

Capital Flows and Asset Prices

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1 Introduction

After liberalizing international transaction of financial assets, many countries experience large swings in capital flows, asset prices, and aggregate production

e.g. Latin America from the late 1970s, Nordic countries in the late 80s and early 90s, East Asia in the 90s

Prasad, Rogoff, Wei and Kose (2003), Obstfeld and Taylor (2004):

No robust relationship between liberalization and growth

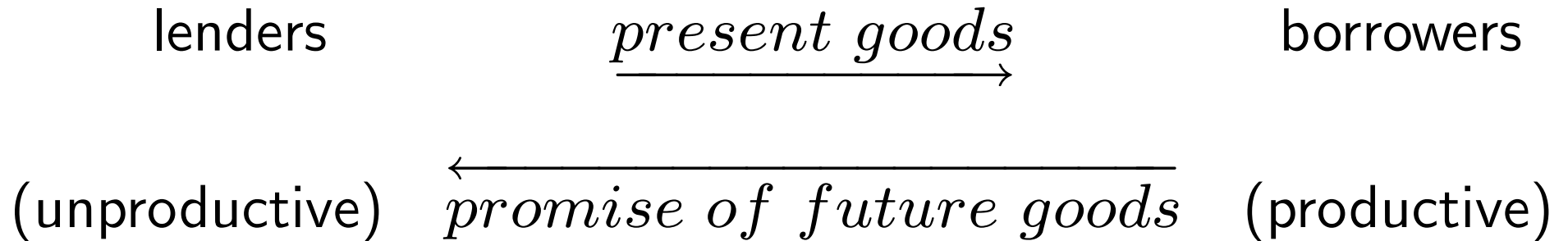
Benefits with strong institution, and costs outweigh with weak institution

In this presentation, we ask

How does the adjustment to capital account liberalization depend upon the development of domestic financial system?

Why may the economy with underdeveloped financial system be vulnerable to shocks to foreign and domestic credits?

Approach:



Borrowers may not keep their promises \Rightarrow use collateral

total assets $>$ collateral for domestic loan

$>$ collateral for international loan

value of fixed assets \rightleftharpoons domestic and foreign credits

2 Model

A small open economy

One homogeneous goods and land

Many entrepreneurs and foreigners

Preference

entrepreneur : $E_0 \left[\sum_{t=0}^{\infty} \beta^t \ln c_t \right]$

foreigner : $E_0 \left[\sum_{t=0}^{\infty} (1/r^*)^t c_t \right] , \quad 1 < r^* < \frac{1}{\beta}$

At date t : Entrepreneur A uses k_t land and m_t material goods to start production

Agent B lends and monitors (lead creditor)

Agent C lends and does not monitor (outside creditors)

At date $t+1$: output $y_{t+1} = a_t \left(\frac{k_t}{\kappa}\right)^\kappa \left(\frac{m_t}{1-\kappa}\right)^{1-\kappa} = a_t F(k_t, m_t)$, if A finishes

$y_{t+1} = \theta a_t F(k_t, m_t)$, if B finishes

$y_{t+1} = 0$, if C finishes

Only single home agent can be the monitor of each segment of project

Productivity of each entrepreneur:

$$a_t = \begin{cases} \alpha, & \text{if the entrepreneur is productive} \\ \gamma, & \text{if he is unproductive} \end{cases}$$

Idiosyncratic productivity transition:

$$\text{Prob}(a_{t+1} = \gamma \mid a_t = \alpha) = \delta, \quad \text{Prob}(a_{t+1} = \alpha \mid a_t = \gamma) = n\delta$$

In Competitive Economy, the entrepreneur (borrower) can walk away from production and debt. No reputation

\Rightarrow Fixed asset (land) becomes collateral for domestic and foreign resalable credits

θ fraction of output from the present project becomes collateral for domestic bilateral credit

Each entrepreneur takes prices (q_t, r_t, r^*) and initial net worth as given, and chooses quantities $(c_t, k_t, m_t, y_{t+1}, b_{t+1}, b_{t+1}^*)$, subject to the flow-of-funds constraint:

$$c_t + q_t (k_t - k_{t-1}) + m_t = y_t - b_t - b_t^* + \frac{b_{t+1}}{r_t} + \frac{b_{t+1}^*}{r^*}$$

and the international and domestic borrowing constraints:

$$\begin{aligned} b_{t+1}^* &\leq q_{t+1} k_t \\ b_{t+1} + b_{t+1}^* &\leq \theta y_{t+1} + q_{t+1} k_t \end{aligned}$$

The markets clear for goods, land, and domestic and international credits

θ and κ : parameter of domestic financial development

κ : share of asset used as collateral for resalable credit

Equilibrium: $(q_t, u_t, r_t, K_t, K'_t, M_t, M'_t, Z_t, s_t, x_t, Z_{t+1}, s_{t+1})$ that satisfies

$$(1) \quad u_t = q_t - q_{t+1}/r^*$$

$$(2) \quad u_t K_t : M_t = \kappa : 1 - \kappa = u_t K'_t : M'_t : \text{factor demand}$$

$$(3) \quad K_t + K'_t = \bar{K} : \text{land market}$$

$$(4) \quad \gamma/u_t^\kappa \leq r_t : \text{unproductive entrepreneur, = holds if } K'_t > 0$$

$$(5) \quad u_t K_t + M_t \leq \frac{\beta s_t Z_t}{1 - (\theta \alpha / r_t u_t^\kappa)}, = \text{holds if } \alpha / u_t^\kappa > r_t$$

$$(6) \quad Z_t = Y_t + Y'_t + q_t \bar{K} - B_t^* - B_t^{*'} : \text{total wealth}$$

$$(7) \quad s_t : \text{share of net worth of productive}$$

$$(8) \quad u_t \bar{K} + M_t + M'_t \leq \beta Z_t, = \text{holds if } r_t > r^*$$

$$(9) \quad x_t = \left[\frac{1-\theta}{(u_t^\kappa/\alpha) - (\theta/r_t)} - r_t \right] / r_t : \text{excess rate of return of pro-} \\ \text{ductive}$$

$$(10) \quad Z_{t+1} = r_t (1 + x_t s_t) \beta Z_t$$

$$(11) \quad s_{t+1} = \frac{(1-\delta)(1+x_t)s_t + n\delta(1-s_t)}{1+s_t x_t} \equiv f(s_t, x_t)$$

- Under financial autarky, if domestic borrowing constraint is tight $\theta < \bar{\theta}(\kappa)$, then the unproductive entrepreneurs produce themselves.

$$\bar{\theta}'(\kappa) < 0$$

- For numerical examples, we use full model with labor:

$$y_{t+1} \leq a_t \left(\frac{k_t}{\kappa} \right)^\kappa \left(\frac{l_t}{\lambda} \right)^\lambda \left(\frac{m_t}{1 - \kappa - \lambda} \right)^{1 - \kappa - \lambda}$$

$$L_t^s = \bar{L} w_t^\eta$$

$$\beta = 0.92, \kappa = 0.03, \lambda = 0.12, \alpha = 1.1, \gamma = 1.05,$$

$$\delta = 0.15, n = 0.1, \eta = 3$$

Figure 1: Steady-state interest rate under autarky

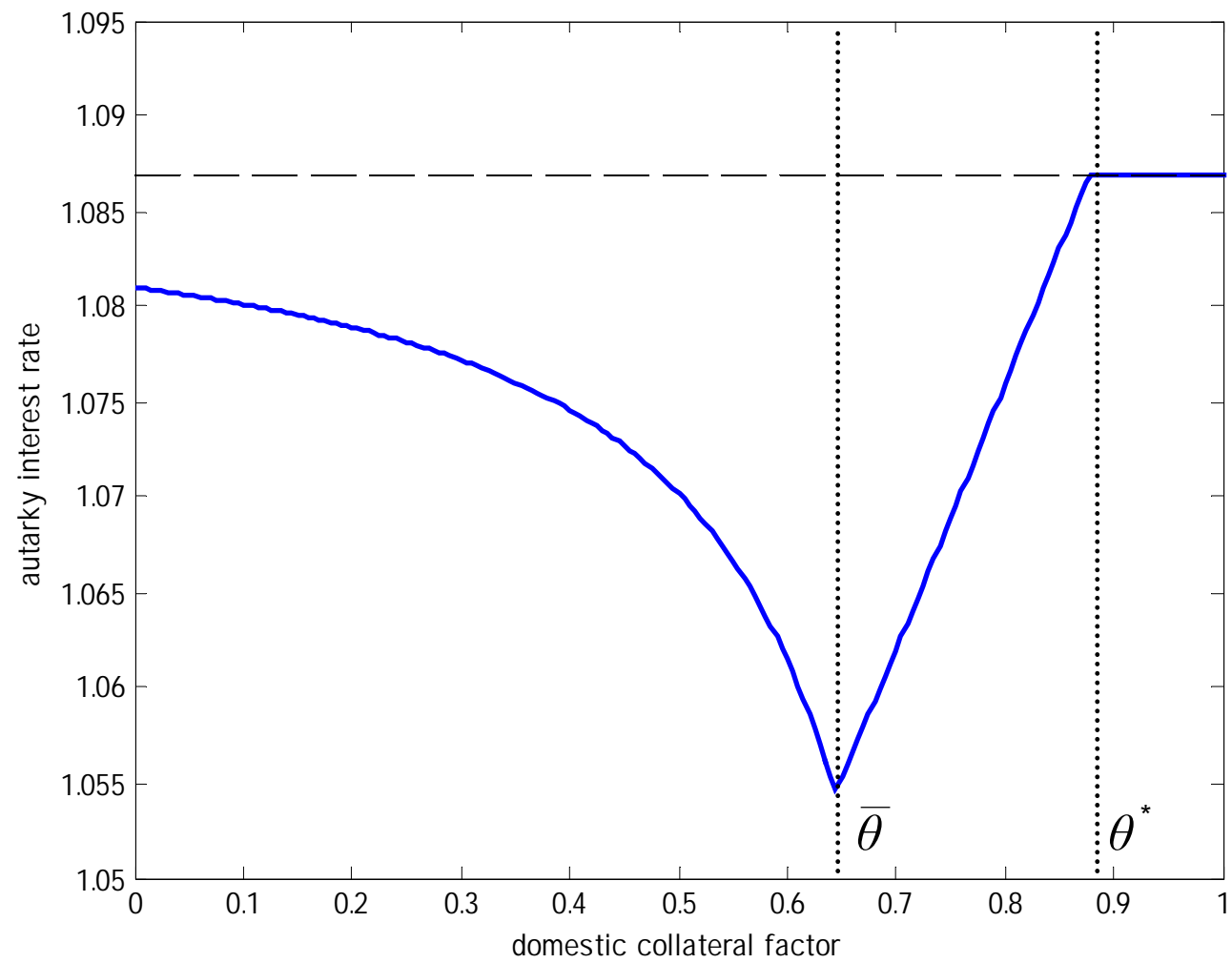
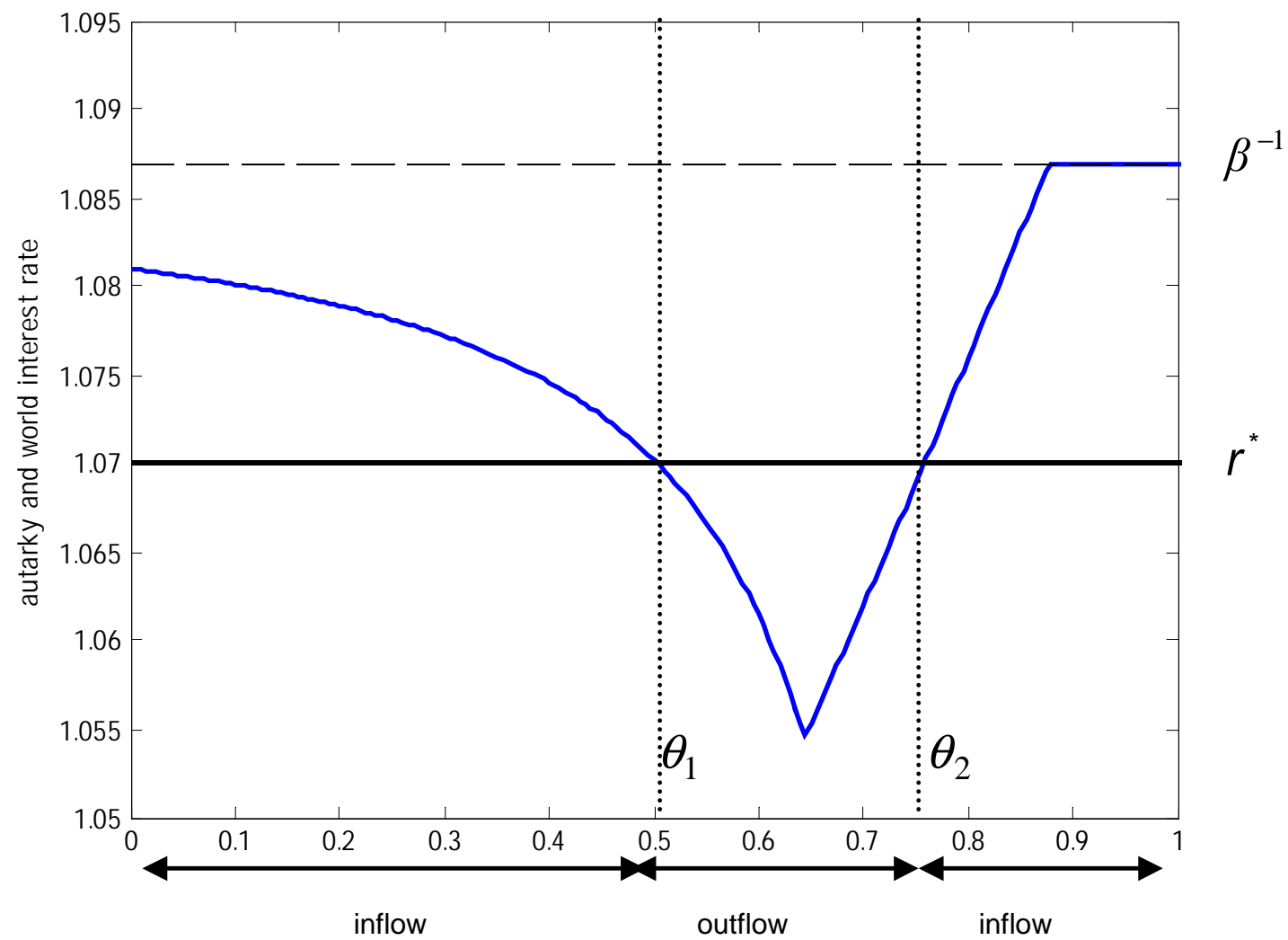


Figure 2: Capital flows after liberalisation



3 Capital Account Liberalization

- Region I, $\theta < \theta_1$: Factor price suppression

Before liberalization, $r^A > r^* \Rightarrow$ liberalization causes capital inflow

unproductive \rightarrow productive



foreigners

\Rightarrow initial boom with land price hike and credit expansion

\Rightarrow boom is not sustainable

Figure 3-1: dynamics after liberalisation: capital inflow (low theta)

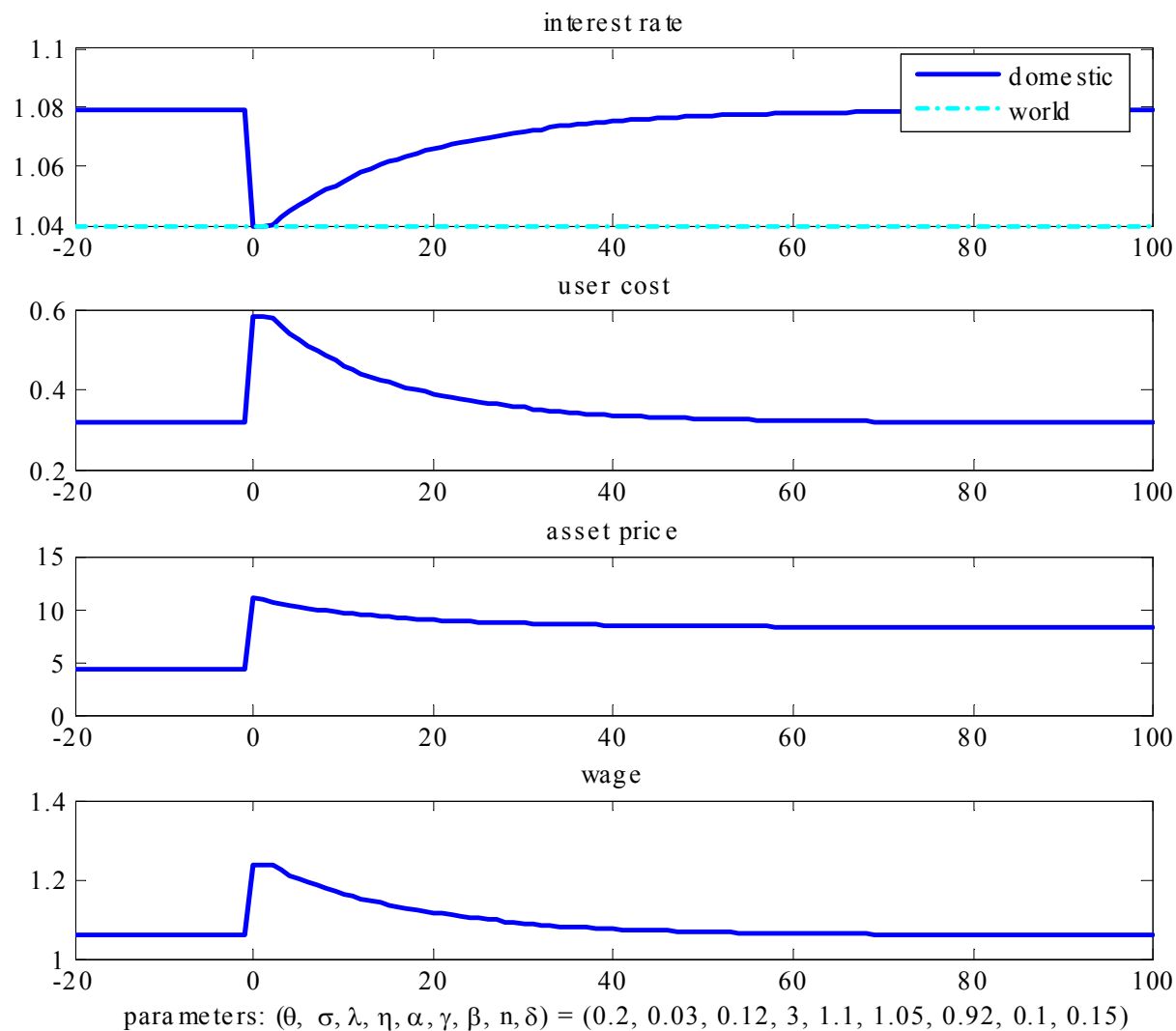
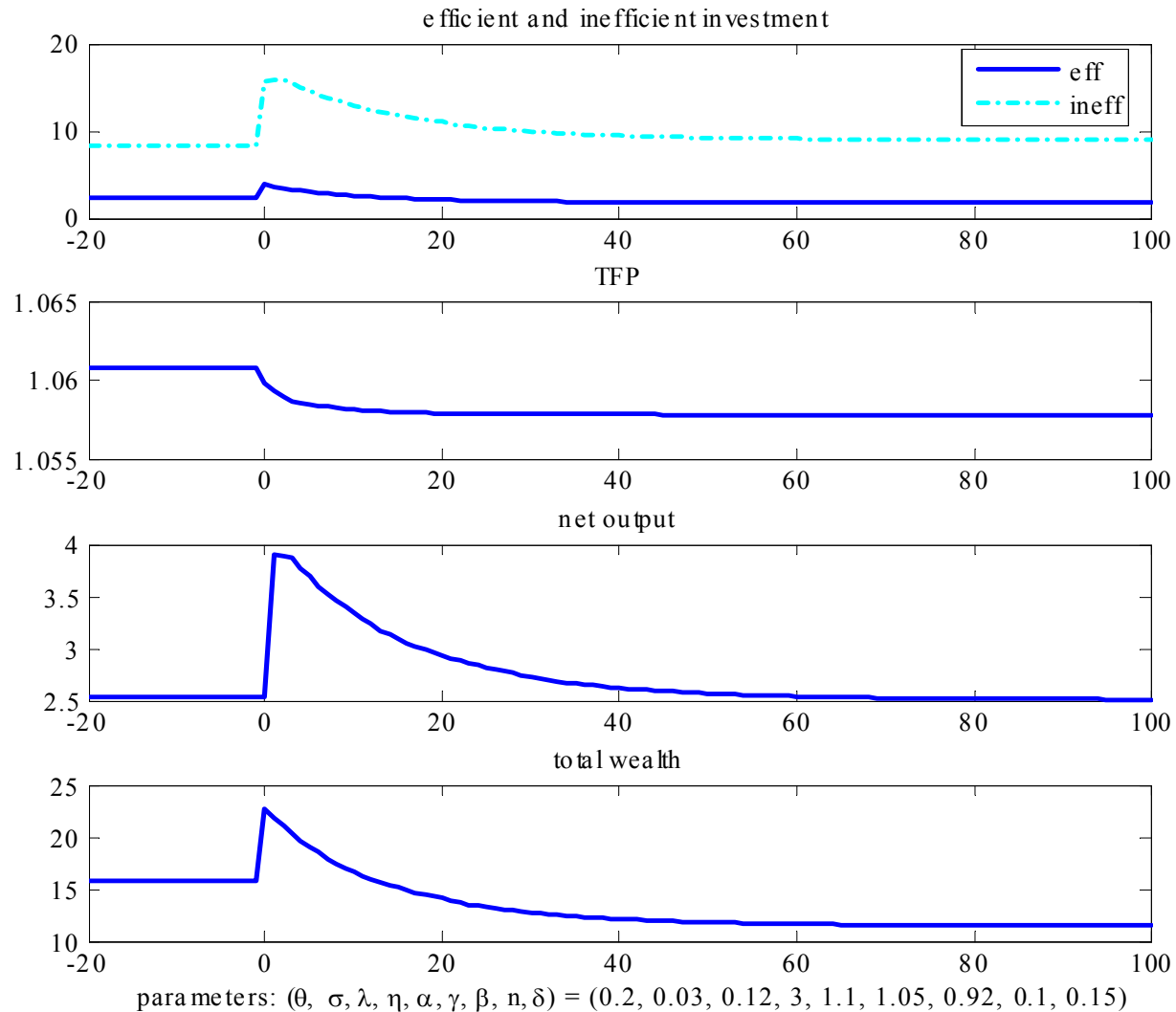


Figure 3-2: dynamics after liberalisation: capital inflow (low theta)



- Region II, $\theta_1 < \theta < \theta_2$: Interest rate suppression

Before liberalization, $r^A < r^* \Rightarrow$ liberalization causes capital outflow

unproductive \rightarrow productive



foreigners

\Rightarrow land price, credit, TFP and output decrease initially

\Rightarrow international capital market act as "catalyst"

Figure 5-1: dynamics after liberalisation: capital outflow

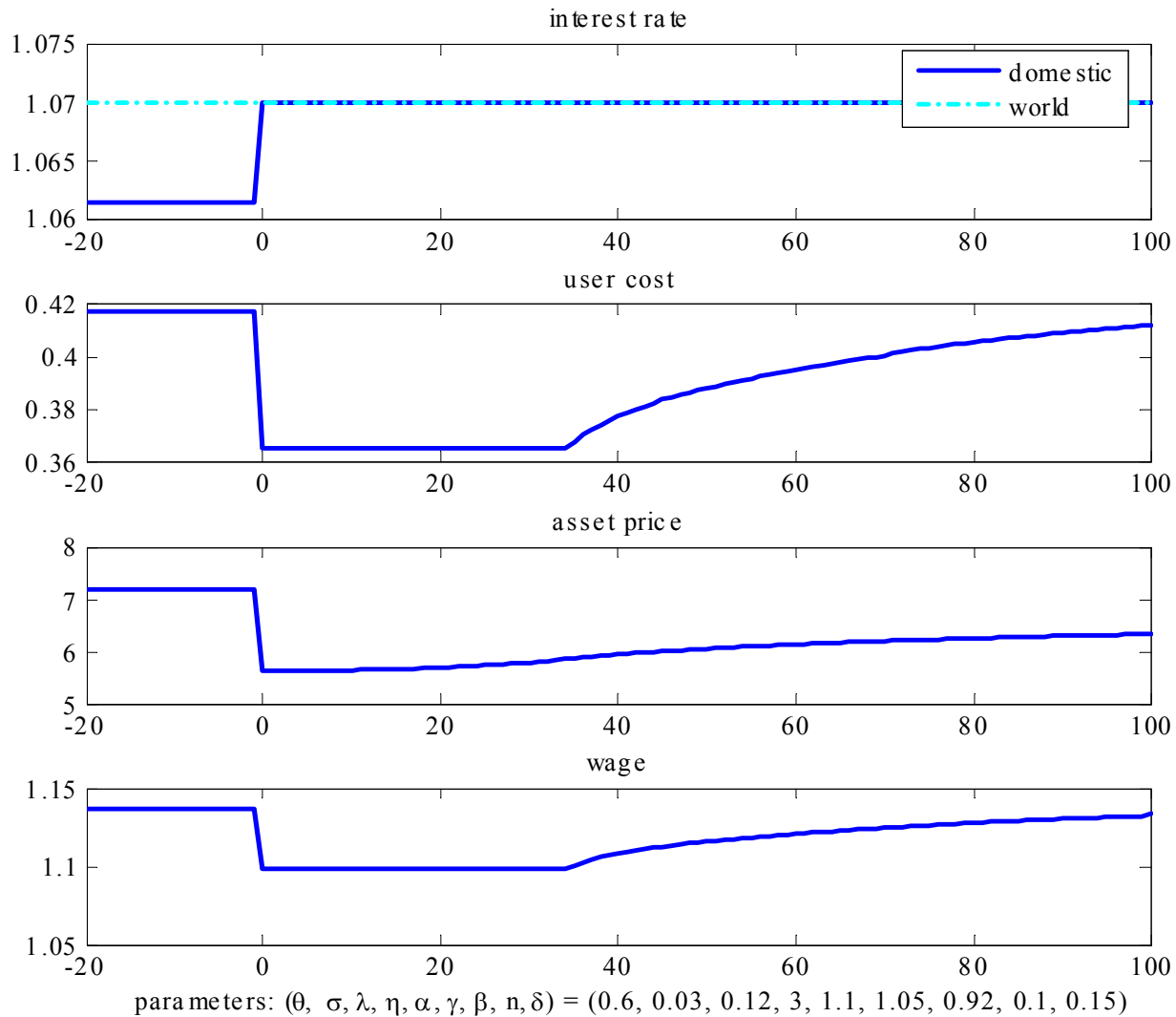
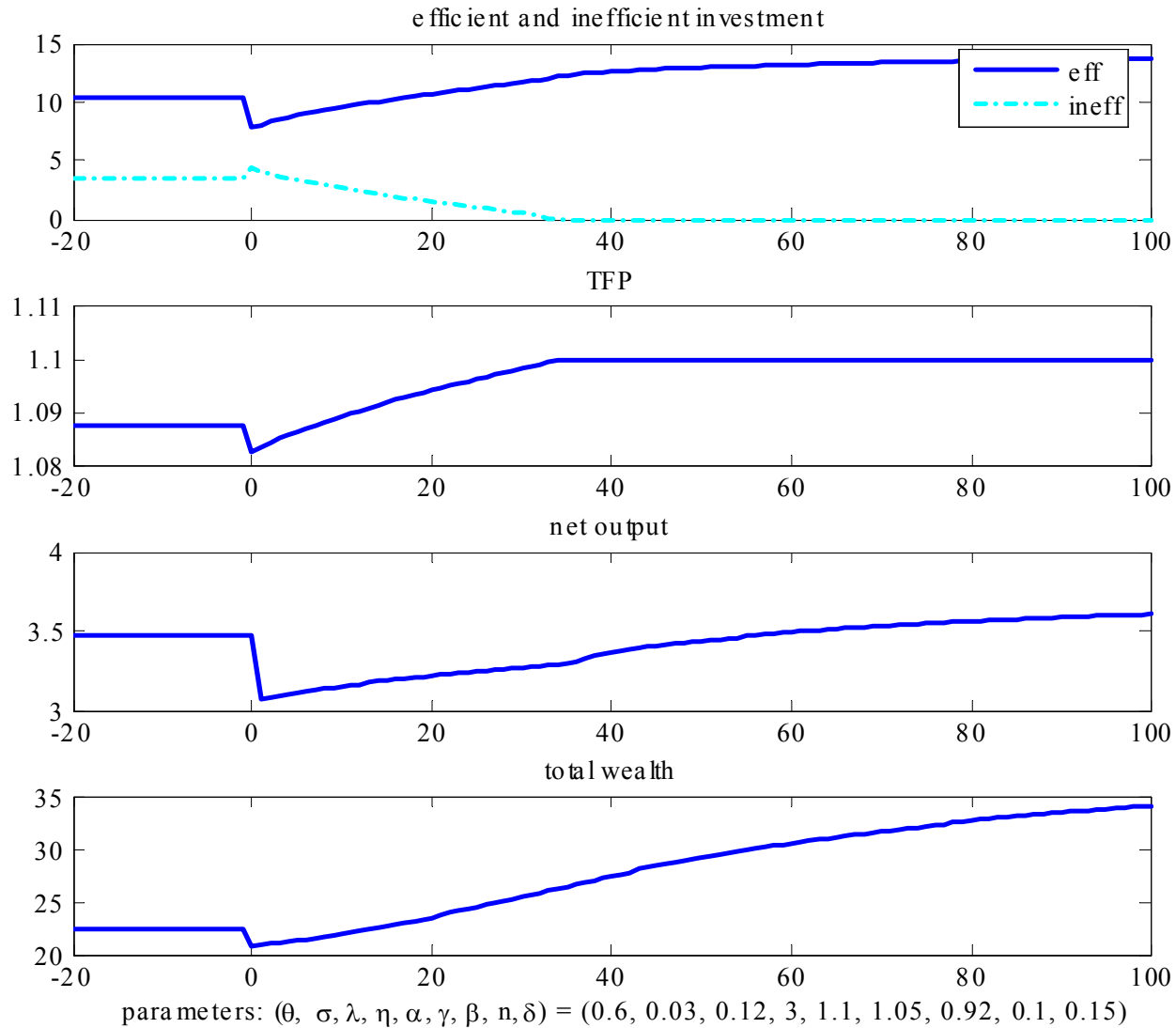


Figure 5-2: dynamics after liberalisation: capital outflow



- Region III, $\theta > \theta_2$: More advanced financial system

Before liberalization, $r^A > r^* \Rightarrow$ liberalization causes capital inflow

unproductive \rightarrow productive



foreigners

\Rightarrow boom with land price hike and credit expansion

\Rightarrow boom is sustainable

- Welfare

$$c_t = (1 - \beta)z_t = (1 - \beta)\beta^{t-1}\tilde{r}_0\tilde{r}_1 \cdots \tilde{r}_{t-1}z_0$$

$$\text{entrepreneurs : } E_0 \left[\sum_{t=0}^{\infty} \beta^t \ln c_t \right]$$

$$\text{workers : } E_0 \left[\sum_{t=0}^{\infty} \beta^t (c_t - v(l_t)) \right]$$

	P's z	P's \tilde{r}	P's EU	U's z	U's \tilde{r}	U's EU	Worker
Region I	0.53	-0.27	0.27	0.32	-0.27	0.05	5.14
Region II	-0.30	0.09	-0.20	-0.02	0.09	0.07	-0.12

4 Shocks to foreign and domestic credits in Region I

- Foreign interest rate rises

⇒ land price falls

⇒ domestic and foreign credit contract

⇒ domestic interest rate rises more than foreign rate

⇒ TFP and output decrease initially

⇒⇒ share of net worth of productive agents will recover

⇒⇒ TFP and output will recover, while land price will not

Figure 7-1: dynamics after shock to world interest rate

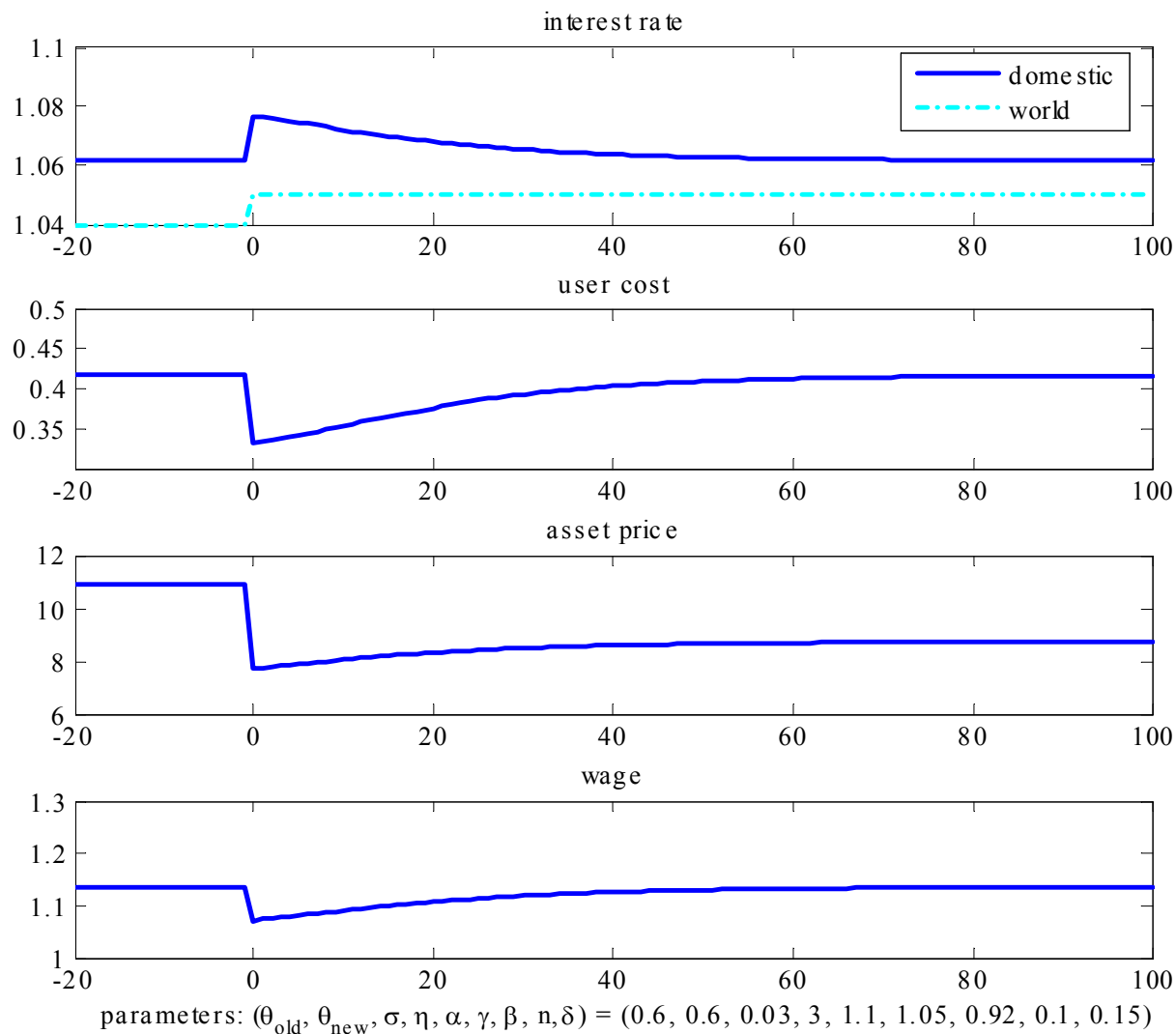
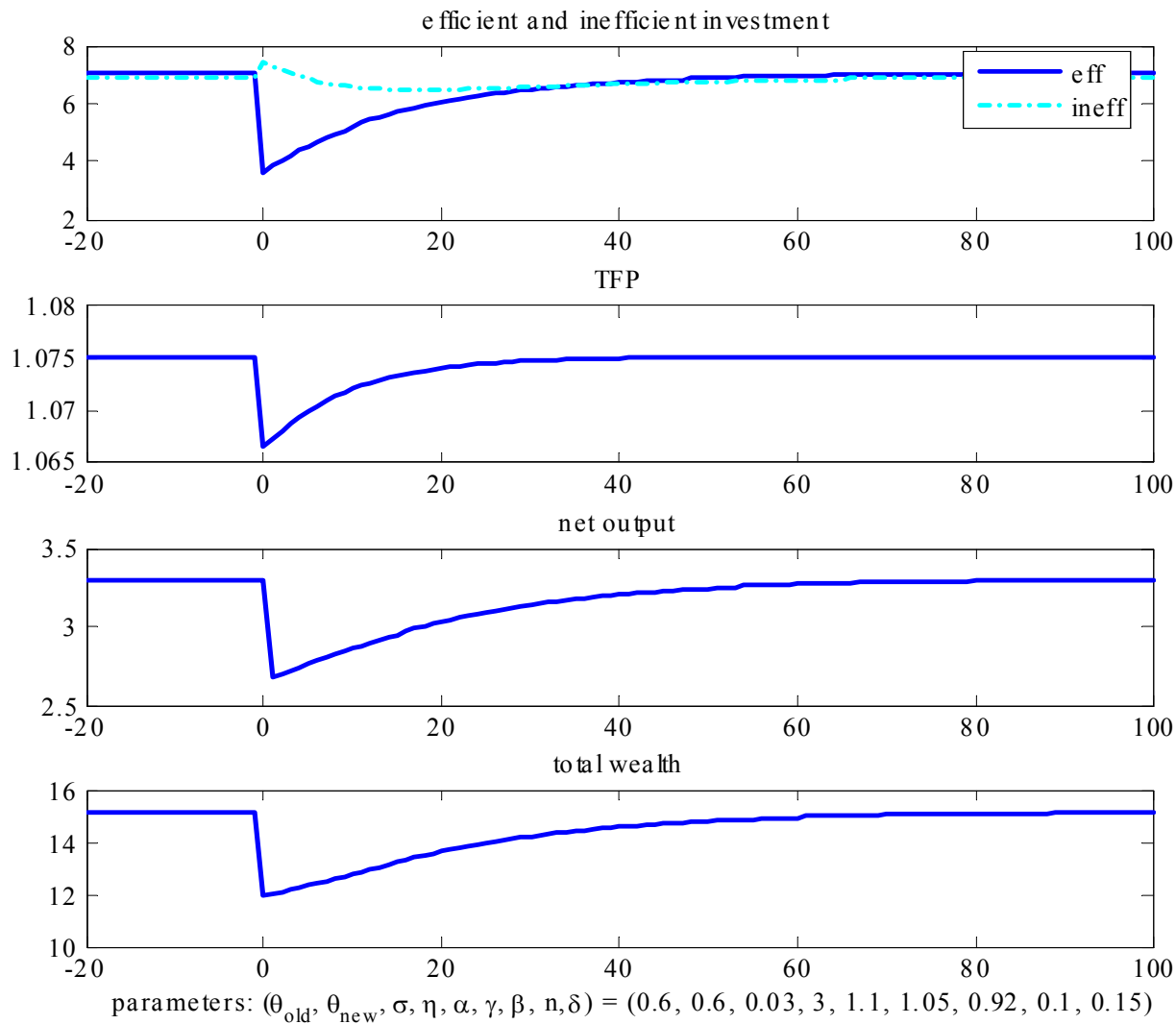


Figure 7-2: dynamics after shock to world interest rate



- Domestic collateral tightened

⇒ land price falls

⇒ foreign credit tightened (capital outflow)

⇒ TFP and output decrease

⇒⇒ share of net worth of productive agents will not recover

⇒⇒ land price, TFP and output continue to stagnate

Figure 6-1: dynamics after shock to theta

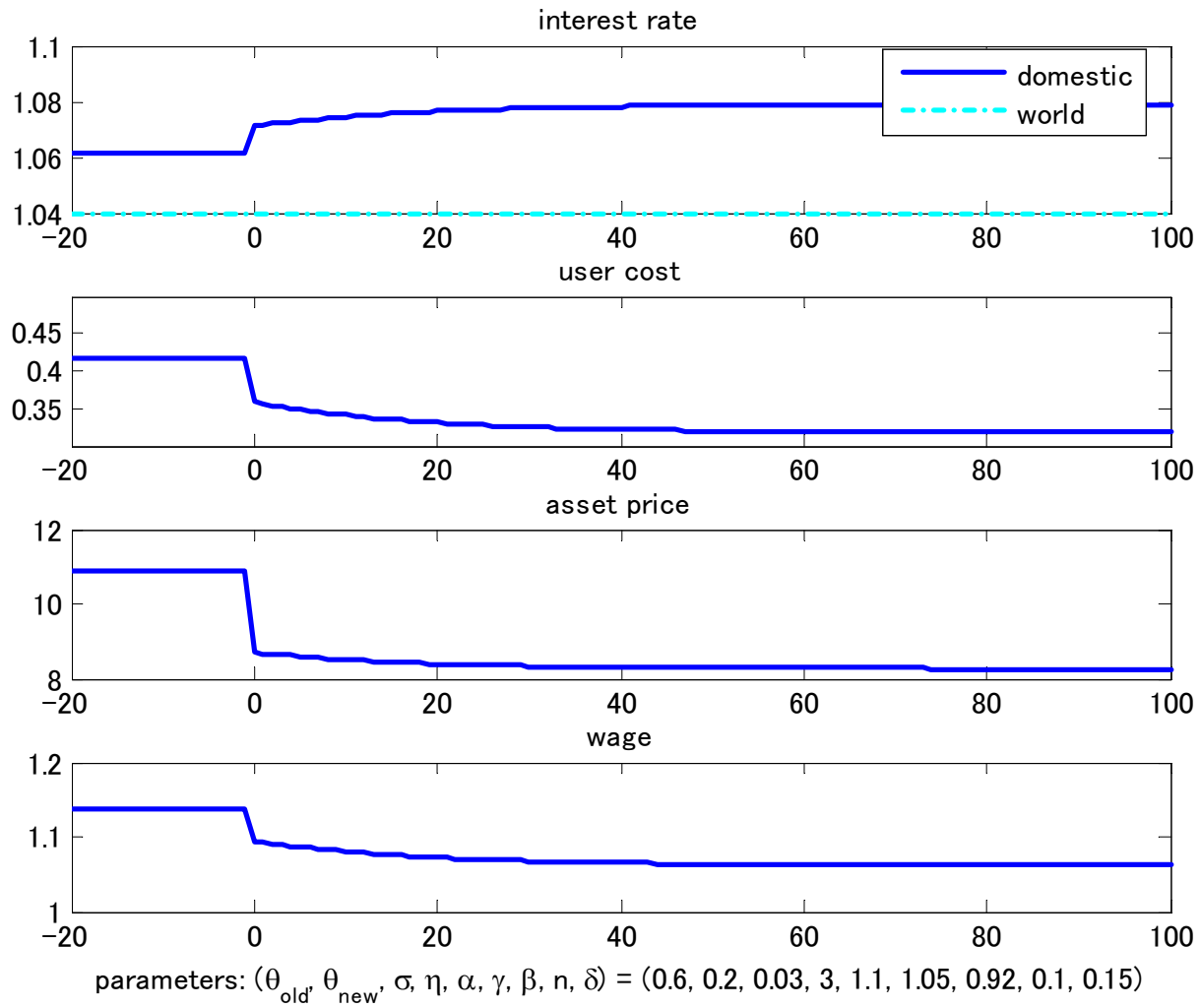
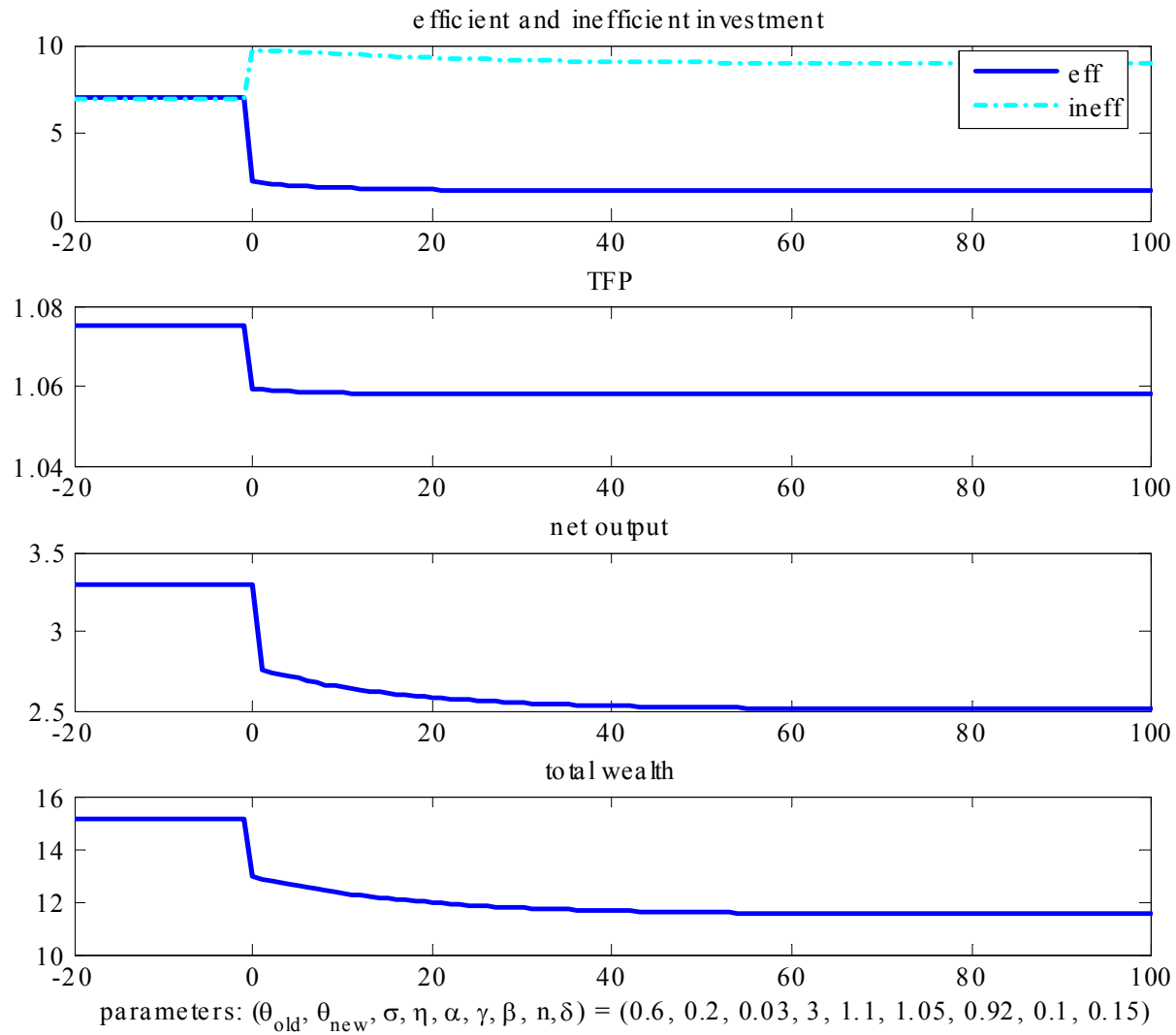


Figure 6-2: dynamics after shock to theta



5 Conclusion

Before liberalization:

With underdeveloped domestic financial system, unproductive agents produce \Rightarrow low TFP

\Rightarrow low factor price

\Rightarrow low interest rate of savers

After capital account liberalization:

Adjustment depends upon the degree of development of domestic institution relative to the rest of the world

Effect of capital account liberalization on output

Short-run

Long-run

Domestic collateral \

Low

Expansionary

Mixed

Medium

Contractionary

Expansionary

High

Expansionary

Expansionary

The economy with low domestic collateral is vulnerable to shocks to domestic and foreign credit

Short-run

Long-run

foreign interest rate \uparrow *Contractionary* *Recovery*

domestic collateral \downarrow *Contractionary* *Contractionary*