

# Comments on “Adverse Selection, Uncertainty Shocks and Business Cycles” by Daisuke Ikeda

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## Motivation1: To understand the great recession

- ▶ Candidates for the cause of great recession:
  - ▶ Risk shock: Christiano et al,
  - ▶ Financial shock (interest rate spread) : Hall, Gilchrist et al,
  - ▶ Marginal Efficiency of Investment (MEI) shocks (investment good to capital good): Justiniano, et al
- ▶ This paper aims to provide microfoundation of financial shock and MEI shock  $\Rightarrow$  Uncertainty shock



## Motivation 2: To develop a computable GE model with adverse selection

Two financial frictions to consider

- ▶ Ex ante private information  $\implies$  Adverse selection  $\nu_t$ .
- ▶ Ex post diversion of resources  $\implies$  Moral hazard  $\phi$ .

# Summary

## Partial Equilibrium model

Financial contract between Entrepreneur and Financier

1. Adverse selection

Entrepreneur has net worth  $N_n$  and private information  $p$ .  
The project yields  $\frac{1}{p}R$  with probability  $p$ .  $p \sim F(p)$ , where  $F(p)$  is publicly known.

2. Moral hazard

Entrepreneur can divert  $\phi$  of gross revenue ex post.

3. Zero profits for banks

## Equilibrium conditions

1. Truth telling constraint  $\Leftarrow$  Adverse selection
2. No diversion constraint  $\Leftarrow$  Moral Hazard
3. Entrepreneurs' participation constraint
4. Zero profits for banks ( $\Leftrightarrow$  Condition is independent of net worth of borrowers)

## Characterization of equilibrium

- ▶ Threshold  $p^*$  does not depend on net worth
- ▶ The amounts of loan ( $B_n(p)$ ) and repayment ( $X_n(p)$ ) are linear in net worth
- ▶ Risky entrepreneurs can borrow and pay more in the equilibrium contract (Riskier entrepreneurs have smaller expected repayment)
- ▶ Intermediaries offer loans to more entrepreneurs as the returns earned by entrepreneurs get higher.

## General Equilibrium Models

Consumption good  $\Rightarrow$  Capital good  $\Rightarrow$  Consumption good

Model 1 – Adverse selection in the demand of capital

- ▶ Entrepreneurs buy capital good and rent it out for competitive production of consumption goods
- ▶ Capital good producers are in the competitive market

Model 2 – Adverse selection in the supply of capital

- ▶ Entrepreneurs buy consumption goods and produce capital goods
- ▶ They sell capital goods in the competitive market

## Simulation Results

- ▶ In response to uncertainty shocks, comovements are reproduced
- ▶ In Model 2 net worth increase in response to uncertainty shock or MEI shock (because there is no CEE adjustment cost)
- ▶ Countercyclical markup in wages and capital utilization rates are crucial for comovement.
- ▶ CEE adjustment costs makes humpshaped and persistent responses.
- ▶ CEE adjustment costs is crucial for predictive power of external finance premium.



## Extensions

- Uncertainty shock ( $v_t$ ) is qualitatively equivalent to risk shock in CMR

$$\hat{s}_t = -\chi_{1,r} \left( \hat{N}_t - \hat{q}_t - \hat{K}_{t+1} \right) - \chi_{2,r} E_t u_{r,t+1},$$

$$\hat{s}_t = -\chi_1 \left( \hat{N}_t - \hat{q}_t - \hat{K}_{t+1} \right) - \chi_2 v_t.$$

- Unrealized uncertainty shock has similar effect as realized uncertainty shock

$$\hat{s}_t = -\chi_1 \left( \hat{N}_t - \hat{q}_t - \hat{K}_{t+1} \right) - \chi_2 v_t + \chi_4 \eta_t.$$

## General Comment

- ▶ Tractable model of adverse selection in the DSGE framework  
( $\Leftrightarrow$  Kurlat 2010, Bigio 2010)
- ▶ One period financial contract in DSGE model:
  - ▶ CF 1997
  - ▶ BGG 1999
  - ▶ CMR 2010 (Risk shock)
  - ▶ Hidakata Sudo Ueda 2009
  - ▶ Kato 2006 (Holmstrom-Tirole type)
- ▶ This model is equivalent to BGG if  $v_t = 0$ .

## Comment 1

### Similarity between Risk shock and Uncertainty shock

- ▶ Risk Shock:  $\sigma_t$ 
  - ▶ BGG framework: Costly State Verification
  - ▶ Ex post idiosyncratic shock on project:  $\ln \omega_t \sim N(\mu, \sigma)$
  - ▶ In BGG model,  $\sigma$  is constant
  - ▶ In CMR model, it is time variant  $\rightarrow$  Risk shock
- ▶ Uncertainty shock:  $v_t$ 
  - ▶ This paper: Adverse selection + Moral hazard
  - ▶ Ex ante idiosyncratic shock on project:  $p \sim U[\underline{p}e^{v_t}, 1]$
  - ▶  $v_t$  follows  $v_t = \rho_v v_{t-1} + \epsilon_t$ .

The aggregate effect of risk shock and uncertainty shock are similar

## Comment 1 (continued)

### Risk shock v.s. Uncertainty shock

- ▶ Incorporating adverse selection into DSGE model
- ▶ Effect on macroeconomic dynamics
- ▶ Microfoundation for financial shocks (interest rate spread)
  - ▶ Is it “micro” foundation?
- ▶ Can introduce additional features, e.g., Knightian uncertainty (Fukuda 2008)

## Comment 2

Shocks on investment (i.e., MEI shock or financial shock):  
main driving force of business cycle?

- ▶ This paper
  - ▶ Shocks on investment  $\Leftrightarrow$  Financial frictions
  - ▶ Shocks on investment = the main driving force (Justiniano et al.)
- ▶ Justiniano et al.
  - ▶ If  $MPL = MRS$  investment shock cannot reproduce comovement
  - ▶ Sticky prices and wages make  $MPL \neq MRS$  and investment shocks generate comovements

## Comment 2 (continued)

- ▶ Labor wedge arguments (Chari et al., Shimer)
  - ▶ Labor wedge  $1 - \tau_t = MRS/MPL$
  - ▶ Changes in labor wedge can reproduce business cycles
  - ▶ Shocks on  $\tau_t$  may be the driving force of business cycles
    - ▶ Search friction in the labor market
    - ▶ Frictions on working capital financing (Jermann and Quadrini 2006, Mendoza 2010)
    - ▶ Nominal wage rigidities + productivity shock
    - ▶ Nominal wage rigidities + investment shock
- ▶ Investment may fluctuate in response to shocks on search friction and/or working capital financing

## Comment 3

DSGE model + Large shock = Great recession?

- ▶ What is the cause of uncertainty shocks (or risk shocks)?
- ▶ We may not need to know the cause of shock for
  - ▶ analysis of mechanism of propagation
  - ▶ assessment of (unconventional) policy
- ▶ We need to know the cause of large shock for prevention of recurrence of financial crisis.

## Comment 3 (continued)

Stylized pattern of financial crisis (Reinhart and Rogoff)

- ▶ Financial liberalization or financial innovation / Capital inflow bonanza
- ▶ Asset price bubble and **overleverage**
- ▶ Banking crisis
- ▶ Inflation / Government debt crisis (external and/or domestic)

Cause of financial crisis

- ▶ DSGE literature: Large shock to a *normal* economy
- ▶ RR imply: Small shock to an *overleveraged* economy



## Minor comment

### Moral hazard shock

- ▶ What is the effect of shocks to  $\phi$ ?

$$\phi_t = (1 - \rho)\bar{\phi} + \rho\phi_t + \epsilon_t$$

- ▶ Is it equivalent to net worth shock?