Discussion of:

Real Keynesian Models and Sticky Prices

by Paul Beaudry & Franck Portier

Edouard Challe

CREST, Ecole Polytechnique

Konstanz Seminar 2018
The Real Keynesian Model

(D)EE : \[ \hat{y}_t = \alpha_l E_t (\hat{y}_{t+1}) - \alpha_r (\hat{i}_t - E_t [\pi_{t+1}]) + d_t \]

\[ \uparrow \]

EE discount

RKPC : \[ \pi_t = \beta E_t [\pi_{t+1}] + \kappa \{ \gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}]) \} + \mu_t \]

\[ \uparrow \]

cost channel
The Real Keynesian Model

\((D)EE\) : 
\[
\hat{y}_t = \alpha_l E_t (\hat{y}_{t+1}) - \alpha_r (\hat{i}_t - E_t [\pi_{t+1}]) + d_t
\]
\(\uparrow\)
EE discount

\(RKPC\) : 
\[
\pi_t = \beta E_t [\pi_{t+1}] + \kappa \{\gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}])\} + \mu_t
\]
\(\uparrow\)
cost channel

\(\checkmark\) take \(\kappa \rightarrow \infty\); if \(\gamma_r = 0\) (basic NKPC), it must be that \(y_t = 0\)
The Real Keynesian Model

\[ (D)EE : \quad \hat{y}_t = \alpha_l E_t (\hat{y}_{t+1}) - \alpha_r (\hat{i}_t - E_t [\pi_{t+1}]) + d_t \]

\[ \text{EE discount} \]

\[ \text{RKPC : } \quad \pi_t = \beta E_t [\pi_{t+1}] + \kappa \{ \gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}]) \} + \mu_t \]

\[ \text{cost channel} \]

\[ \text{take } \kappa \to \infty; \text{ if } \gamma_r = 0 \text{ (basic NKPC), it must be that } y_t = 0 \]

\[ \text{if } \gamma_r > 0 \text{ (RKPC), it must be that } \gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}]) = 0 \]
The Real Keynesian Model

\[ (D)EE : \hat{y}_t = \alpha_l \mathbb{E}_t (\hat{y}_{t+1}) - \alpha_r (\hat{i}_t - \mathbb{E}_t [\pi_{t+1}]) + d_t \]

\[ \text{EE discount} \]

\[ \text{RKPC} : \pi_t = \beta \mathbb{E}_t [\pi_{t+1}] + \kappa \{ \gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - \mathbb{E}_t [\pi_{t+1}]) \} + \mu_t \]

\[ \text{cost channel} \]

\[ \text{take } \kappa \rightarrow \infty; \text{ if } \gamma_r = 0 \text{ (basic NKPC), it must be that } y_t = 0 \]

\[ \text{if } \gamma_r > 0 \text{ (RKPC), it must be that } \gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - \mathbb{E}_t [\pi_{t+1}]) = 0 \]

\[ \text{intuition: change in input use by bottom production layer} \]
The Real Keynesian Model

\[(D)EE:\]  
\[
\hat{y}_t = \alpha_l E_t (\hat{y}_{t+1}) - \alpha_r (\hat{i}_t - E_t [\pi_{t+1}]) + d_t
\]

\[\uparrow\] EE discount

\[RKPC:\]  
\[
\pi_t = \beta E_t [\pi_{t+1}] + \kappa \{\gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}])\} + \mu_t
\]

\[\uparrow\] cost channel

- take \(\kappa \to \infty\); if \(\gamma_r = 0\) (basic NKPC), it must be that \(y_t = 0\)
- if \(\gamma_r > 0\) (RKPC), it must be that \(\gamma_l \hat{y}_t + \gamma_r (\hat{i}_t - E_t [\pi_{t+1}]) = 0\)
- intuition: change in input use by bottom production layer
- now use this to eliminate \(i_t - E_t [\pi_{t+1}]\) from \((D)EE\) and get:

\[
y_t = \left(\frac{\alpha_l}{1 - \alpha_r \gamma_l / \gamma_r}\right) E_t (y_{t+1}) + \left(\frac{1}{1 - \alpha_r \gamma_l / \gamma_r}\right) d_t
\]

\(A \in (0,1)\) under RK cond.
The Real Keynesian Model

- **intuition** for the expansionary effect of a d-shock in flex-price limit?

- start with model **without** cost channel ($\gamma_r = 0$)

- at given nominal interest rate, prices and wages, firms serve demand; their “notional” labor demand rises, and so does the nominal wage

- firms pass this cost through to prices until the mark-up (i.e., the inverse of RMC) is back to its optimal value

- the central bank adjusts $\hat{i}_t$ upwards

- ultimately, $\{\hat{i}_t, \pi_t\}$ adjust so that $\hat{i}_t - \mathbb{E}_t[\pi_{t+1}] = \alpha_r^{-1} d_t \quad \forall t$

- how does the cost channel break this feature?
The Real Keynesian Model

- direct impact on notional labor demand and upward pressure on nominal wage are identical as before

- firms pass this through to prices until RMC is back to optimal but this no longer requires the same real wage as before

- $w_t$ can rise provided that $\hat{\pi}_t - \mathbb{E}_t [\pi_{t+1}]$ falls

- **demand side**: households consume more in the present
  (direct effect of $d_t$-shock + indirect effect from $\hat{\pi}_t - \mathbb{E}_t [\pi_{t+1}]$)

- **supply side**: households work more in the present

- carries over to sticky prices, except that both $w_t$ and $\hat{\pi}_t - \mathbb{E}_t [\pi_{t+1}]$ can rise since RMC is countercyclical

- breakdown of divine coincidence and potential policy tradeoff from demand shocks (see Ravenna & Walsh JME 2006)
Comment #1: Specification of the cost channel

- standard specification (e.g., CEE 2005; Ravenna-Walsh 2006) has **nominal** interest rate in firms’ real marginal cost because wage bill must be paid in advance of production. **Does this matter?**

- with wage bill paid in advance the nominal cost of an hour of work is $W_t (1 + i_t)$ and the RMC (wo. capital) becomes:
  \[
  \phi_t = \frac{W_t}{P_t} (1 + i_t)
  \]

- NKPC becomes:
  \[
  \pi_t = \beta \mathbb{E}_t [\pi_{t+1}] + \kappa (\gamma \hat{y}_t + \hat{i}_t) + \mu_t \\
  \overbrace{\hat{\phi}_t}
  \]

- flex-price limit now has:
  \[
  \hat{y}_t = -\frac{1}{\gamma} \hat{i}_t
  \]

- **intuition:** lower $\hat{i}_t$ reduces cost of financing the wage bill and hence boosts labor demand, employment and output
Comment #1: Specification of the cost channel

- no longer possible to eliminate $\hat{\mathbb{E}}_t [\pi_{t+1}]$ from (D)EE:

$$y_t = \alpha_l \mathbb{E}_t (y_{t+1}) - \alpha_r (\hat{i}_t - \mathbb{E}_t [\pi_{t+1}]) + d_t - \gamma y_t$$

- even flex-price limit needs another equation

- assume following interest-rate rule:

$$\hat{i}_t = \phi_l \hat{y}_t + \phi_\pi \mathbb{E}_t [\pi_{t+1}]$$

- (D)EE + interest-rate rule + constant RMC gives flex-price solution
Comment #1: Specification of the cost channel

- you get:

\[
\hat{y}_t = \left\{ \frac{\alpha_l \phi_\pi}{\phi_\pi (1 - \alpha_r \gamma) + \alpha_r (\gamma + \phi_l)} \right\} \mathbb{E}_t (\hat{y}_{t+1}) \\
\in (0,1) ?
\]

\[
+ \left\{ \frac{\phi_\pi}{\phi_\pi (1 - \alpha_r \gamma) + \alpha_r (\gamma + \phi_l)} \right\} d_t \\
> 0 ?
\]

- different “RK condition”:

\[
\phi_\pi (1 - \alpha_r \gamma - \alpha_l) + \alpha_r (\gamma + \phi_l) > 0
\]

- Taylor rule coefficients (and, probably, shape) play a key role

- EE discount ($\alpha_l < 1$) no longer necessary (can even have $\alpha_l > 1$)
Comment #1: Specification of the cost channel

- now look at responses to iid $d$-shocks and **away** from sticky prices

- in this case **both** models give (with $\phi_\pi = 1$ in Beaudry-Portier):

\[
\begin{align*}
  y_t &= \left( \frac{1}{1 + \alpha_r \phi_I} \right) d_t \\
  \hat{i}_t &= \left( \frac{\phi_I}{1 + \alpha_r \phi_I} \right) d_t \\
  \pi_t &= \left( \frac{\kappa \gamma + \phi_I}{1 + \alpha_r \phi_I} \right) d_t
\end{align*}
\]

- dynamics is robust in that specific case at least
Comment #1: Specification of the cost channel

Bottom line

- RK condition sensitive to model details

- model workings at/away from flex-price limit may/may not be

- how sensitive are empirical results to (implicit) parameter restriction?
Comment #2: RK model with sticky prices (Section 2)

- recall (D)EE:

\[ \hat{y}_t = \alpha_i \mathbb{E}_t (\hat{y}_{t+1}) - \alpha_r (i_t - \mathbb{E}_t [\pi_{t+1}]) + d_t \]

- posit interest rate rule:

\[ \hat{i}_t = \mathbb{E}_t [\pi_{t+1}] + \phi_i \hat{y}_t \]

- then

\[ \hat{y}_t = \left( \frac{\alpha_i}{1 + \alpha_r \phi} \right) \mathbb{E}_t (\hat{y}_{t+1}) + \left( \frac{1}{1 + \alpha_r \phi} \right) d_t \]

- Prop. 3 and 4 follow (impact of \( d_t \)-shocks on output and inflation)

- what does it have to do with NK versus RK?

- isn’t it just about (bad) monetary policy?

- knife-edge Taylor rule that disconnects (D)EE from rest of model
Comment #3: Structural estimation

- **baseline**: ML-estimation of purely forward-looking model

- reduced form representation has no endogenous persistence

- then extended to backward looking *(D)EE*

- what about inflation persistence? interest rate smoothing?

- risk of mis-specification
Summary

- not one great paper but two!
- rejuvination of cost channel and implications
- a number of intriguing results (some less)
- issue of robustness w.r.t. specification
- not-so-innocuous restrictions in structural estimation