"Monetary Policy, Bounded Rationality, and Incomplete Markets"
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Discussion

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Bank of Canada Macro Conference, 2018

Forward guidance

- Consumer with labor income $Y_0, Y_1, ...$ and access to a single bond
- Euler equation

$$U'(C_t) = \beta (1 + r_t) U'(C_{t+1})$$

- Intertemporal budget constraint

$$C_0 - Y_0 + \frac{1}{1+r_0}(C_1 - Y_1) + \frac{1}{1+r_0}\frac{1}{1+r_1}(C_2 - Y_2) + ... = 0$$

- Rate stable at $1/\beta - 1$
- Suddenly consumer anticipates a future blip in r_J, what happens?

Forward guidance (continued)

- Euler equation: keep consumption constant before and after J
- Intertemporal budget constraint

$$\left(1 + \beta + \beta^2 + ... + \beta^J\right) C_0 +$$
$$+ \frac{1}{1 + r_T} \frac{\beta^J}{1 - \beta} C_{J+1} = ...$$

- As $J \to \infty$ effect on C_0 gets smaller and smaller and

$$C_0 \to \sum_{j=0}^{\infty} \beta^j Y_{t+j}$$

Forward guidance (continued)

- Where is the forward guidance puzzle?!?
- It's all in the fact that agents anticipate, rationally, that in general equilibrium

$$Y_{t+j} = C_{t+j}$$

- Then you can use *only* Euler equation

$$U'(C_t) = U'(C_{t+1}) = ... = \beta (1 + r_{t+J}) U'(Y^*)$$

- Effect is same for all t

General equilibrium

- Not many people think general equilibrium
- (That's why we have a job)

Bounded rationality

- k-level rationality (Garcia-Schmidt and Woodford, 2015)
- 0-level: take initial income sequence as given, same as PE (wrinkle)
- 1-level: what if other consumers think like me at 0 level?
  - Now income Y_t higher in periods 0 to J
- 2-level: what if other consumers...

Bounded rationality + incomplete markets

- An agent with binding borrowing constraint at 1

$$U'(C_1) > \beta (1 + r_1) U'(C_2)$$

- For that agent

$$C_0 - Y_0 + \frac{1}{1 + r_0} (C_1 - Y_1) = 0$$

- Interest rate beyond r_0 does not matter at all
- For this agent PE effect is zero
- Incomplete markets $\Longrightarrow$ small PE
- Bounded rationality $\Longrightarrow$ GE closer to PE
- Together: small GE

Open challenges

- Announce higher inflation target
- Gradually agents learn we are in new regime
- How to combine k-level rationality $+$ learning

Open challenges (continued)

- Combining different ways of making forecasts:
  - write a model and think it through
  - run a regression
- Usually a bit of both
- Boundedly rational agents as (bad) theorists or as (bad) empirical guys?
- E.g., car manufacturer needs to forecast effect of forward guidance on car purchases

Open challenges (continued)

- Multi k models
- Asset prices, yield curve respond faster, maybe higher k (higher cost from using low k)
- Consumer decisions respond to asset prices, but still miss GE on income