

Extensions and New Directions

- Estimated medium-scale DSGE models

- academic precedents

 - Smets-Wouters (2003, 2007), Christiano-Eichenbaum-Evans (2005)

- "institutional" models

 - ECB (NAWM), Fed (MAQS, SIGMA), Riksbank (RAMSES),...

- endogenous capital accumulation

- habit formation, costs of investment adjustment

- price and wage indexation

- multiple shocks

- potential uses: decompositions, counterfactual analysis,

forecasting...

- Introduction of *real* frictions

- labor market frictions \Rightarrow unemployment

- financial frictions \Rightarrow intermediation, spreads

New Keynesian Models with Labor Market Frictions

- Motivation:

- NK Models with nominal rigidities: role for monetary policy, no unemployment
- Search and Matching models: unemployment, no role for monetary policy

Recent literature: combines nominal rigidities with labor market frictions.

New Keynesian Models with Labor Market Frictions

- Labor market frictions (Mortensen-Pissarides)

- firms: costs of hiring or firing a worker
- worker: time/effort required to find a job
 - ⇒ any existing employment relation generates a *surplus*

$$\text{Mg. Product of Labor} \geq \text{Wage} \geq \text{Mg. Disutility of Labor}$$

- Wage bargaining set
- Wage determination (I): Flexible wages + Nash Bargaining

$$\text{Wage} = \Phi \text{ Mg. Disutility of Labor} + (1 - \Phi) \text{ Mg. Product of Labor}$$

⇒ Re-emergence of the "Divine Coincidence" (Blanchard-Galí AEJ 2010)

New Keynesian Models with Labor Market Frictions

- Wage determination (II): Wage rigidities
 - Consistent with privately efficient employment relationships (Hall (2005))

$$\text{Wage} \in [\text{Mg. Disutility of Labor}, \text{Mg. Product of Labor}]$$

Examples:

- Real wage rigidities (Blanchard-Galí,...)
- Nominal wage rigidities (Thomas, Galí, ...)

- ⇒ Important effects on the economy's response to shocks
- ⇒ End of the "Divine Coincidence": trade-off between stabilization of inflation and unemployment
- ⇒ Potential endogeneity of wage rigidities (Galí-van Rens)

New Keynesian Models with Financial Frictions

- In the standard New Keynesian model
 - frictionless financial markets, accessible by all households and firms
 - *one* interest rate for each riskless asset of any given maturity
 - representative household: no credit flows in equilibrium
- Some extensions with financial frictions
 - (a) models with non-Ricardian households
 - (b) models with collateralized debt and borrowing constraints
 - (c) models with credit spreads
 - financial accelerator models
 - costly financial intermediation models

New Keynesian Models with Financial Frictions

- Models with Non-Ricardian Households

Galí, López-Salido and Vallés (JEEA 2007)

Ricardian households (measure $1 - \lambda$):

$$c_t^r = E_t\{c_{t+1}^r\} - \frac{1}{\sigma} (i_t - E_t\{\pi_{t+1}\} - \rho)$$

Non-Ricardian households (measure λ):

$$c_t^{nr} = w_t - p_t + n_t^{nr}$$

Some implications:

- interest rate sensitivity of aggregate demand dampened
- can account for the rise in consumption after an increase in G

New Keynesian Models with Financial Frictions

- Models with Collateralized Debt and Borrowing Constraints

Real precedents: Bernanke-Gertler (1989), Kiyotaki-Moore (1997),...

NK extensions: Iacoviello (2005), Monacelli (2008),...

Two household types: patient (savers) and impatient (borrowers)

Borrowing/Collateral constraint:

$$B_t \leq (1 - \chi) D_t P_{d,t}$$

Some implications:

- additional motive for durable good purchases
- strict inflation targeting no longer optimal (flex price allocation is inefficient)
- variations in inflation used with redistributive purposes (tradeoff)
- desirability of partial stabilization of relative price of durables (to offset variations due to collateral motive).

New Keynesian Models with Financial Frictions

- Models with Credit Spreads (I): The Financial Accelerator Model

Bernanke, Gertler and Gilchrist (1999)

- Credit flows from households (savers) to entrepreneurs (borrowers).
- Entrepreneurs finance capital purchases with net own worth + loans
- External finance premium: marginal cost of external finance minus riskless rate
 - required to compensate for agency costs
 - ⇒ EFP decreasing in net worth
- Investment demand increasing in new worth (consistent with empirical evidence).

Key implication:

- financial accelerator effect ⇒ amplification of shocks

New Keynesian Models with Financial Frictions

- Models with Credit Spreads (II): Costly Financial Intermediation

Cúrdia and Woodford (2009)

Two household types: patient (savers) and impatient (borrowers)
Each household switches between types (Markov process)

Friction: borrowing and saving through financial intermediaries

Technology:

$$d_t = b_t + \Xi_t(b_t)$$

Credit spread:

$$i_t^b = i_t^d + \Xi'_t(b_t) + \mu_t^b$$

Some implications:

- central bank sets i_t^d , but aggregate demand is a function of a weighted average of i_t^d and i_t^b
- optimal paths of inflation and output gap in the standard NK model, nearly optimal under financial frictions
- .- key difference: implementation of optimal policy through interest rate rule: need to account for spread between the policy rate and the relevant rate.