Discussion of "What Do Sectoral Dynamics Tell Us About the Origins of Business Cycles?" by Matthes and Schwartzman

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Introduction

- What drives business cycles?
- Usual approach: VAR on macro data
- This paper: Use priors on sectoral sensitivity to aggregate shocks motivated by theory to sharpen identification
- Demand shocks important of aggregate fluctuations

Recap

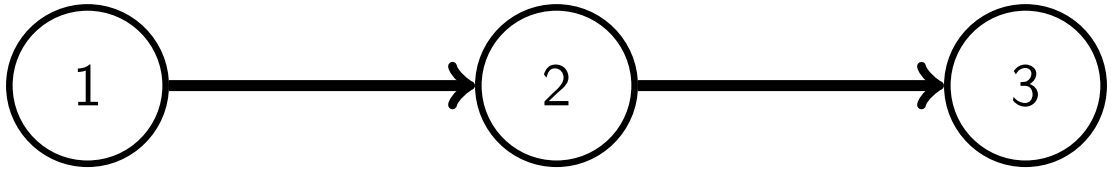
$$u_t^i = D^i \varepsilon_t + w_t^i, \quad i = 1, \ldots, n$$

- u_t^i : residuals
- ε_t : structural shocks
- w_t^i : non-structural shocks
- Priors on impact matrix D^i:
  - Key element: $\alpha_{k,s}^i$
  - Interpretation: sector i's sensitivity (and sign) of variable k to shock s relative to other sectors

Direct vs network effect

- What determines $\alpha^i_{k,s}$ (sector's sensitivity to a macro shock)?
- This is a non-trivial question: have to consider not only the direct effect but also the indirect/network effect
- Example: When an aggregate G shock hits
  - Sector i's output increases because G spending in sector i increases (*direct effect*)
  - . . . but also because sector j's input demand for good i increases because G spending in sector j increases (*network effect*)
- Priors motivated by direct effect
  - G shock: $\alpha^i_{k,s} = \frac{G_i}{Y_i}$
  - Household demand shock: $\alpha^i_{k,s} = \frac{C_i}{Y_i}$

Direct vs network effect: illustration



- 3-sector RBC with G shock
- Sector 1 supplies inputs to sector 2, which in turn supplies inputs to sector 3
- Model 1 (network effect only): $\{\frac{G_1}{Y_1}, \frac{G_2}{Y_2}, \frac{G_3}{Y_3}\} = \{0.1, 0.1, 0.1\}$
- Model 2 (small direct effect): $\{\frac{G_1}{Y_1}, \frac{G_2}{Y_2}, \frac{G_3}{Y_3}\} = \{0.05, 0.1, 0.15\}$
- Model 3 (large direct effect): $\{\frac{G_1}{Y_1}, \frac{G_2}{Y_2}, \frac{G_3}{Y_3}\} = \{0.01, 0.1, 0.2\}$

Direct vs network effect: illustration

Table: ΔY_i (on impact) to 10% increase in G

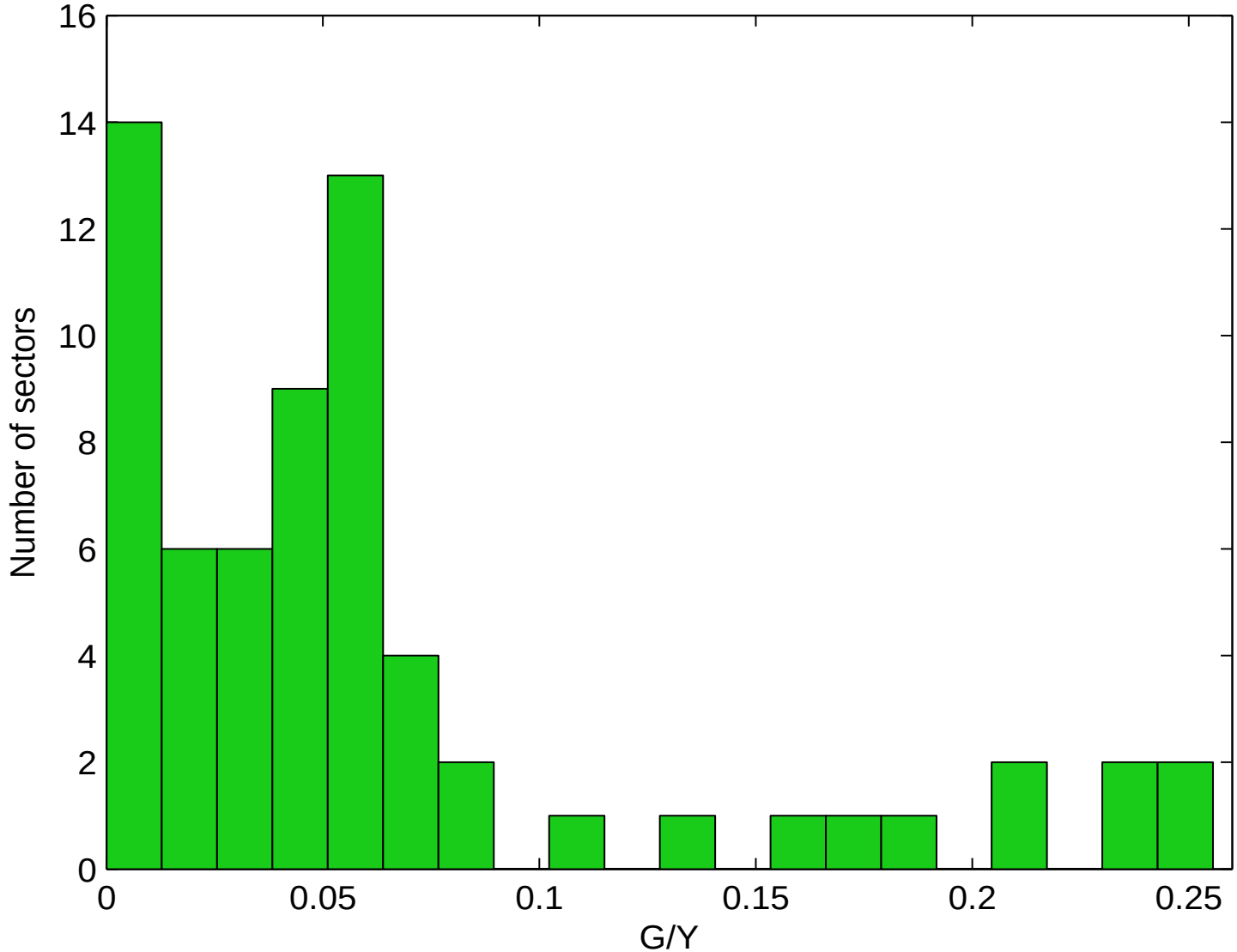
	Sector 1	Sector 2	Sector 3
Model 1 (network effect only)	0.44	0.14	0.13
Model 2 (small direct effect)	0.26	0.25	0.25
Model 3 (large direct effect)	0.15	0.33	0.36

- Network effect: upstream sector most sensitive to G shock
- Direct effect: sectors with high $\frac{G_i}{Y_i}$ more sensitive to G shock

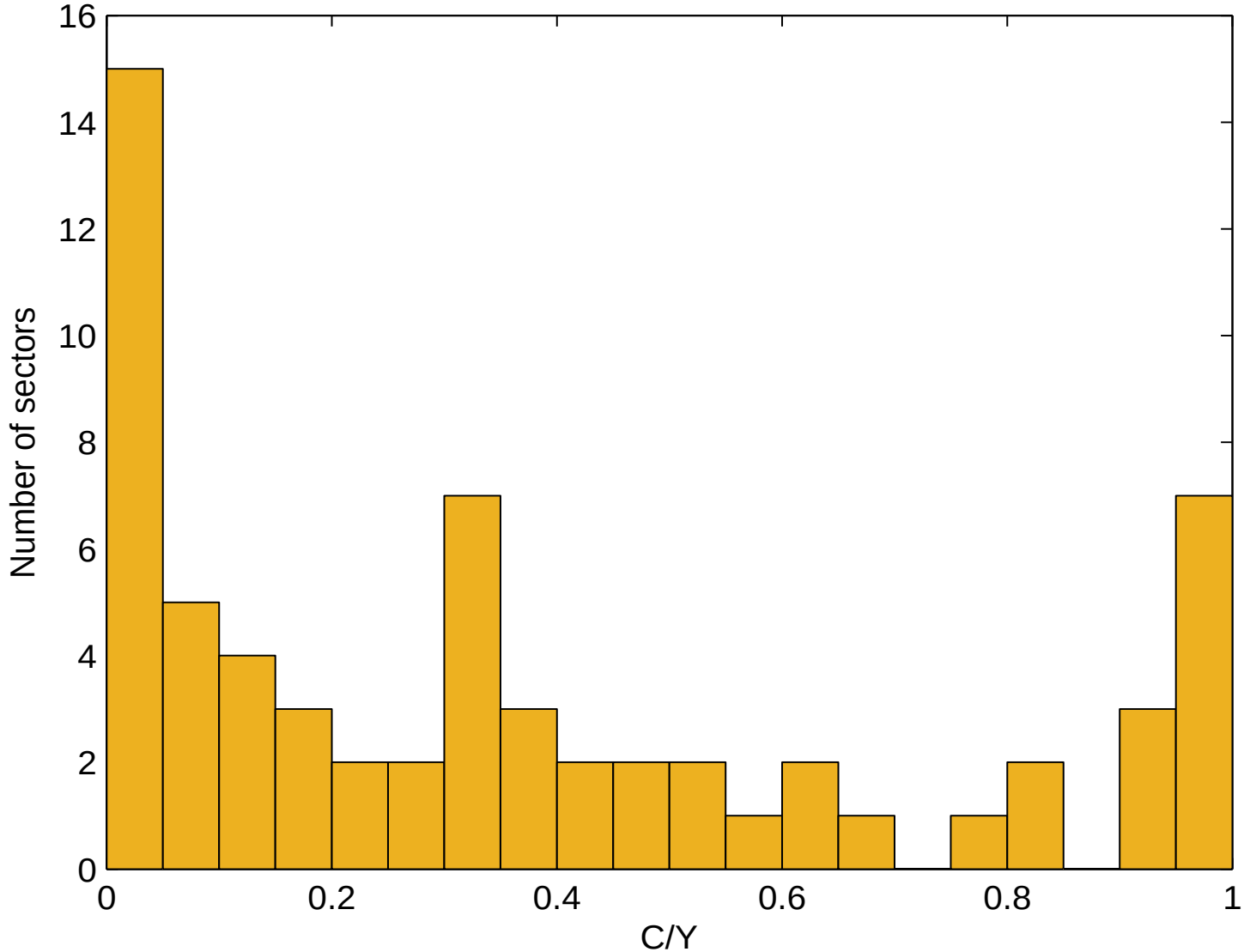
Quantitative evaluation

- 60-sector RBC calibrated to US sectoral facts
- G shock: $\text{Corr}(\Delta Y_i, \frac{G_i}{Y_i}) = 0.80$
- Household demand shock: $\text{Corr}(\Delta Y_i, \frac{C_i}{Y_i}) = 0.81$
- Works well!

Cross-sectoral distribution of G/Y



Cross-sectoral distribution of C/Y



Conclusion

- Excellent paper!
- Direct effect strong for G shock and household demand shock
  - This is because cross-sectoral dispersion of $\frac{G_i}{Y_i}$ and $\frac{C_i}{Y_i}$ large in data
- For other shocks not clear whether direct effect dominates network effect
  - Alternative: set priors based on network effect
- These issues could be addressed within the multi-sector DSGE the authors are currently developing