Some Financial News

- ZLB
- Stock market drop
- Major US stock market indexes
  - Dow Industrials (3)
  - S&P 500
  - S&P Total Stock Market (5000)
  - NASDAQ
  - Others from US and elsewhere?
Housing, Mortgages, Tax Policy, and the Financial Meltdown

• Misallocation
• Subsidies, regulation
• GSEs
  • Fannie Mae
    • (Federal National Mortgage Association)
  • Freddy Mac
    • (The Federal Home Loan Mortgage Corporation)
Bank runs: Review of DD

- Three periods: $T = 0, 1, 2$
- A single good
- A continuum of agents with measure 1
- Each agent is endowed with 1 unit of the good in period 0.
The Model: Asset Return

\[ T = 0 \quad T = 1 \quad T = 2 \]

\[ \begin{align*}
-1 & \quad 0 & \quad R \\
1 & \quad 0 &
\end{align*} \]
The Model: Preferences

• In period 0, all agents are identical.

• In period 1, some agents become “patient” and others become “impatient.” (private information)

\[
\begin{align*}
    & \begin{cases} 
    u(c_1) & \text{if impatient} \\
    u(c_2) & \text{if patient} 
    \end{cases} \\
\end{align*}
\]

• The probability of being impatient is \(\lambda\) for each agent in period 0.

• The proportion (the measure) of impatient consumers in period 1 is also \(\lambda\).
Autarky

- Autarky:
  - Utility of the impatient in period 1: $u(1)$
  - Utility of the patient in period 2: $u(R)$
  - Expected utility in period 0: $\lambda u(1) + (1 - \lambda) u(R)$

- $1 < R$
  - Insurance against the liquidity shock is desirable.
Banking Economy

• Banks offers demand deposit contract \( (d_1, d_2) \)

• Agents
  • make deposits in period 0.
  • withdraw \( d_1 \) in period 1.
  • or withdraw \( d_2 \) in period 2.

• free-entry banking sector: \( (d_1, d_2) \) maximizes the depositor’s expected utility.
Optimal Deposit Contract

\[
\max_{d_1,d_2}\{\lambda u(d_1) + (1 - \lambda)u(d_2)\}
\]

such that \((1 - \lambda)d_2 \leq (1 - \lambda d_1)R\) \((RC)\)

withdrawals in period 2 resources in period 2

\[
d_1 \leq d_2 \quad (IC)
\]
The Unconstrained Optimal Banking Contract

- Assumes (for the moment) that a consumer’s type is public knowledge in period 1

- So that IC does not bind

- We solve for the unconstrained optimal deposit contract (misleadingly referred to by DD as “the optimal contract”)
Optimal Deposit Contract

\[ (1 - \lambda)d_2 = (1 - \lambda d_1)R \]

\( \text{slope} = -\frac{\lambda}{1 - \lambda} R \)
What do Banks Do?

- $u'(d_1^*)/u'(d_2^*) = R$
- $u'' < 0 \Rightarrow d_1^* < d_2^*$
- CRRA: $u(c) = \frac{c^{1-\gamma}}{1-\gamma}$

- $u'(c) = c^{-\gamma} \Rightarrow u'(d_1)/u'(d_2) = (d_2/d_1)^\gamma$
- If $\gamma = 1 \Rightarrow d_1^* = 1, \ d_2^* = R$
- If $\gamma > 1 \Rightarrow 1 < d_1^* < d_2^* < R$

- The unconstrained optimal contract can be decentralized uniquely if there is public knowledge of types in period 1. The teller will not make payments in period 1 to patient depositors.
  - Impatient receives $d_1^*$ in period 1
  - Patient receives $d_2^*$ in period 2
The Constrained Banking Contract

• Consumer types are private knowledge. IC binds.

• Test the DD “optimal contract” in the private knowledge bank. There are 2 outcomes:
  • The non-run equilibrium as in the public knowledge case
  • The bank run equilibrium

• Criticism: If the run probability $s$ is non-zero, then the DD contract in non-optimal. The contract should be more conservative as $s$ increases.
Why Do Bank Runs Occur?

- $\gamma > 1 \Rightarrow 1 < d_1^* < d_2^* < R$
- IC: $d_1 \leq d_2$
- Expectation: Only the impatient depositors withdraw in period 1.

- A patient depositor can
  \[
  \begin{cases}
    \text{get } d_2^* & \text{if he withdraws in period 2} \\
    \text{get } d_1^* & \text{if he withdraws in period 1}
  \end{cases}
  \]
Why Do Bank Runs Occur? (Continued)

• $\gamma > 1 \implies 1 < d_1^* < d_2^* < R$

• Expectation: *All* other depositors demand withdrawal in period 1.

• A patient depositor can

\[
\begin{cases}
\text{get *nothing* if he withdraws in period 2} \\
\text{get } d_1^* \text{ with probability } 1/d_1^* \text{ if he withdraws in period 1}
\end{cases}
\]
Improvements on DD

• Sequential Service Constraint, Neil Wallace

• Partial Suspension of Convertibility, Neil Wallace

• Sunspots, Runs, and the Optimal Banking Contract
  • Jim Peck & Karl Shell
  • Yu Zhang and Karl Shell
Cornell/ Penn State Macroeconomics Workshop

• All-day Saturday & all-morning Sunday, October 1 & 2

• Weill Hall