Inside Money and Liquidity

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1 Question

Under what environment, is the circulation of inside money essential for smooth running of the economy?

How does the financial deepening interwine with economic development?

We focus on two aspects of limited commitment

Bilateral: Debtor may default to the original creditor $\longrightarrow$ borrowing constraint

Multilateral: Debtor may default to the new lenders $\longrightarrow$ limited resaleability

2 Framework

A homogeneous, perfectly storable good at each date

A continuum of agents (population size 3)

$$U_t = \ln c_t + \beta \ln c_{t+1} + \beta^2 \ln c_{t+2} + \ldots$$

Production technology:

Input at date t : $G(y) = \gamma y^{\frac{1}{1-\lambda}} \longrightarrow y$: Output at date t+2

where $\lambda \in (0, 1)$

The agent are fully engaged throughout production

There is fiat money of fixed supply

First Best Steady State Allocation:

Each agent repeats 3-periods cycle of investing, growing, and harvesting

Each of population size one invests $G(y^*)$ every period:

$$G'(y^*) = \beta^2$$

Each agent consumes c^* every period:

$$c^* = \frac{1}{3}[y^* - G(y^*)]$$

Borrowing constraint: the agent can commit to repay only up to θ fraction of output from the present investment

Resaleability constraint: each project comprises large number of parts & a fraction α will fail. After investment, the original creditor privately learns which part will fail & the failing part can be separated

$\rightarrow$ For a large enough $\alpha > \frac{1-\beta^3}{1+\beta^3}$, regular (blue) paper cannot be resold at t+1 because of "lemons" problem

$z \leq y$ fraction of projects can be bundled at additional cost $[(1-\phi)/\phi]\, G(z)$, where $0 < \phi < 1 \rightarrow$ special (red) paper backed by the bundled parts can be resold at t+1

q_t, n_t : price and quantity of newly issued illiquid blue paper

p_t, m_t : price and quantity of liquid red paper to mature in the next period

Flow-of-funds constraints for investing, growing (′) and harvesting (") agents:

$$
\begin{aligned}
& G(y_{t+2}) + \frac{1-\phi}{\phi} G(z_{t+2}) + c_t + p_t m_t + q_t n_t \\
= \;& p_t p_{t+1} \theta z_{t+2} + q_t \theta (y_{t+2} - z_{t+2}) + m^{"}_{t-1} + n^{'}_{t-2}
\end{aligned}
$$

$$c^{'}_{t+1} + p_{t+1} m^{'}_{t+1} + q_{t+1} n^{'}_{t+1} = m_t + n^{"}_{t-1}$$

$$c^{"}_{t+2} + p_{t+2} m^{"}_{t+2} + q_{t+2} n^{"}_{t+2} = (1-\theta) y_{t+2} + m^{'}_{t+1} + n_t$$

Symmetric Equilibrium

$$
\begin{aligned}
y_t &= c_t + c_t^{'} + c_t^{"} + G(y_{t+2}) + \frac{1-\phi}{\phi} G(z_{t+2}) \\
\theta(y_{t+2} - z_{t+2}) &= n_t + n_t^{'} + n_t^{"} \\
p_t \theta z_{t+2} + \theta z_{t+1} &\leq m_t + m_t^{'} + m_t^{"}, \text{ where}
\end{aligned}
$$

$=$ holds and fiat money has no value if $p_t < 1$

fiat money may have value if $p_t = 1 \longrightarrow$ can be $<$

We examine the steady sate equilibrium

Proposition 1: The first best allocation $y = y^*$, $z = 0$, $c = c' = c" = c^*$, can be achieved as a symmetric, steady-state equilibrium if and only if

$$\theta \geq \theta^* \equiv \frac{1}{3}\left[2 - \frac{\lambda\beta^2(1+2\beta^2)}{1+\beta^2+\beta^4}\right]$$

Proposition 2: If $\theta < \theta^*$, then the economy exhibits the liquidity shortage:

borrowing constraints bind for investing agents

consumption is jagged: lowest when invest, and highest when harvest

investment and output are lower than the first best

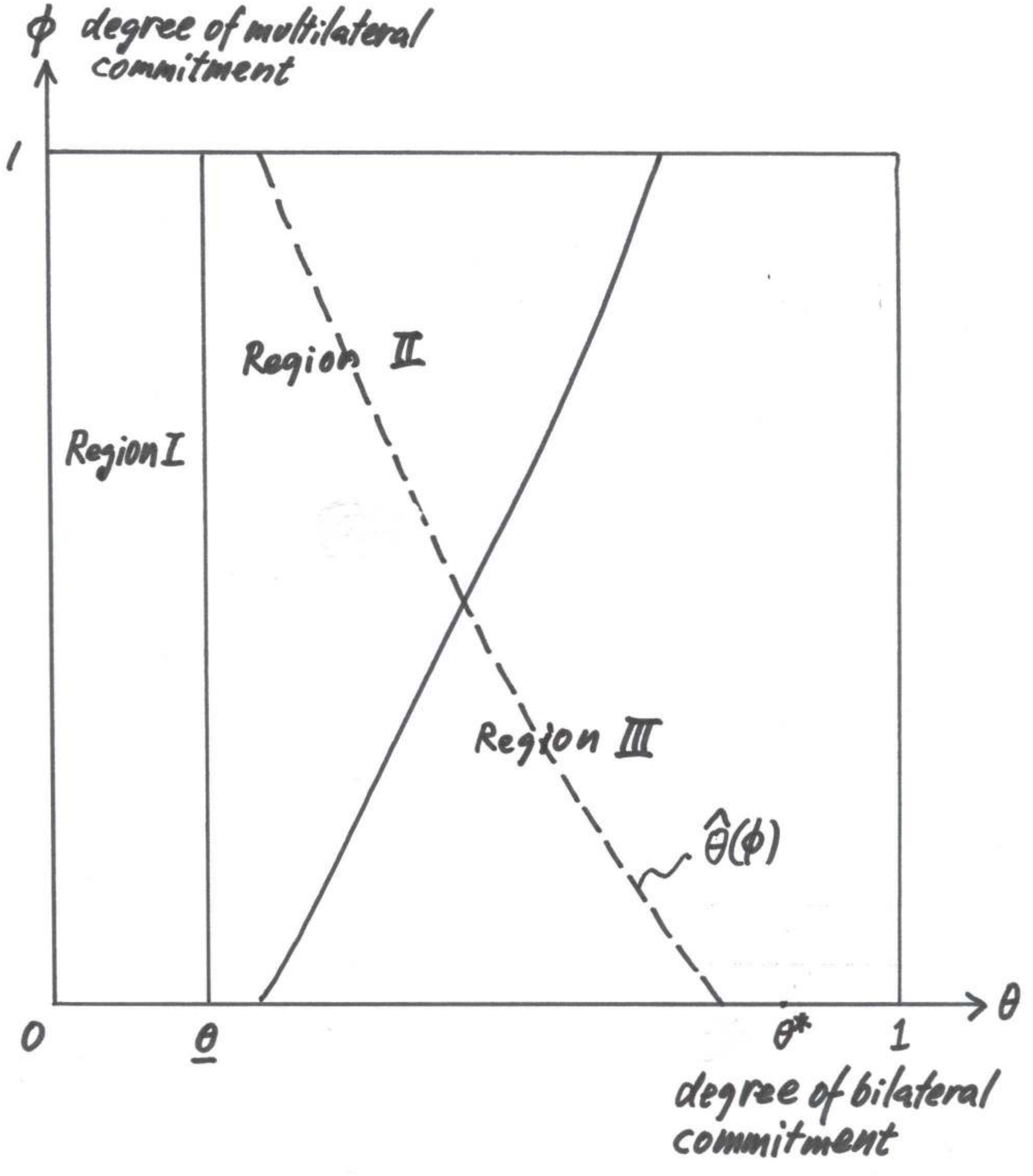
$$\frac{1}{p} < \frac{1}{\sqrt{q}} < \frac{1}{\beta}$$

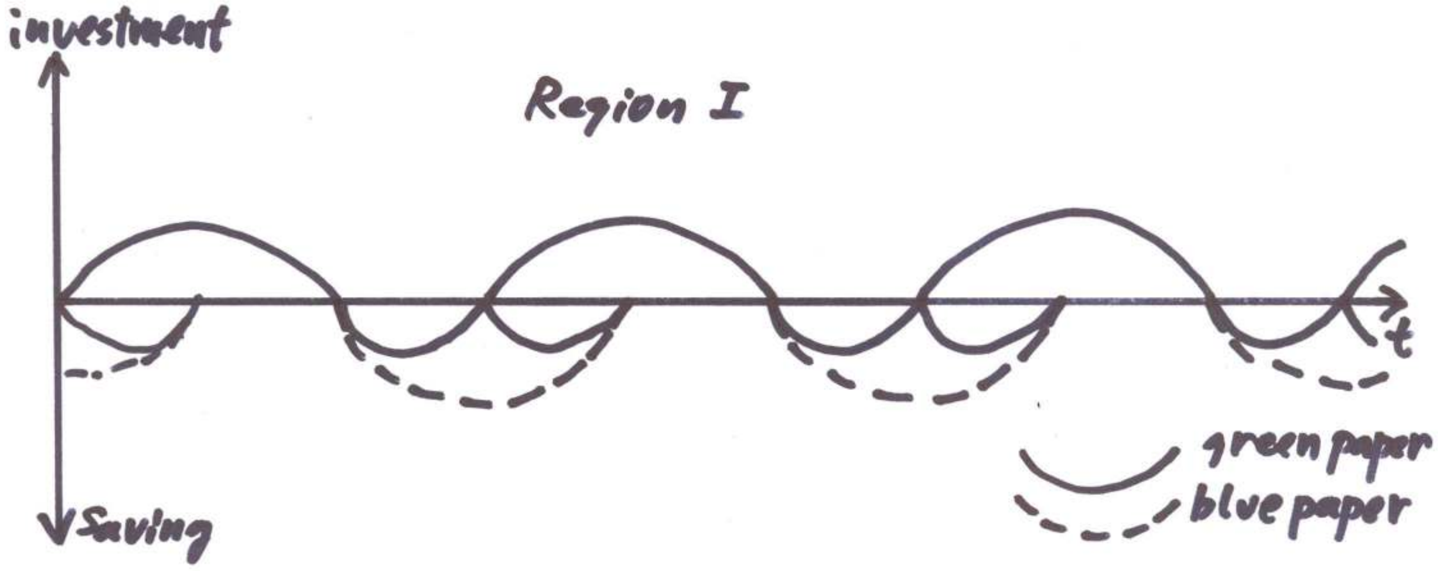
Equilibrium with valued fiat money exists if $\theta < \hat{\theta}(\phi) < \theta^*$

Region I: A Cash-Based Economy

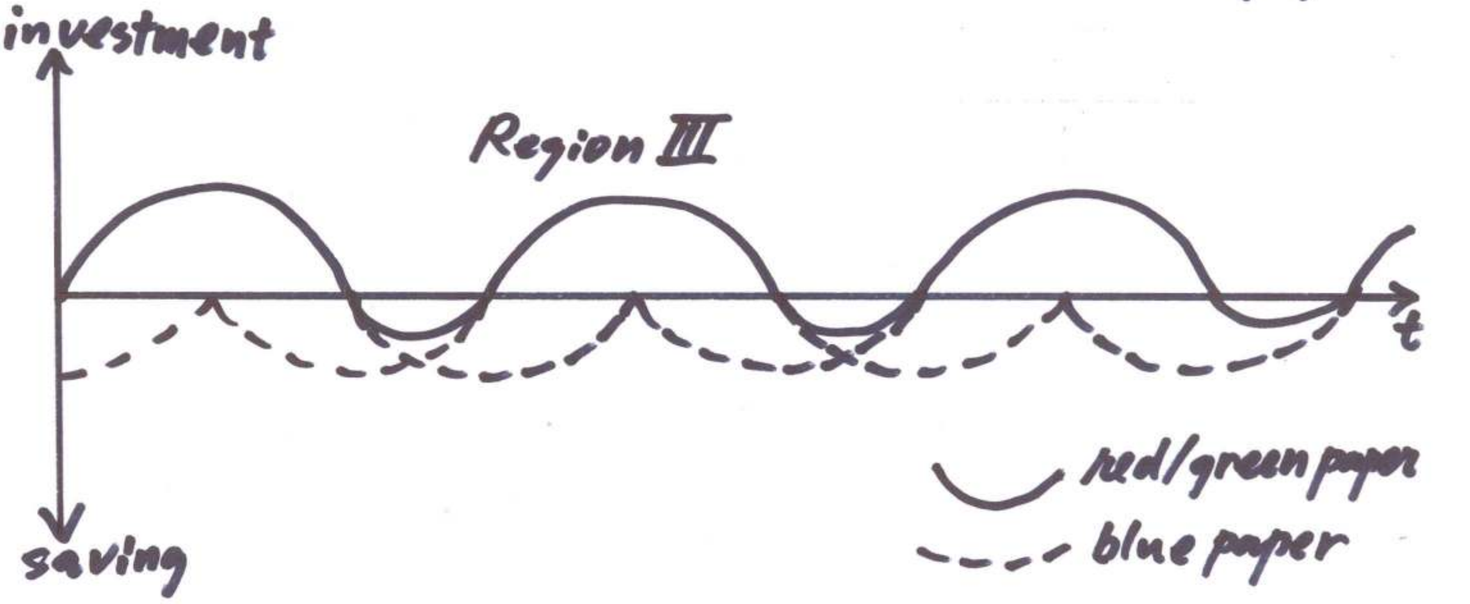
Region II: An Economy with Specialized Financial Markets

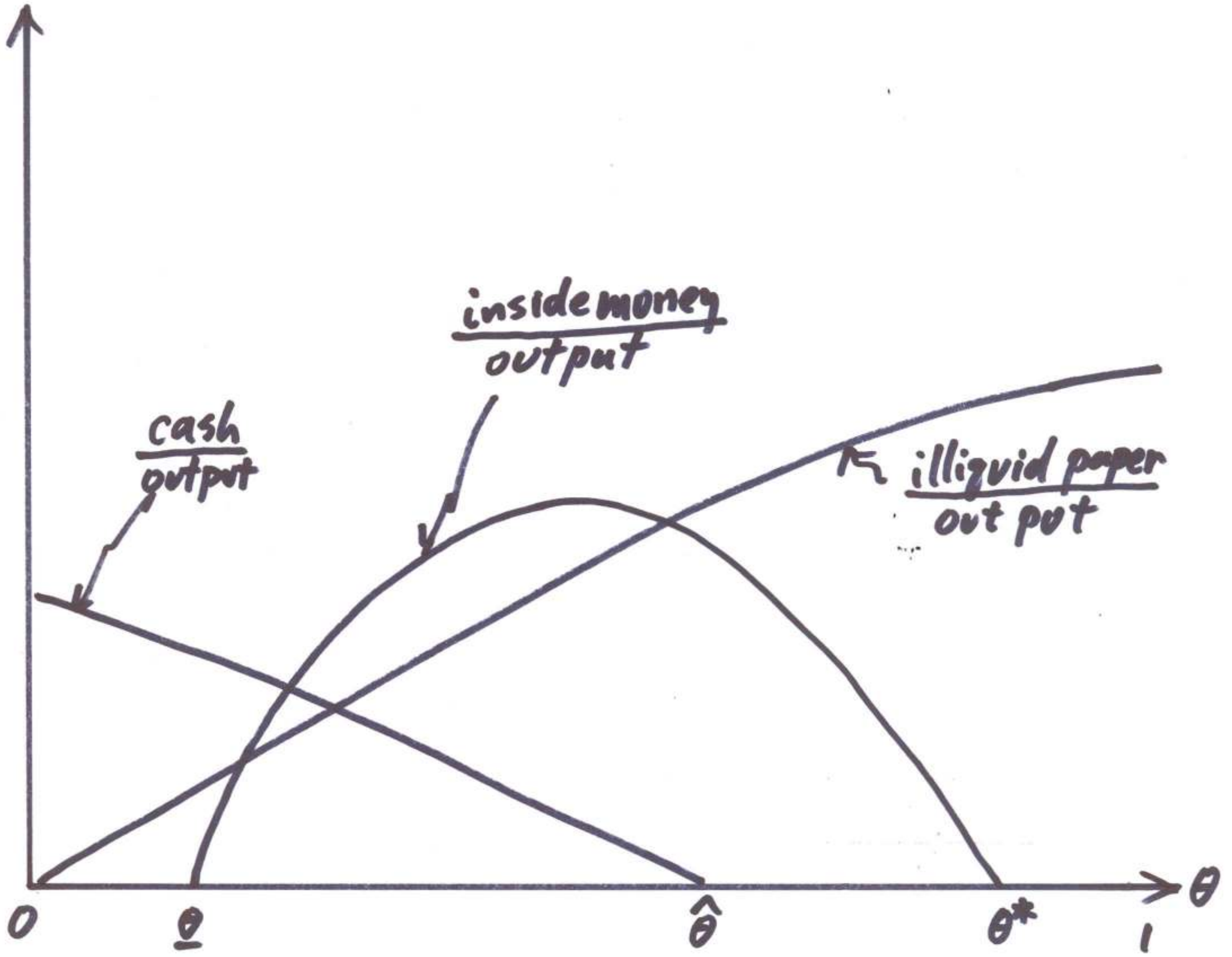
Region III: An Economy with Gross Financial Positions


ϕ degree of multilateral commitment
1
Region I
Region II
Region III
$\hat{\theta}(\phi)$
0
$\underline{\theta}$
θ^*
1
θ
degree of bilateral commitment


investment
Region I
t
green paper
blue paper
saving


investment
Region II
t
red/green paper
blue paper
saving


investment
Region III
t
red/green paper
blue paper
saving



inside money / output
cash / output
illiquid paper / out put
0
$\underline{\theta}$
$\hat{\theta}$
θ^*
1
θ