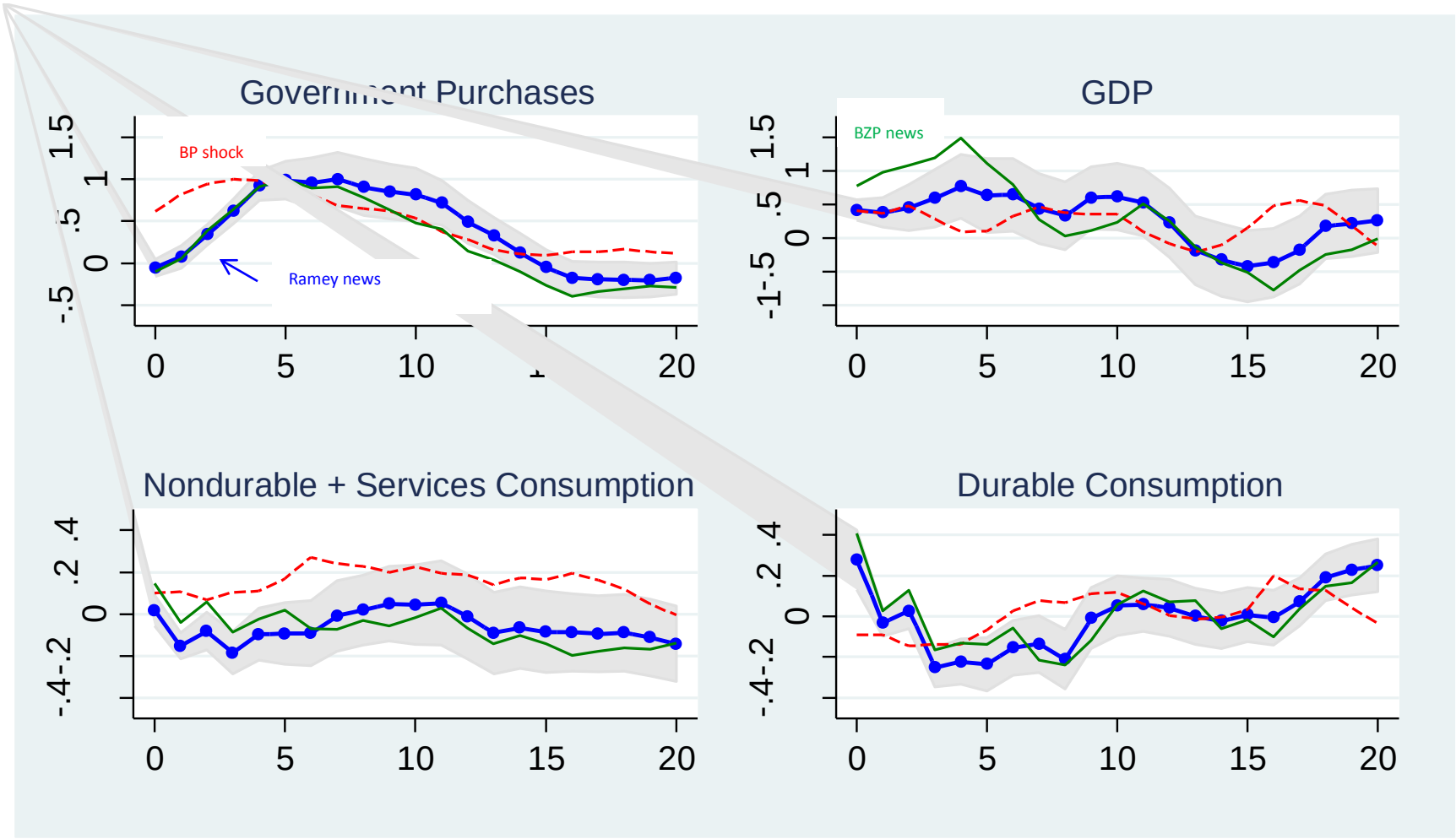
- Ramey: Narrative construction of military news series

  Military spending is chosen to solve the exogeneity problem. News is used because I have argued that most movements in government spending are anticipated.

- Ben Zeev–Pappa (BZP): Medium horizon identification of defense spending news.

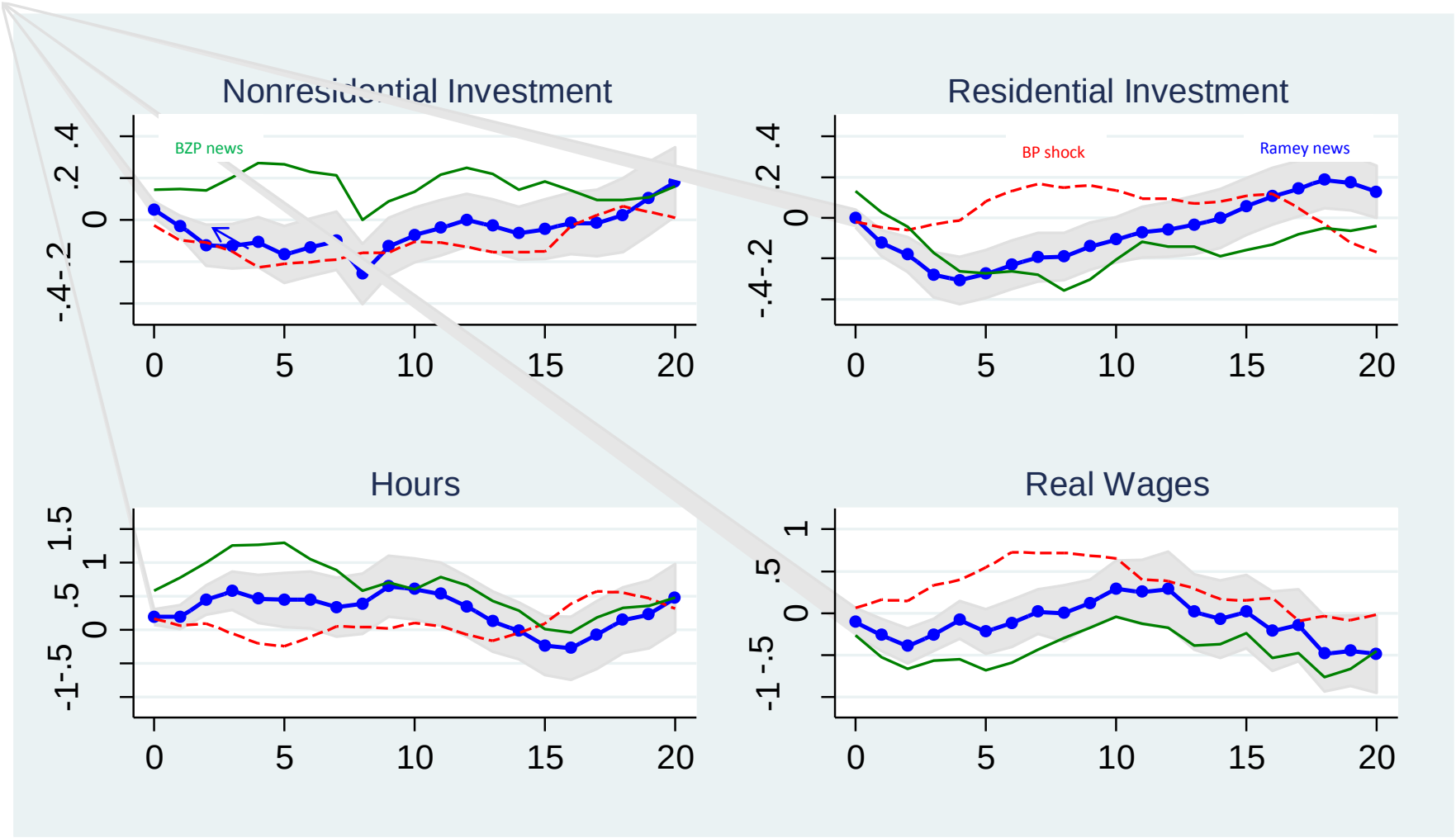
  Shock that (i) is orthogonal to current defense spending; and (ii) best explains future movements in defense spending over a horizon of five years.

Comparison of results



Blanchard-Perotti Ramey news Ben Zeev-Pappa

Comparison of results (continued)



Blanchard-Perotti Ramey news Ben Zeev-Pappa

Summary of results

- Multipliers

  BZP > Ramey > BP
  2-year cumulative multiplier: BZP = 1.4; Ramey = 0.8; BP= 0.4.

- Consumption and real wages

  BP implies rise; Ramey, BZP imply fall.

- Nonresidential investment

  BP, Ramey imply fall; BZP imply rise.

- Residential Investment

  BP implies rise; Ramey, BZP imply fall.

Conclusions about government spending shocks

- The only consistent result is that GDP rises in response to a government spending shock.
- How much depends on the method.
- Each method has its weakness (influential observations, anticipations, low relevance as an instrument).
- It's a puzzle that the Blanchard-Perotti shock is the only one that produces a rise in consumption, yet it produces the smallest multipliers.
- More work needs to be done!