Impact of Temporary Fiscal Shocks on the Canadian Economy

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The views expressed in this paper are those of the authors. No responsibility for them should be attributed to the Bank of Canada.
Motivation

What are the effects of temporary fiscal shocks in Canada?
Motivation

• Many tools:
  – Macroeconomic structural models, narrative studies, natural experiments, VARs, etc.

• Various conclusions:
  – Spending shock:
    • Significant positive impact on output (Fatas and Mihov, 2001);
    • Weak impact on output (Mountford and Uhlig, 2005)

• US vs. Canada.
Our work

Methodology:

• Structural VAR;
• 3 variables and shocks;
• 3 identification approaches:
  – Recursive (Fatas and Mihov, 2001);
  – Blanchard and Perotti (2002);
  – Sign restrictions (Mountford and Uhlig, 2005).
Data

• 3 variables:
  – Real Canadian GDP;
  – Real government expenditures on goods and services;
  – Real government net revenues.
  
Source: CANSIM (Statistics Canada)

• Transformations
  – Deflated by BoC’s estimate of potential output;
  – Filtered with HP filter ($\lambda = 20,000$).
Recursive approach

• Cholesky decomposition implies causal ordering of variables:

\[
\begin{bmatrix}
1 & 0 & 0 \\
-\alpha_{yG} & 1 & 0 \\
-\alpha_{TG} & -\alpha_{Ty} & 1
\end{bmatrix}
\begin{bmatrix}
u^G_t \\
u^y_t \\
u^T_t
\end{bmatrix}
= 
\begin{bmatrix}
1 & 0 & 0 \\
0 & 1 & 0 \\
0 & 0 & 1
\end{bmatrix}
\begin{bmatrix}
\epsilon^G_t \\
\epsilon^y_t \\
\epsilon^T_t
\end{bmatrix}
\]
Blanchard-Perotti approach

- External institutional information about taxes and transfers.

\[
\begin{bmatrix}
1 & -\alpha_{Gy} & 0 \\
-\alpha_{yG} & 1 & -\alpha_{yT} \\
0 & -\alpha_{Ty} & 1
\end{bmatrix}
\begin{bmatrix}
u_t^G \\
u_t^y \\
u_t^T
\end{bmatrix}
= \begin{bmatrix}
1 & 0 & 0 \\
0 & 1 & 0 \\
\beta_{TG} & 0 & 1
\end{bmatrix}
\begin{bmatrix}
\epsilon_t^G \\
\epsilon_t^y \\
\epsilon_t^T
\end{bmatrix}
\]

- 2 specifications:
  - Perotti (2004): $\alpha_{Gy} = 0$ and $\alpha_{Ty} = 0.43$;
  - Murchison and Robbins (2003): $\alpha_{Gy} = 0.21$ and $\alpha_{Ty} = 0.43$. 
Sign restrictions approach

- Restricts direction of responses to shocks.
- 2 specifications:
  - Mountford and Uhlig (2005):
    \[
    \begin{align*}
    \begin{bmatrix} G_t \\ y_t \\ T_t \end{bmatrix} &= \begin{bmatrix} + & 0 \end{bmatrix} \begin{bmatrix} \xi_t^G \\ \xi_t^y \\ \xi_t^T \end{bmatrix} \\
    \end{align*}
    \]
  - Enhanced specification:
    \[
    \begin{align*}
    \begin{bmatrix} G_t \\ y_t \\ T_t \\ (T_t - G_t) \end{bmatrix} &= \begin{bmatrix} + & + & + & 0 \end{bmatrix} \begin{bmatrix} \xi_t^G \\ \xi_t^y \\ \xi_t^T \end{bmatrix} \\
    \end{align*}
    \]
Non-fiscal shock
Shock to government revenues
Shock to government expenditures
Sensitivity analysis

- Alternative trends:
  - Persistence.

- Subsample stability:
  - Revenues shock: robust;
  - Spending shock: more persistent after 1982.

- Model specification (5 variables):
  - Revenues shock: smaller effect after 2 years;
  - Spending shock: within confidence bands.
Conclusion

• **Revenues shock:**
  - Positive and persistent effect;
  - Robust among approaches.

• **Spending shock:**
  - Positive effect on impact;
  - Negative effect on other components;
  - Not robust among approaches;

• **Sensitivity**
  - Sensitivity to trend;
  - Adding variables ↓ impact.