Banking Globalization and International Business Cycles

Kozo Ueda

Bank of Japan

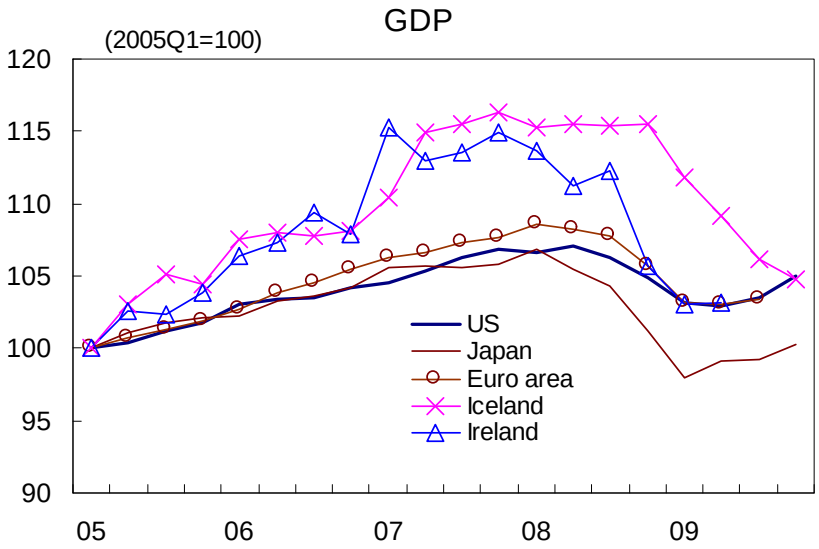
May 26, 2010

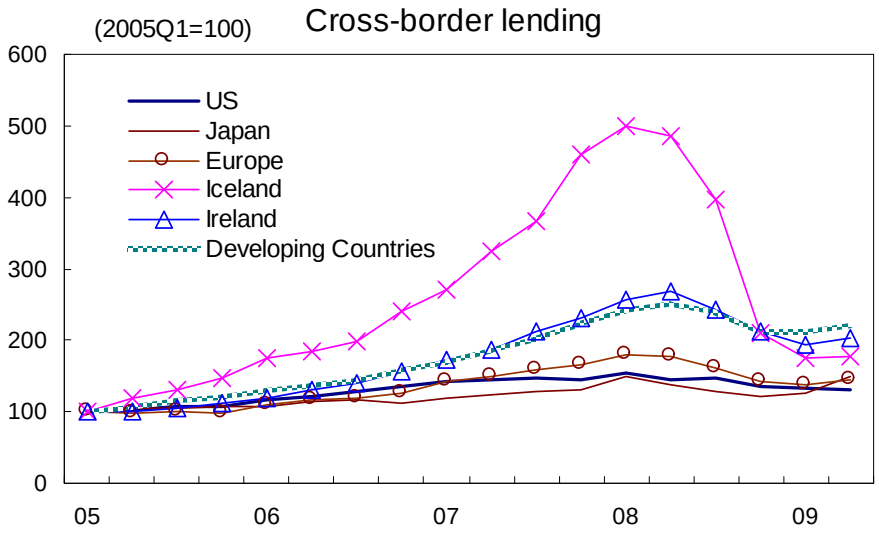
Outline

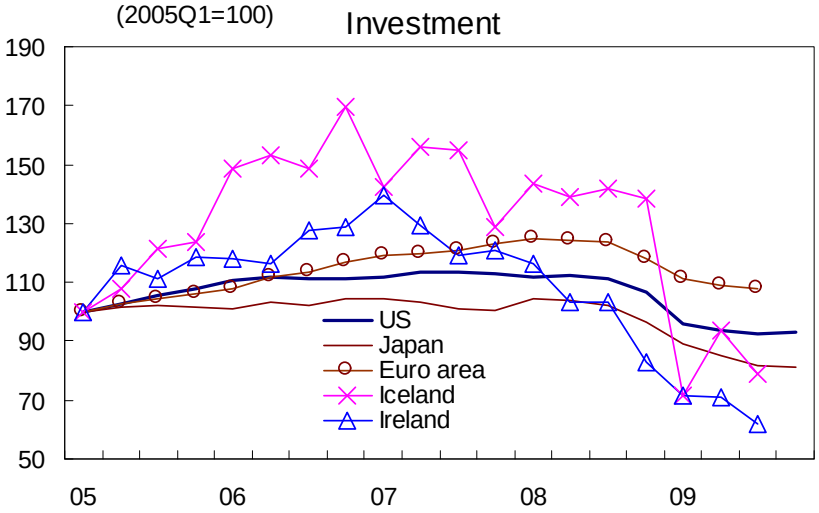
- In the recent credit crisis, we observed
  - Global downturns on the real and financial sides
  - Deterioration in **financial intermediaries' (FIs)** credit conditions
- I construct a DSGE model which explains those observations.
  - Credit-constrained FIs which engage in cross-border lending
- Key to understanding the recent financial crisis

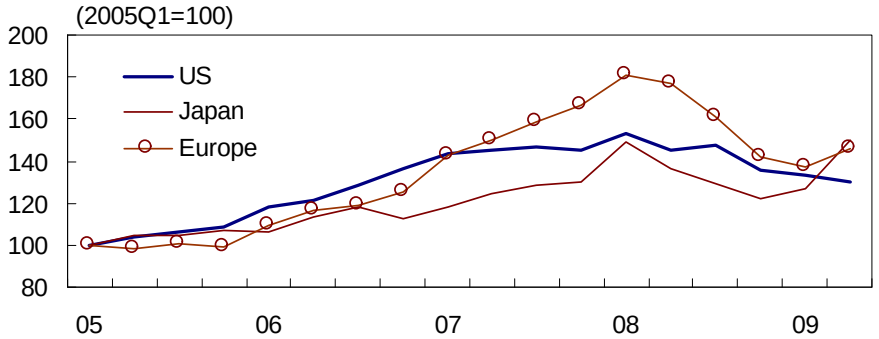
1. FIs' globalization
2. FIs' net worth shock
3. FIs' credit constraints

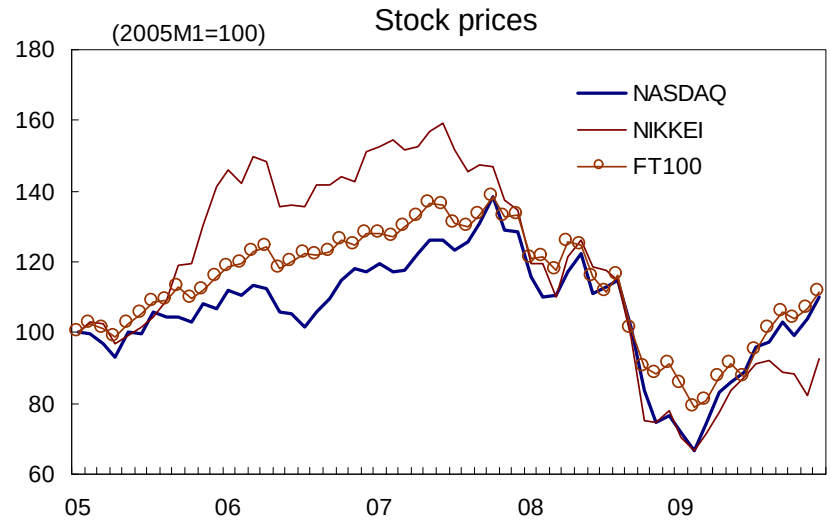
Related Literature and Stylized Facts

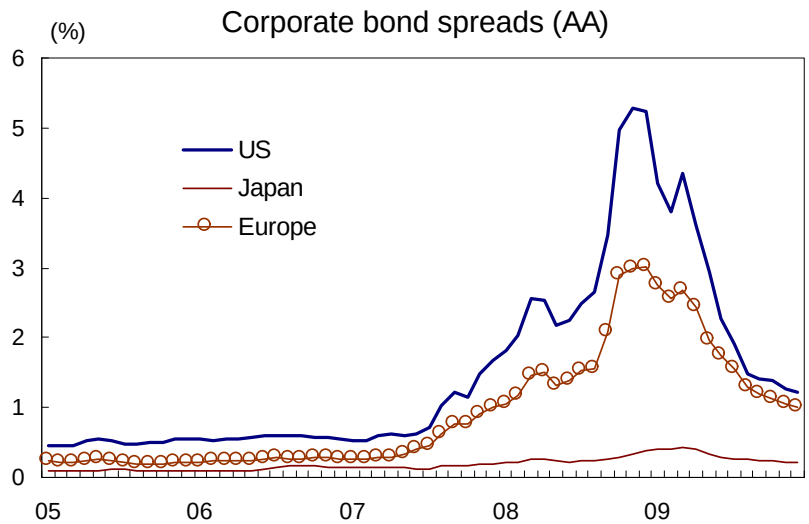


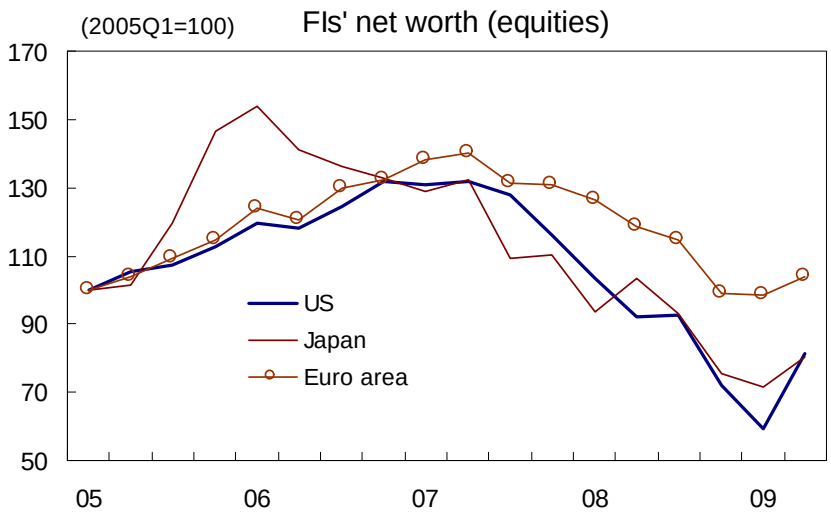


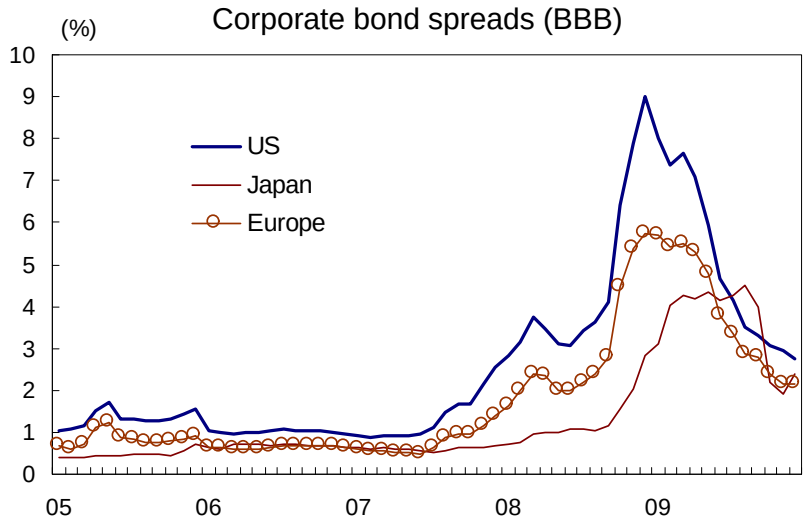





Stock prices
(2005M1=100)
180
160
140
120
100
80
60
05
06
07
08
09
NASDAQ
NIKKEI
FT100


Corporate bond spreads (AA)
(%)
6
5
4
3
2
1
0
05
06
07
08
09
US
Japan
Europe


Fls' net worth (equities)
(2005Q1=100)
170
150
130
110
90
70
50
05
06
07
08
09
US
Japan
Euro area


Corporate bond spreads (BBB)
(%)
10
9
8
7
6
5
4
3
2
1
0
05
06
07
08
09
US
Japan
Europe

Theoretical Studies on Bilateral Correlations (1)

- Correlation (quantity) puzzle
  - International RBC model by Backus, Kehoe, and Kydland (1992) predicts a negative correlation.
  - Suppose a productivity shock. It is efficient to increase I and L in the more productive country and reduce I and L in the less productive country. $\longrightarrow$ Negative bilateral correlation.

Theoretical Studies on Bilateral Correlations (2)

- Frictions in the financial markets resolve the puzzle.
  - Baxter and Crucini (1995), Heathcote and Perri (2002), Iacovielloa and Minetti (2006), Faia (2007), Dedola and Lombardo (2009), and Devereux and Yetman (2009).

- However,
  - No explicit role of FIs. No effect of banking globalization
  - Unexplained movements other than GDP

(2) Macroeconomic Effects of FIs

- Empirical studies
  - Declines of FIs' net worth generate a macroeconomic downturn.
    - Peek and Rosengren (1997, 2000), Calomiris and Mason (2003), Anari, Kolari and Mason (2005), Ashcraft (2005)
  - Common lender effect
    - Kaminsky and Reinhart (2000), and Van Rijckeghem and Weder (2003)

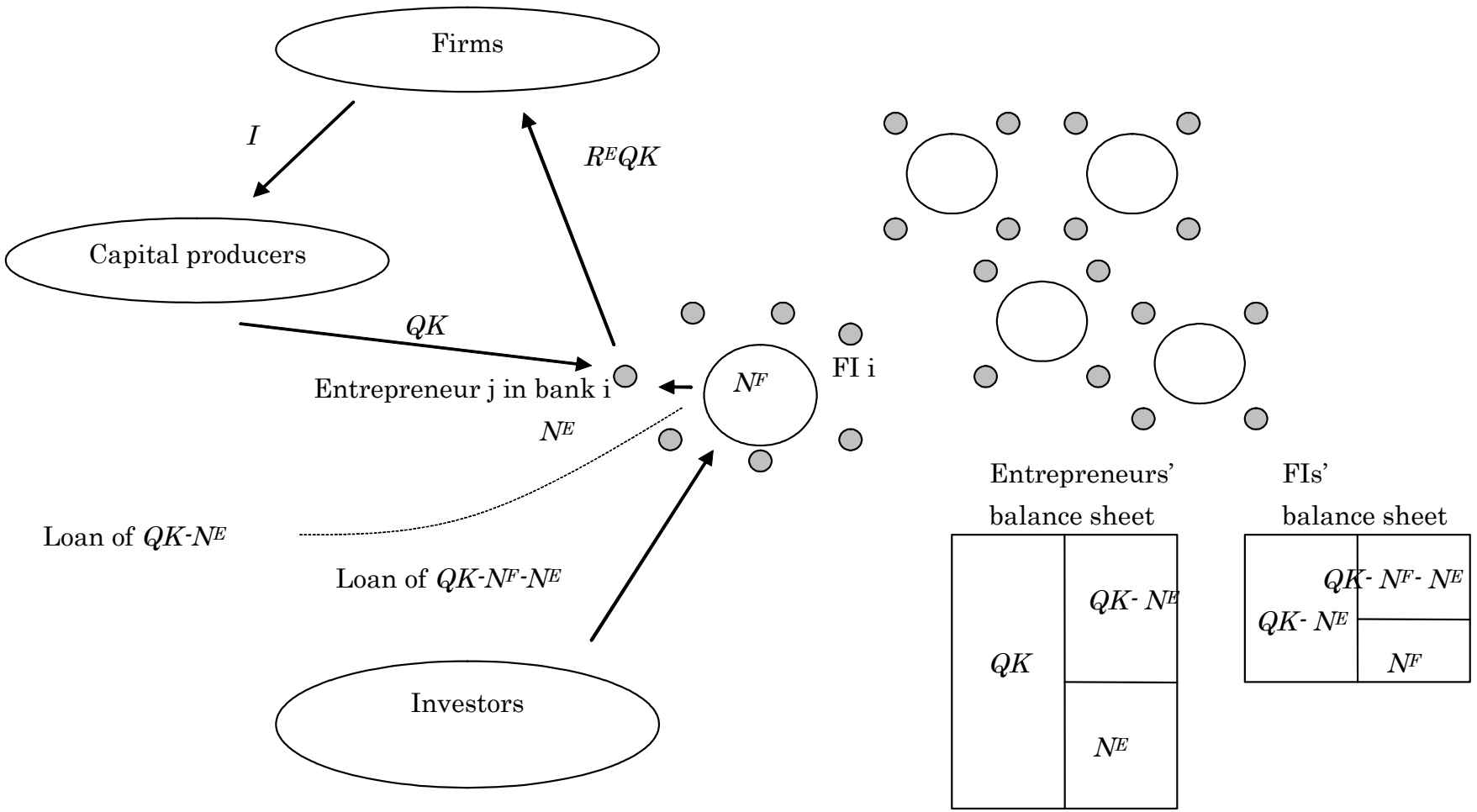
- Theoretical Studies
  - Macroeconomic model with FIs' credit frictions
    - Bernanke and Blinder (1988), Goodfriend and McCallum (2007), Van den Heuvel (2008), Gerali, Neri, Sessa, and Signoretti (2008), Dib (2009), Gertler and Karadi (2009), Gertler and Kiyotaki (2010), Curdia and Woodford (2009)
  - Macroeconomic model with both FIs' and entrepreneurial credit frictions
    - Holmstrom and Tirole (1997)
    - **Hirakata, Sudo, and Ueda (2009, 2010). Bernanke, Gertler and Gilchrist (1999, hereafter BGG)'s contracts become Chained Credit Contracts (CCC).**

Contribution

- Develop a DSGE model with:
  - Credit-constrained FIs and chained credit contracts
  - Two countries: banking globalization and cross-border lending
- Explain business cycle synchronization
  - For real and financial variables
  - Effect of banking globalization
  - Effect of credit-constrained FIs

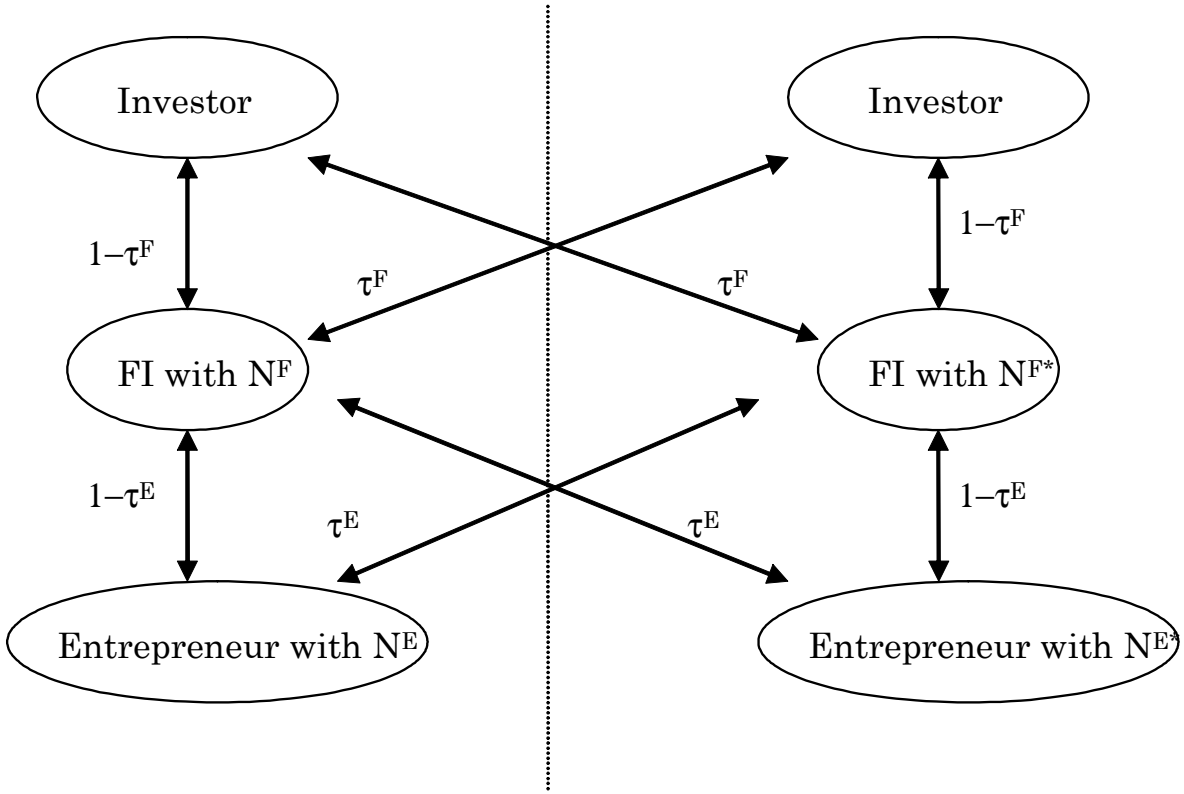
Model

Chained Credit Contracts (CCC, No banking globalization)



CCC under Banking Globalization

- Banking globalization parameters τ^E and τ^F
  - Exogenous (portfolio choice is not incorporated)
  - They determine the allocation of finance between the home and foreign country.



Credit Market

- Investors, FIs, and entrepreneurs make CCC.
  - Hirakata, Sudo, and Ueda (2009, 2010) extending BGG (1999)
  - Costly state verification (CSV) both for FIs' and entrepreneurial idiosyncratic productivity ω^F, ω^E
  - FIs' and entrepreneurial net worths matter.
  - Monopolistic FIs optimize the content of CCC so as to satisfy investors' and entrepreneurial participation constraints.
  - FIs specify $\overline{\omega^F}$ and $\overline{\omega^E}$ so that FIs (entrepreneurs) default if $\omega^F < \overline{\omega^F}$ ($\omega^E < \overline{\omega^E}$), and FIs (entrepreneurs) repay debts of $\overline{\omega^F}$ ($\overline{\omega^E}$) otherwise.

Optimal Chained Credit Contract (CCC)

- Cost-of-funds (premiums) depend on four net worths.

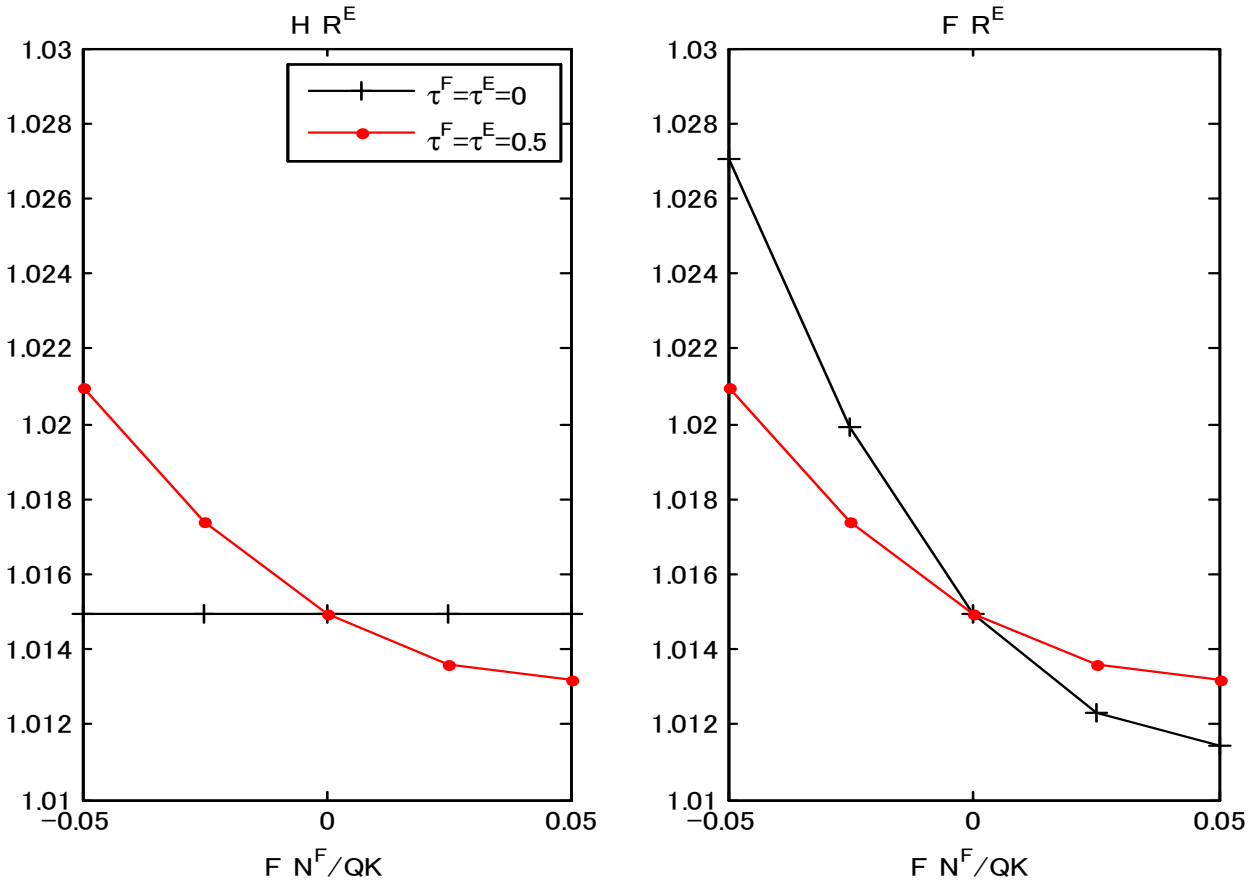
$$\frac{\mathrm{E}_t\left\{R_H^E\left(s^{t+1}\right)\right\}}{R} = F\left(\frac{N^F}{QK_H}, \frac{N^E}{QK_H}, \frac{N^{F*}}{Q^*K_H^*}, \frac{N^{E*}}{Q^*K_H^*}\right).$$

Calibration

- The U.S. data suggests:
  - Net worth is biased to entrepreneurial sector so that we have $\frac{N^F}{QK} = 0.1$ and $\frac{N^E}{QK} = 0.5$.
- Credit market parameters are calibrated.
- Banking globalization τ^F and τ^E (exogenous)
  - Roughly, $(\tau^E + \tau^F)/2$ is 0.15 for the US, 0.1 for Japan, and 0.35 for the Euro area.

Cost-of-Funds for Entrepreneurs

- Focus only on the credit market (not general equilibrium)



Goods Market

- Based on the two-country model of Backus, Kehoe, and Kydland (1992), and its sticky price extension by Clarida, Gali, and Gertler (2002)
  - Tradable two consumption goods
  - Immobile labor and physical capital
  - Calvo-type sticky prices

Goods Market

- $C\left(s^t\right)$ in H:

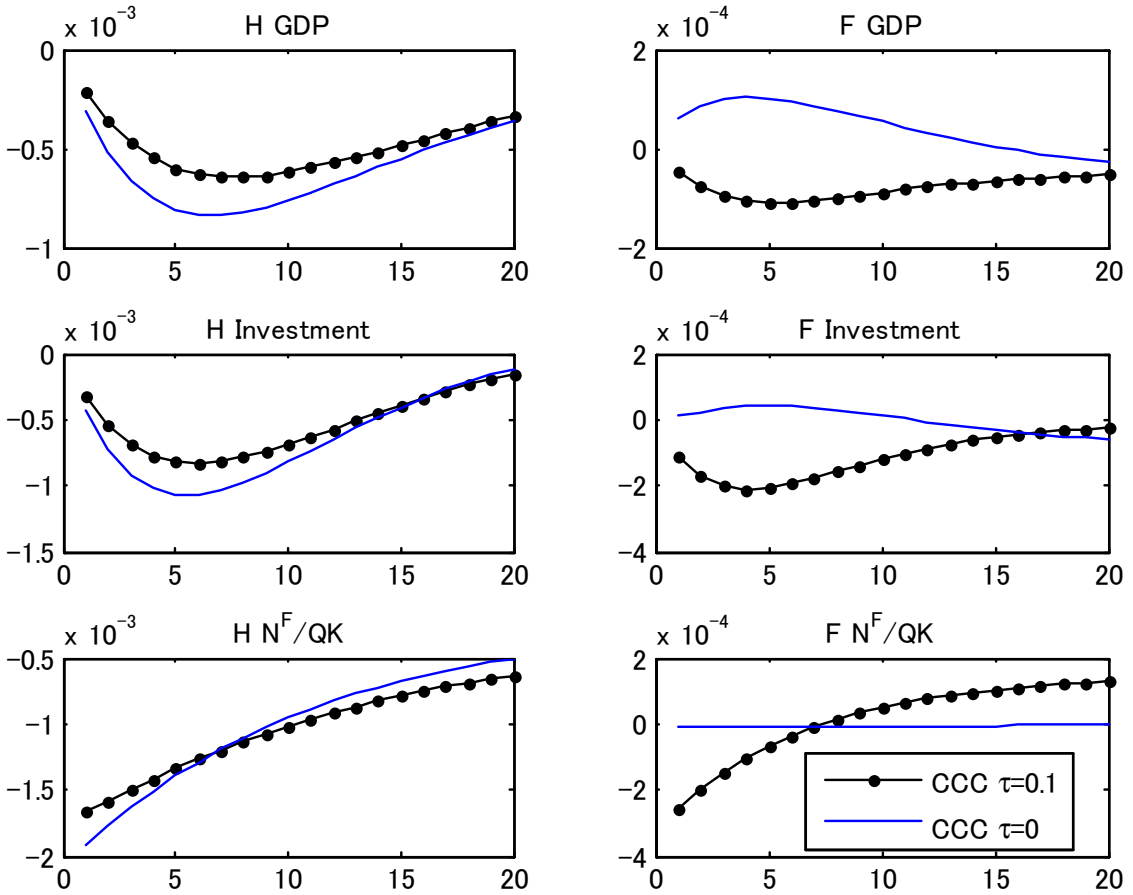
$$C\left(s^t\right) = \left((1-\gamma)^{1/\eta} C_H\left(s^t\right)^{(\eta-1)/\eta} + \gamma^{1/\eta} C_F\left(s^t\right)^{(\eta-1)/\eta}\right)^{\eta/(\eta-1)}.$$

  - γ : inverse of the home bias
  - γ is 0.15 for US and Japan.

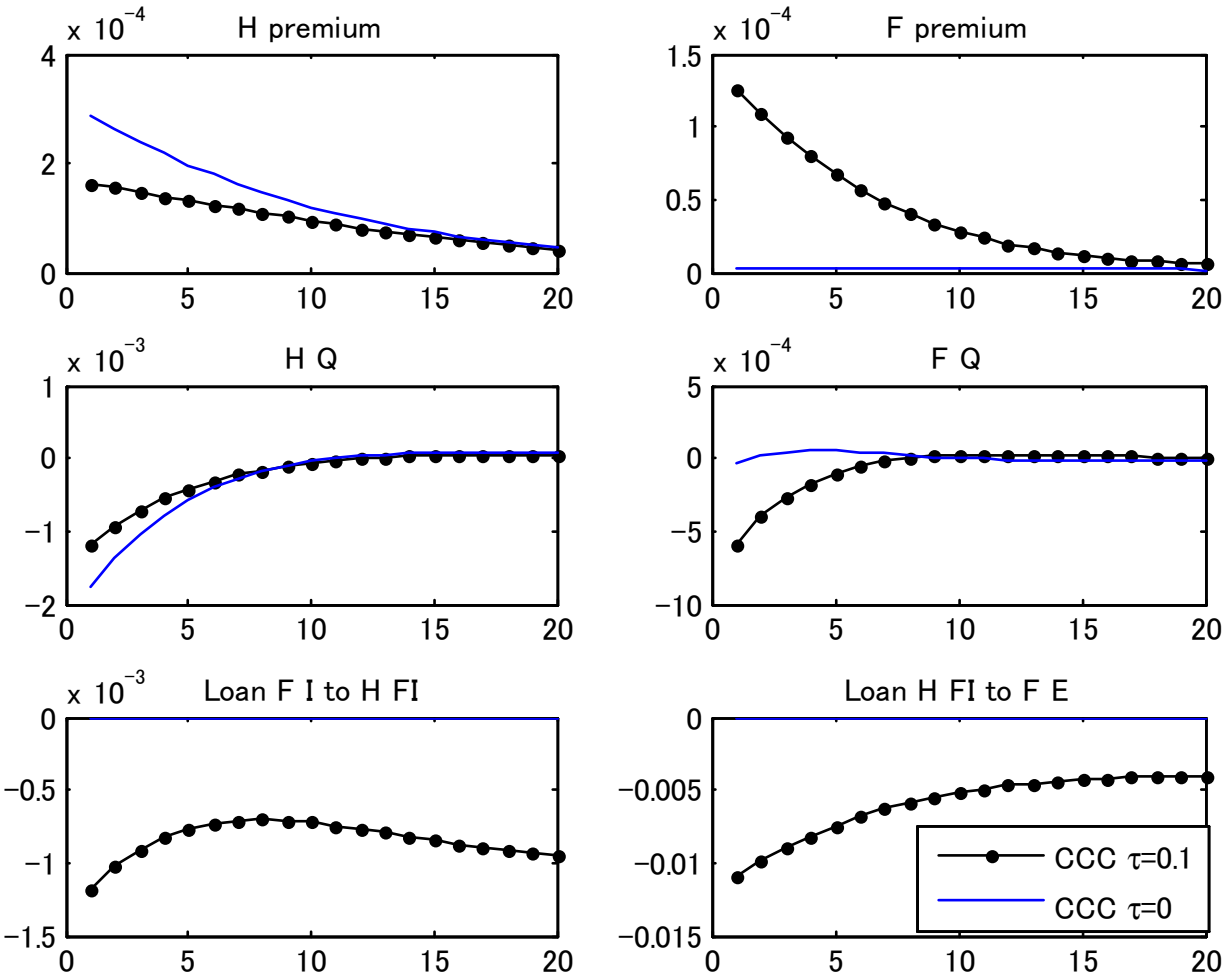
Simulation

FIs' Net Worth Shock in H (1)

- Business cycle synchronization
- No synchronization without banking globalization ($\tau = 0$)
- Common lender effect

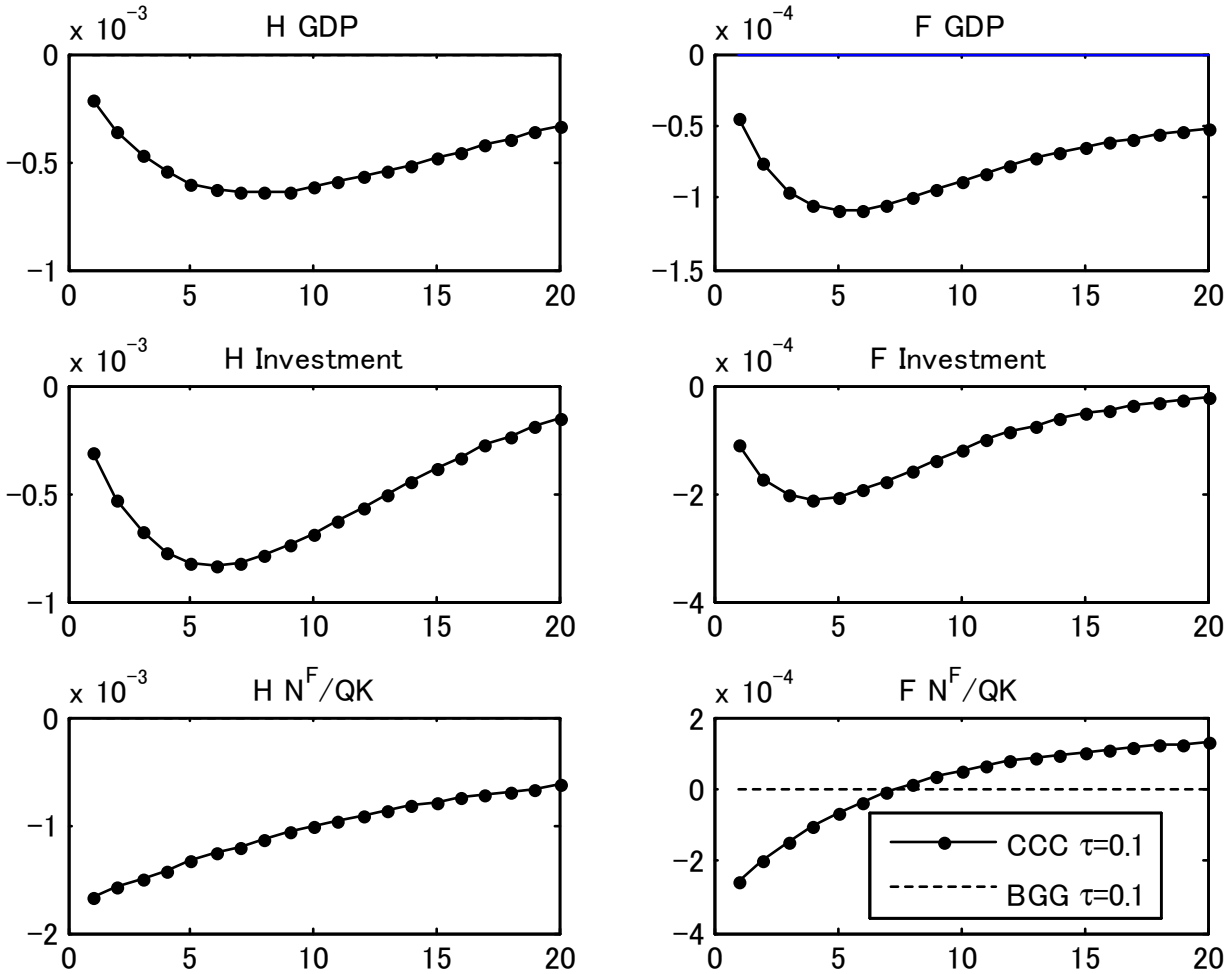


FIs' Net Worth Shock in H (2)



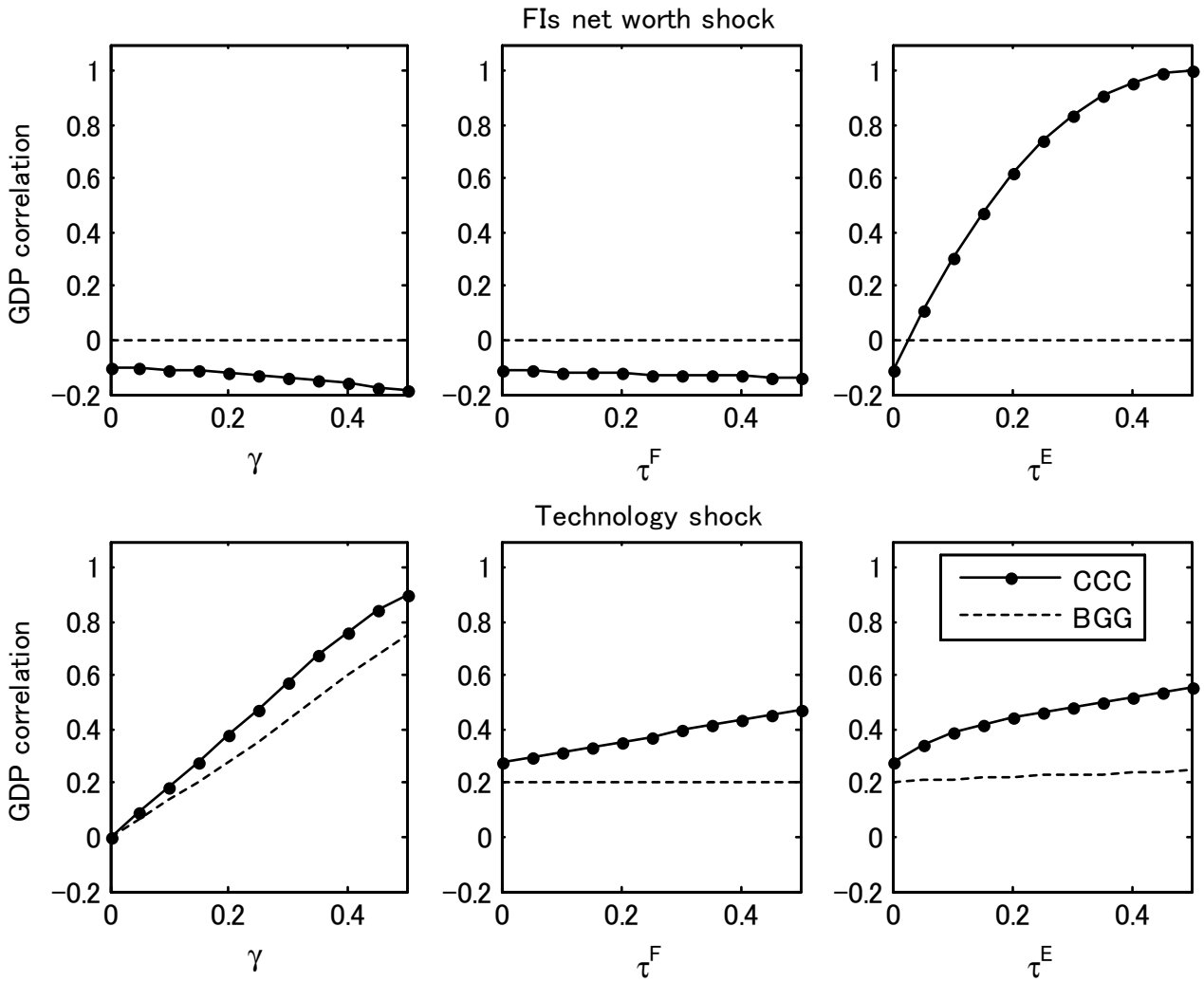
FIs' Net Worth Shock in H (3)

- No effect in BGG



Predicted GDP Bilateral Correlations

- Globalization in FIs' lending (τ^E) yields positive correlations.



What We Find

- Key to the recent financial crisis
  - FIs' globalization
  - FIs' credit constraint
  - FIs' net worth shock
- As globalization intensifies, policy comes to have greater global impacts.
  - Besides the dollar swap program, a reduction in policy rates and capital injection policy.

Applications

- Foreign assets and global imbalances
- Various policies, such as pegged exchange rate policy, a currency swap program, capital injection policy, macroprudential policy
- Welfare changes when two countries with different financial technology are interconnected with different financial openness.
- More complex credit network