FISCAL NEWS AND DYNAMIC GOVERNMENT SPENDING MULTIPLIERS

Lorenz Kueng  Mu-Jeung Yang

UC Berkeley

November 2011
Stabilization Policy and Fiscal News

Friedman (1948, AER): time lags of fiscal policy

"No matter how much advance planning may have been done, the rate of expenditure cannot be stepped up or curtailed overnight unless the number of names on the payroll is to be the only basis in terms of which the expenditure is to be controlled or judged. Time is involved in getting projects under way with any degree of efficiency; (...)"

News Effects provide counterargument:
forecasted future fiscal expansions can be stimulative now!
Question: what are the effects of a fiscal stimulus before its implementation? (As opposed to "on impact").

I) **Timing**: at which point is information on future government spending news?

II) **Magnitude**: how large are changes in terms of present-value? (Includes: expected size and expected persistence)
**Main Idea**

\[ \text{PV of government debt} = \text{PV(spending)} - \text{PV(taxes)} \]

I) **Timing**: recovered from financial market data on government debt & yields augmented with forecasting model

II) **Magnitude**: recovered from PV-relations in intertemporal government budget constraint
Overview of Talk

I) Fiscal News vs. TFP News: the Puzzle

II) Two Alternative Identification Approaches for Government Spending News
WHAT DO WE KNOW ABOUT NEWS-EFFECTS OF FISCAL POLICY?

Ramey (2011, QJE) : (close to) neoclassical effects
THE DATA THROUGH THE LENS OF A RBC MODEL

\[ E_0 \left[ \sum_{t=0}^{\infty} \beta^t \left( \frac{C_t^{1-\frac{1}{\sigma}}}{1-\frac{1}{\sigma}} - \xi \frac{h_t^{1+\phi}}{1+\phi} \right) \right] \] (1)

\[ Y_t = C_t + I_t + G_t \] (2)

\[ Y_t = A_t K_t^\alpha L_t^{1-\alpha} \] (3)

\[ K_{t+1} = I_t + (1-\delta)K_t \quad 0<\delta<1 \] (4)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta )</td>
<td>0.99</td>
<td>Discount factor</td>
</tr>
<tr>
<td>( \alpha )</td>
<td>0.3</td>
<td>Capital Share</td>
</tr>
<tr>
<td>( \delta )</td>
<td>0.025</td>
<td>Depreciation</td>
</tr>
<tr>
<td>( \xi )</td>
<td>2.95</td>
<td>Disutility from labor</td>
</tr>
<tr>
<td>( \phi )</td>
<td>1</td>
<td>Frisch-elasticity of labor supply</td>
</tr>
<tr>
<td>( \sigma )</td>
<td>0.2 or 1 or 2</td>
<td>Intertemporal Elasticity of Substitution</td>
</tr>
</tbody>
</table>
FISCAL NEWS AND THE “COMOVEMENT PROBLEM”

Output response

Consumption response

Investment response

Hours response

News shock

10% G shock
Bad News and the “Comovement Problem"

Bad News ($E[A] \downarrow$ or $E[G] \uparrow$) lead to

- Output, employment & investment boom
- Consumption slump

Baxter and King (1986): a wealth effect!
CONTRADICTING EVIDENCE

I) Hours:

Beaudry-Portier (2004, AER): $E[A] \downarrow \Rightarrow C \downarrow, h \downarrow$

Ramey (2010, QJE): $E[G] \uparrow \Rightarrow C \downarrow, h \uparrow$

II) Investment:

Barksy-Sims (2010, JME): $E[A] \downarrow \Leftrightarrow C \downarrow, h \uparrow, I \uparrow$

Ramey (2010, QJE): $E[G] \uparrow \Leftrightarrow C \downarrow, h \uparrow, I \downarrow$
This short review motivates our main research questions:

- How strong are wealth effects to government spending news?
- Does the type of government spending matter for the news response (defense, investment, consumption)?
- Does it matter whether government spending shocks are permanent or transitory?
- How do responses to government spending news square with TFP news responses?
Identification Approach 1: VECM

Market value of debt ($B_t$) and primary surpluses ($S_t = T_t - G_t$) are co-integrated

- Construction of variables forecasting future surpluses (co-integration residual)
- Which variables error-correct?
- What is the persistence of shocks to $G$, $T$, and $B$?
- Permanent-transitory decompositions
**GBC: Forecast Implications**

The government budget constraint is

\[ B_{t+1} = R^b_{t+1}(B_t - S_t) \]

Log-linearizing and iterating on the debt following Campbell and Mankiw (1989)

\[ sb_t = E_t \left[ \sum_{j=1}^{\infty} \rho^j \cdot \left( r^b_{t+j} - \mu \tau \Delta \tau_{t+j} + \mu g \Delta g_{t+j} \right) \right] \]

- Surplus-Debt Ratio \((sb = \log(S/B))\) comparable to dividend-price ratio in asset pricing
- High surplus-debt ratio forecasts high future bond returns, or low future surplus
DLS Estimation of Cointegration Vector

\[ b_t = \beta_0 + \alpha_g \cdot g_t + \alpha_\tau \cdot \tau_t + \sum_{i=-k}^{k} \beta_{g,i} \cdot \Delta g_{t-i} + \sum_{i=-k}^{k} \beta_{\tau,i} \cdot \Delta \tau_{t-i} + \epsilon_t \]

\[ \hat{s}b_t = -\hat{\alpha}_g \cdot g_t - \hat{\alpha}_\tau \cdot \tau_t - b_t \]
**Error-Correction Form: Persistence**

\[ X_t = (g_t, \tau_t, b_t) \]
\[ \alpha = (-\hat{\alpha}_g, -\hat{\alpha}_\tau, -1) \]
\[ \Delta X_t = -\gamma \alpha' X_{t-1} + \Gamma(L) \cdot \Delta X_{t-1} + e_t \]

- Key parameters: \( \gamma = (\gamma_g, \gamma_\tau, \gamma_b) \) determining strength of error-correction through spending, taxes and debt value
- Note: \( e_t \) is not orthogonal
PERMANENT-TRANSITORY DECOMPOSITION

Orthogonalization using insight from VECM following Gonzalo and Ng (JEDC 2001)

\[ \gamma' \perp \gamma = 0 \]

where \( \gamma' \perp \) knocks out parts of shocks that error-correct to recover permanent shocks as those that do not error-correct

\[
G = \begin{bmatrix} \gamma' \perp \\ \alpha \end{bmatrix}
\]

\[
\Delta X_t = C(L)e_t = \underbrace{C(L)G \cdot G^{-1}e_t}_{D(L) \cdot \eta_t}
\]

\[ D(1) \cdot \alpha' \cdot e = 0 \quad \text{Long-run response to transitory component of shocks} \]
\[ D(1) \cdot \gamma_\perp \cdot e \neq 0 \quad \text{Long-run response to permanent component of shocks} \]
IDENTIFICATION APPROACH 2: NEWS DECOMPOSITION

Use GBC again, but now we follow Cambpell and Shiller (RFS 1988)

- Proxy expectations of taxes and expected returns to government bond portfolio in an augmented VAR
- Surprise to NPV of spending = Surprise to expected taxes + surprise to government bond returns

\[ (E_{t+1} - E_t) \left[ \sum_{j=1}^{\infty} \rho^j \Delta g_{t+j} \right] = \frac{\mu_{\tau}}{\mu_g} (E_{t+1} - E_t) \left[ \sum_{j=1}^{\infty} \rho^j \Delta \tau_{t+j} \right] \]

\[ + \frac{1}{\mu_g} \cdot (E_{t+1} - E_t) \left[ \sum_{j=0}^{\infty} \rho^j \tau_{t+j}^b \right] \]

- Augmented VAR (potentially F-VAR), now with returns instead of debt:
  \[ X_t = (r_t^b, \tau_t, g_t, \text{tax expectation proxy, return expectation proxy}) \]
Proxy for Expected Taxes

- Income tax rate:
  - expected rate: muni spread from Kueng (2011)
  - expected basis: top incomes from Piketty and Saez (QJE 2003)
- Dividend and capital gains tax: tax capitalization in portfolios from Sialm (AER 2009)
- Corporate income tax
  - expected rate: work-in-progress based on lecture notes by Hines (suggestions welcome!)
  - expected basis: aggregate profits
- Payroll tax: using different definitions of primary surplus as robustness check
- Additionally: CBO and other forecasters
Proxy for Expected Returns on Government Bond Portfolio

- principal components of yield curve: level, slope, curvature
- inflation
- Cochrane and Piazzesi (AER 2005) risk factor based on forward rates
**Data: Holding Returns and Market Value of Debt**

$P_t^k$: price of a bond in $t$, maturing in period $k$.

$$ r_t^k = \frac{P_t^{k-1} - P_t^k}{P_{t-1}^k} \quad (5) $$

$$ w_{t-1}^k = \frac{s_{t-1}^k P_t^k}{\sum_{l=1}^{K} s_{t-1}^l P_{t-1}^l} \quad (6) $$

$$ r_t^b = \sum_{k=1}^{K} w_{t-1}^k r_t^k \quad (7) $$
DATA: HOLDING RETURNS ON GOVERNMENT DEBT
DATA: MARKET VALUE OF GOVERNMENT DEBT
COMPARISON OF IDENTIFICATION APPROACHES

- **VECM approach** recovers average response to transitory and permanent news shocks
- ... but identifies mainly surplus news
- **Proxy approach** uses more information to differentiate spending from tax news
- ... but does not identify size of spending surprises vs persistence

STAY TUNED: TO BE CONTINUED...
COMPARISON OF IDENTIFICATION APPROACHES

- **VECM approach** recovers average response to transitory and permanent news shocks
- ... but identifies mainly surplus news
- **Proxy approach** uses more information to differentiate spending from tax news
- ... but does not identify size of spending surprises vs persistence

STAY TUNED: TO BE CONTINUED ...