

Rethinking the Effects of Financial Liberalization

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The effects of financial liberalization in emerging markets

- The conventional view was that liberalization would lead to
 - capital inflows
 - higher investment and growth
 - international risk sharing
 - development of domestic financial markets
 - higher welfare

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 - capital inflows
 - higher investment and growth
 - international risk sharing
 - development of domestic financial markets
 - higher welfare
- However, liberalization has led to
 - small, volatile, and procyclical net capital flows
 - unchanged or even lower investment and growth
 - higher consumption volatility
 - domestic markets which are unstable and prone to crises
 - welfare?

A model of financial liberalization based on sovereign risk

- Standard ingredients
 - enforcement institutions only care about domestic residents
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 - constrained asset trade with foreigners

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- Standard ingredients
 - enforcement institutions only care about domestic residents
 - they cannot commit to enforce payments
 - constrained asset trade with foreigners
- New ingredients
 - heterogeneity within country → scope for domestic asset trade
 - institutions cannot discriminate between domestic and foreign debts
 - interactions between domestic and foreign asset trade
 - * temptation to default on foreigners may lead to domestic default
 - * cost of domestic default may lead to repayment to foreigners

Is non-discriminatory enforcement realistic?

- Assumption of non-discrimination allows the model to account for the main empirical facts about financial liberalization
- Non-discrimination seems quite realistic
 - episodes of default on government debts usually affect all bondholders regardless of nationality
 - bond prices do not differ by nationality of holder
 - same holds true for debts issued by firms and/or banks
- The role of secondary markets
 - borrowing is often done by selling assets that trade in secondary markets (bonds, stocks)
 - foreigners can get repaid indirectly by selling bonds to domestic residents
 - exact role of secondary markets depends on degree of commitment
 - see Broner, Martin, Ventura (2010)
- Even when borrowing is intermediated (banks, mutual funds)
 - imperfect information about nationality of clients of intermediaries
 - cannot control how intermediaries distribute losses among domestic and foreign clients
 - courts often abide by equal-treatment rules

Related literature

- Financial liberalization with sovereign risk
 - Eaton, Gersovitz (1981), Bulow, Rogoff (1989), Eaton, Fernández (1995), Aguiar, Gopinath (2006), Arellano (2008)
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- Financial liberalization with domestic financial frictions
 - Gertler, Rogoff (1990), Boyd, Smith (1997), Matsuyama (2004, 2008), Aoki, Benigno, Kiyotaki (2006), Caballero, Farhi, Gourinchas (2008), Antras, Caballero (2009), Mendoza, Quadrini, Rios-Rull (2009)
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 - microeconomic frictions are exogenous
- Financial liberalization with sovereign risk and domestic financial frictions
 - Caballero, Krishnamurthy (2001), Tirole (2003), Brutti (2008), Gennaioli, Martin, Rossi (2009), Broner, Martin, Ventura (2010), Broner, Ventura (2011)
 - interactions between domestic and international asset trade
 - * can account for effects on domestic financial markets
 - * important implications for policy and welfare
 - in this paper we focus on the macroeconomic effects of financial liberalization

Plan of the talk

- Conventional view
- Enforcement of domestic and foreign debts
- Rethinking the effects of financial liberalization
- Policy
- Final remarks

Conventional view: Autarky

- Small country: overlapping generations of size 1
- Representative member of generation t
 - maximizes: $u(c_{t,t}) + \beta \cdot E_t[u(c_{t,t+1})]$ with $u(\cdot) = \ln(\cdot)$
 - when young: earns wage w_t , invests to produce capital k_{t+1} , consumes

$$c_{t,t} = w_t - k_{t+1}$$

- when old: receives return to capital (full depreciation), consumes

$$c_{t,t+1} = r_{t+1} \cdot k_{t+1}$$

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$$c_{t,t+1} = r_{t+1} \cdot k_{t+1}$$

- Cobb-Douglas aggregate production function:

$$w_t = (1 - \alpha) \cdot k_t^\alpha \quad \text{and} \quad r_t = \alpha \cdot k_t^{\alpha-1}$$

Conventional view: Autarky

- The law of motion of the capital stock is

$$k_{t+1} = s \cdot k_t^\alpha$$

where $s \equiv \frac{\beta}{1 + \beta} \cdot (1 - \alpha)$ is the (gross) savings rate

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- These are the dynamics of the Solow model
- The steady state is

$$k_{SS}^A = s^{\frac{1}{1-\alpha}} \quad \text{and} \quad r_{SS}^A = \frac{\alpha}{s} \geq 1$$

Conventional view: Financial liberalization

- Removes barriers to access international financial market (IFM)
- IFM has commitment and buys and sells any bonds with expected gross return 1. Thus,

$$R_{t+1} = \frac{1}{\Pr_t[z_{t+1} = E]} \quad \text{and} \quad R_{t+1}^* = 1$$

where $z_{t+1} \in \{E, N\}$ denotes whether generation t repays its debts

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- Theory of enforcement:
 - with probability π , enforcement institutions work well and force generation t to repay its debts
 - with probability $1 - \pi$, institutions fail and generation t chooses when old whether to repay its debts
- Since all members of generation t prefer not to repay their debts,

$$\Pr_t[z_{t+1} = E] = \pi$$

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- The budget constraints of generation t are

$$c_{t,t} = w_t - k_{t+1} - \frac{b_{t+1}^*}{R_{t+1}^*} - \frac{b_{t+1}}{R_{t+1}}$$
$$c_{t,t+1} = \begin{cases} r_{t+1} \cdot k_{t+1} + b_{t+1}^* + b_{t+1} & \text{if } z_{t+1} = E \\ r_{t+1} \cdot k_{t+1} + b_{t+1}^* & \text{if } z_{t+1} = N \end{cases}$$

Conventional view: Financial liberalization

- The law of motion of the capital stock is

$$\alpha \cdot k_{t+1}^{\alpha-1} - 1 = \begin{cases} \frac{1 - \pi}{\pi} \cdot \frac{k_{t+1} - s \cdot k_t^\alpha}{k_{t+1}} & \text{if } k_t < \kappa \\ 0 & \text{if } k_t \geq \kappa \end{cases}$$

where $\kappa = s^{-\frac{1}{\alpha}} \cdot \alpha^{\frac{1}{\alpha(1-\alpha)}}$

- The risk premium on domestic capital $\alpha \cdot k_{t+1}^{\alpha-1} - 1$ is proportional to the enforcement risk $1 - \pi$ and to the amount borrowed $k_{t+1} - s \cdot k_t^\alpha$

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- The risk premium on domestic capital $\alpha \cdot k_{t+1}^{\alpha-1} - 1$ is proportional to the enforcement risk $1 - \pi$ and to the amount borrowed $k_{t+1} - s \cdot k_t^\alpha$
- The steady state is

$$k_{SS}^D = [\pi \cdot \alpha + (1 - \pi) \cdot s]^{\frac{1}{1-\alpha}} \in [k_{SS}^A, \alpha^{\frac{1}{1-\alpha}}]$$

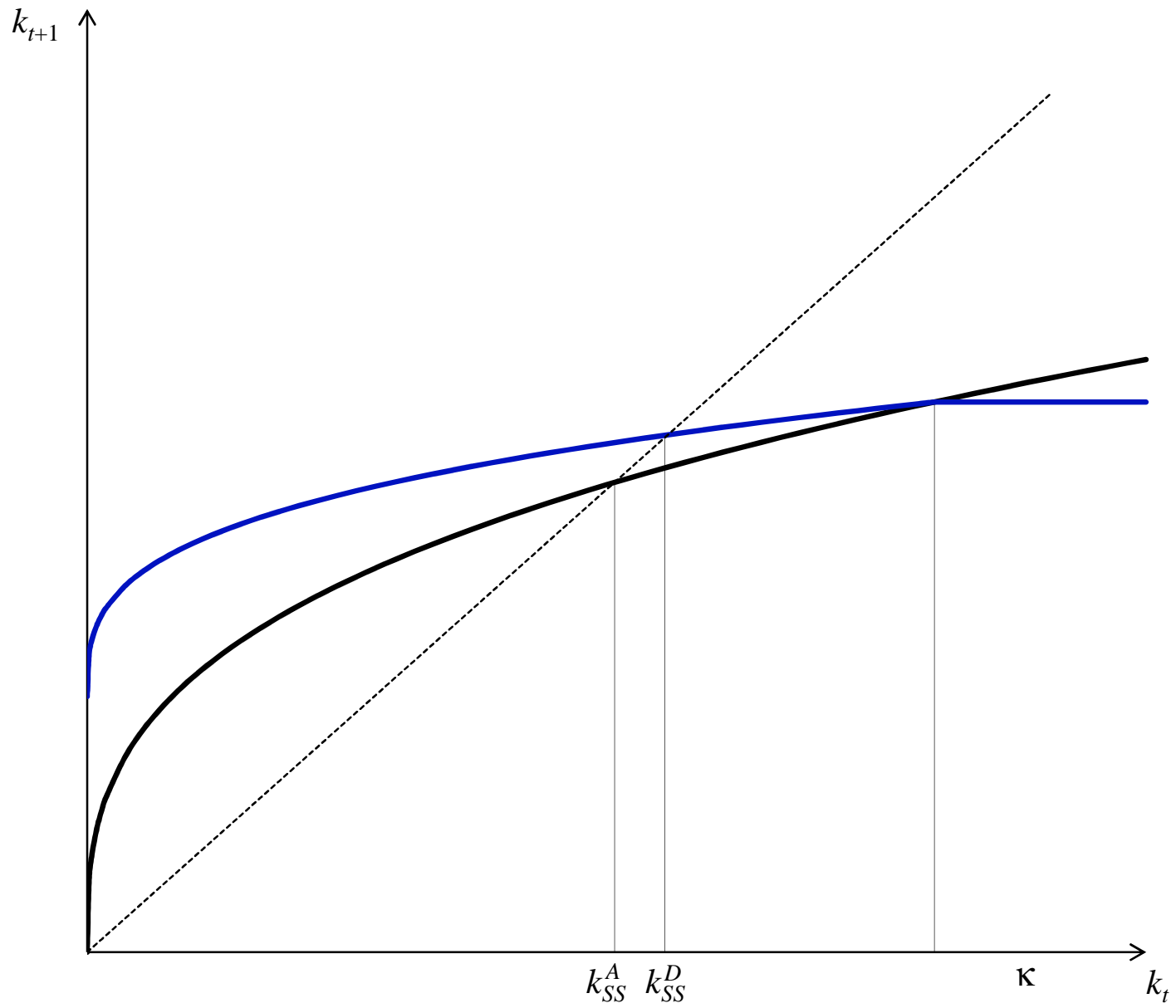


Figure 1: Laws of Motion under Conventional View

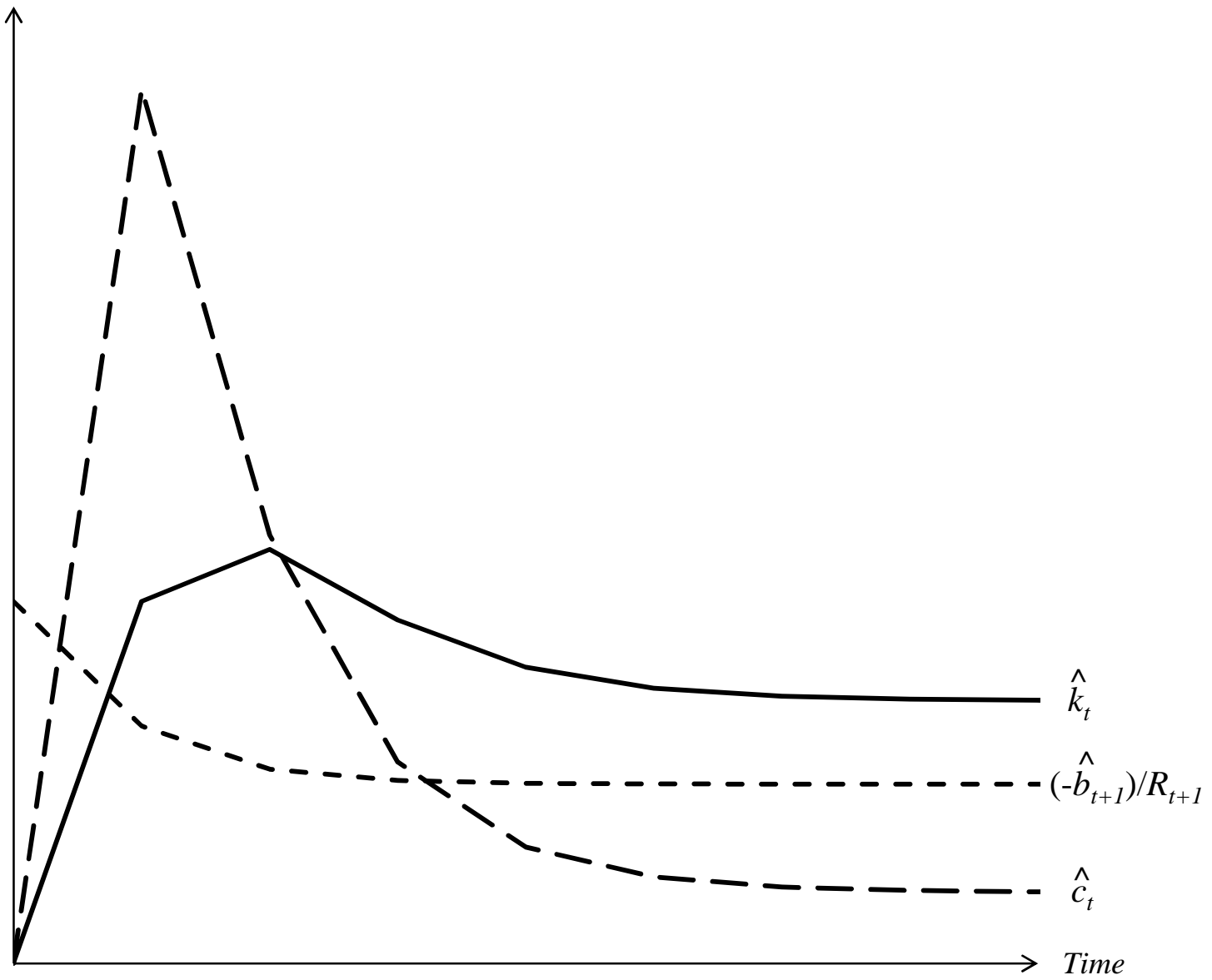


Figure 2: Effects of Financial Liberalization under Conventional View

Enforcing domestic and foreign debts

- We argue that traditional models cannot account for the effects of financial liberalization because they ignore the role of domestic asset trade and its interactions with foreign asset trade
- Assumption: Only a fraction ε of each generation t can produce capital (entrepreneurs I_t^E). The rest can only save by lending (savers I_t^S)

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- Assumption: Only a fraction ε of each generation t can produce capital (entrepreneurs I_t^E). The rest can only save by lending (savers I_t^S)
- This assumption generates domestic asset trade and raises two issues regarding enforcement
 1. How is conflict within a generation resolved?
 2. Is it possible to discriminate between domestic and foreign debts?

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- This assumption generates domestic asset trade and raises two issues regarding enforcement
 1. How is conflict within a generation resolved?
 2. Is it possible to discriminate between domestic and foreign debts?
- Regarding (1), we assume that enforcement decisions are consistent with these two principles
 - an increase in the consumption of any member is good
 - a redistribution from a member with high consumption to one with low consumption is good
 - in particular, generation t maximizes

$$c_{t,t+1} - \frac{\omega}{2} \cdot \int_{i \in I_t} |c_{it,t+1} - c_{t,t+1}|$$

where $\omega \in (0, 1)$ is the weight on the second principle

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- Regarding (2), the conventional view would apply if enforcement were discriminatory
 - foreign debts are enforced with probability π
 - domestic debts are enforced with probability 1
 - Note: savers provide safe credit and act as intermediaries sharing risk of foreign borrowing

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- Regarding (2), the conventional view would apply if enforcement were discriminatory
 - foreign debts are enforced with probability π
 - domestic debts are enforced with probability 1
 - Note: savers provide safe credit and act as intermediaries sharing risk of foreign borrowing
- We assume, instead, that enforcement is non-discriminatory
 - all debts are enforced with probability 1, including foreign ones, or
 - all debts are enforced with probability π , including domestic ones

When domestic enforcement leads to foreign enforcement

- Conjecture that

$$\Pr_t [s_{t+1} = E] = 1$$

- Then

$$k_{t+1} = \alpha^{\frac{1}{1-\alpha}}$$

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- When enforcement institutions fail, will enforcement take place as conjectured?

– if it does, $c_{it,t+1} = s \cdot k_t^\alpha$ for $i \in I_t$

– if it does not, $c_{it,t+1} = \begin{cases} \frac{1}{s} \cdot \alpha^{\frac{1}{1-\alpha}} & \text{for } i \in I_t^E \\ \varepsilon & \\ 0 & \text{for } i \in I_t^S \end{cases}$

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- The optimistic steady state is

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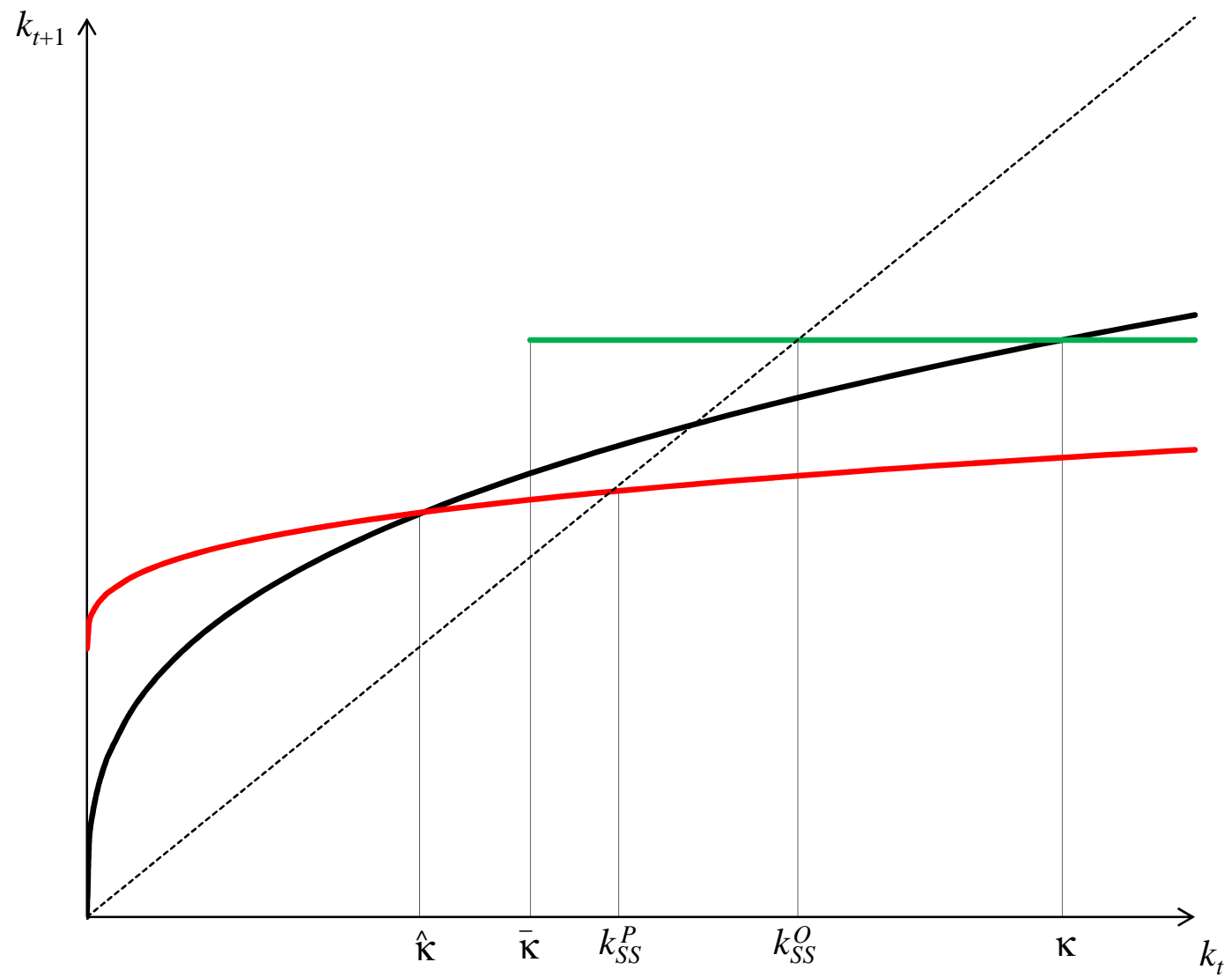


Figure 4: Laws of Motion with Domestic Asset Trade and Non-Discrimination

When default on foreigners leads to domestic default

- Conjecture that

$$\Pr_t [z_{t+1} = E] = \pi$$

- The “pessimistic” equilibrium always exists:
 - domestic lending is risky and the risk premium is zero \Rightarrow savers only lend abroad and their consumption is unaffected by enforcement
 - entrepreneurs borrow from abroad and enforcement lowers their consumption

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- This law of motion is identical to the one in the conventional view, except that the destruction of domestic intermediation reduces the effective gross savings by the factor ε

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$$k_{SS}^P = [\pi \cdot \alpha + (1 - \pi) \cdot \varepsilon \cdot s]^{\frac{1}{1-\alpha}} \leq k_{SS}^A$$

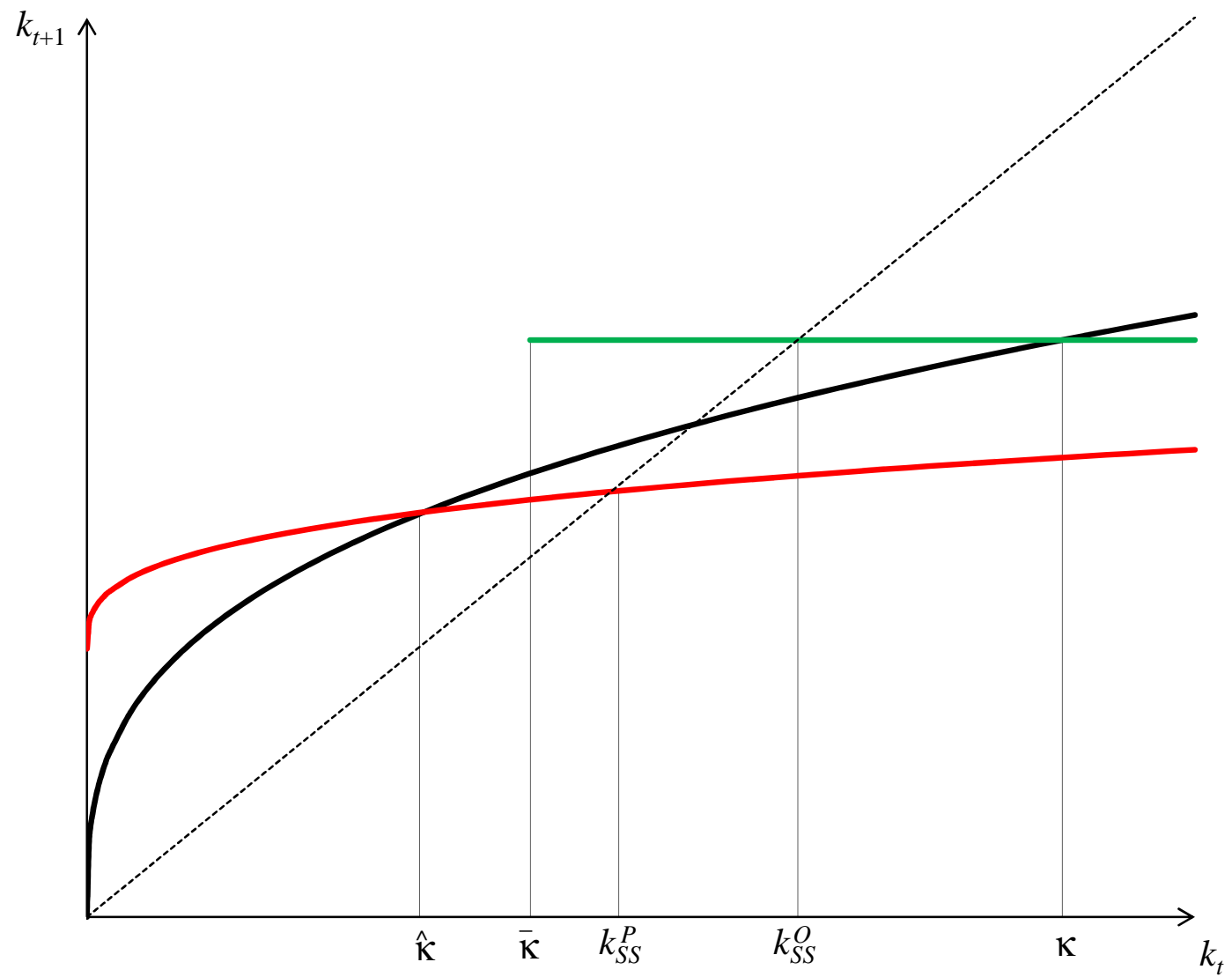


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- Why may capital flow out of capital-scarce countries?

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- Without discrimination, entrepreneurs
 - face borrowing risk on their borrowing from savers
 - cannot share borrowing risk on their borrowing from foreigners with savers
 - may invest less than in autarky

Financial liberalization: Multiple equilibria

- In optimistic equilibrium
 - expect low risk \Rightarrow no diversification \Rightarrow high domestic intermediation \Rightarrow enforcement \Rightarrow low risk
- In pessimistic equilibrium
 - expect high risk \Rightarrow diversification \Rightarrow low domestic intermediation \Rightarrow no enforcement \Rightarrow high risk

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- A sunspot materializes at the beginning of each period
 - with probability $p_t \in (0, 1)$ sunspot is “optimistic”: if optimistic equilibrium exists, it is played
 - with probability $1 - p_t$ sunspot is “pessimistic”: pessimistic equilibrium is played

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- If $k_{SS}^P < \bar{k}$
 - the capital stock converges to k_{SS}^P
 - monotonically from below and after periods of volatility from above

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- If $k_{SS}^P \geq \bar{k}$
 - the capital stock converges to interval $[k_{SS}^P, k_{SS}^O]$
 - monotonically from below and in one generation from above

Rethinking the effects of financial liberalization: dynamics

- Assume that $\hat{k} < \bar{k} < k_{SS}^P$ and consider the effects of liberalization if $k_{tL} < \hat{k}$

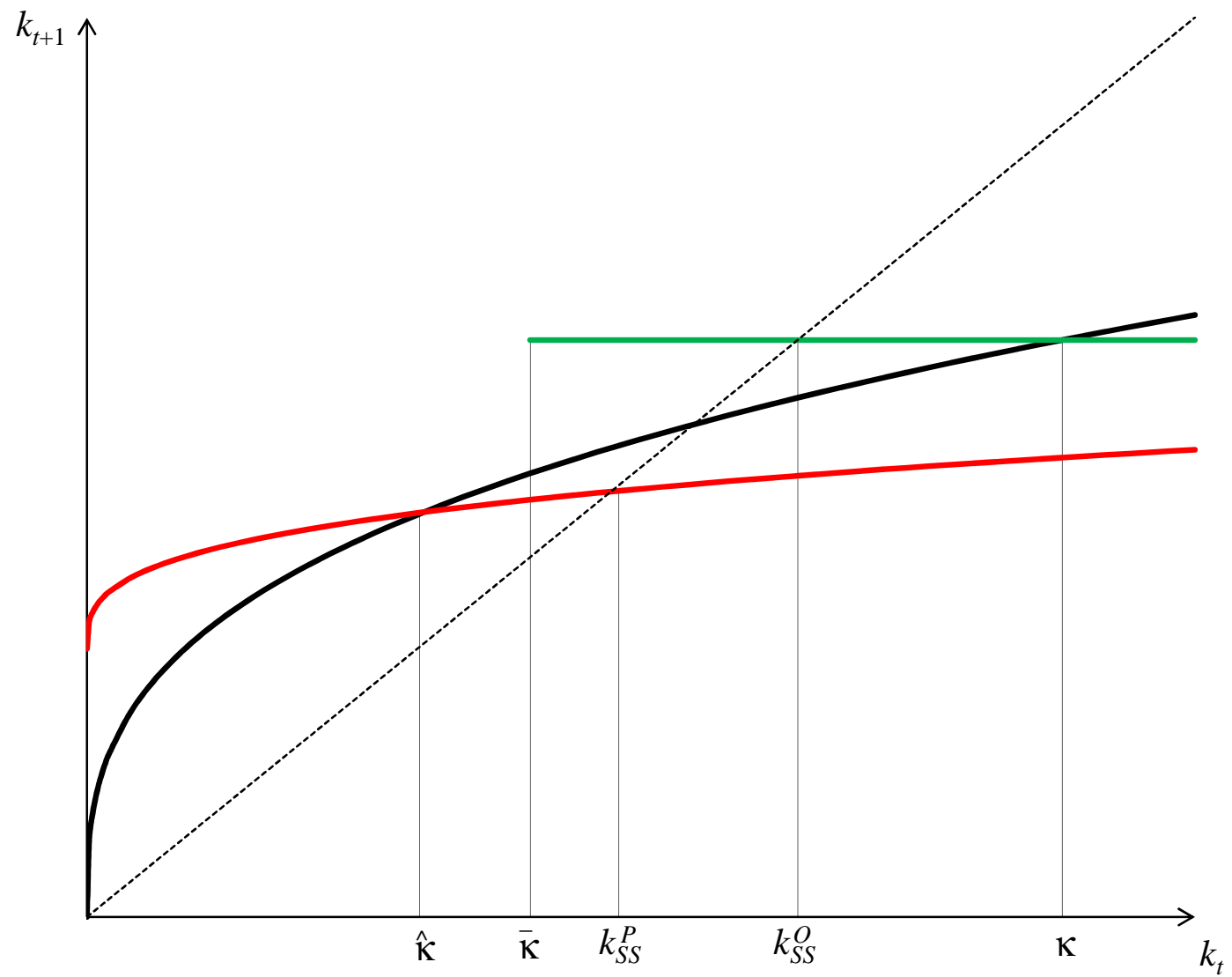


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- Phase I: $k_{t_L} \leq k_t < \hat{k}$
 - only pessimistic equilibrium exists
 - borrowing is risky, but country is so capital scarce that there are net capital inflows
 - investment and growth are higher than in autarky

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- Phase II: $\hat{k} \leq k_t < \bar{k}$
 - only pessimistic equilibrium exists
 - borrowing is risky and domestic savings are higher than in Phase I, so there are net capital outflows
 - investment and growth are lower than in autarky

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- Phase II: $\hat{k} \leq k_t < \bar{k}$
 - only pessimistic equilibrium exists
 - borrowing is risky and domestic savings are higher than in Phase I, so there are net capital outflows
 - investment and growth are lower than in autarky
- Phase III: $\bar{k} \leq k_t$
 - transitions between
 - * optimistic equilibrium: repatriation of savings, net capital inflows, and high growth
 - * pessimistic equilibrium: domestic capital flight, net capital outflows, and low growth
 - steady state may be higher or lower than in autarky
 - volatility is higher than in autarky

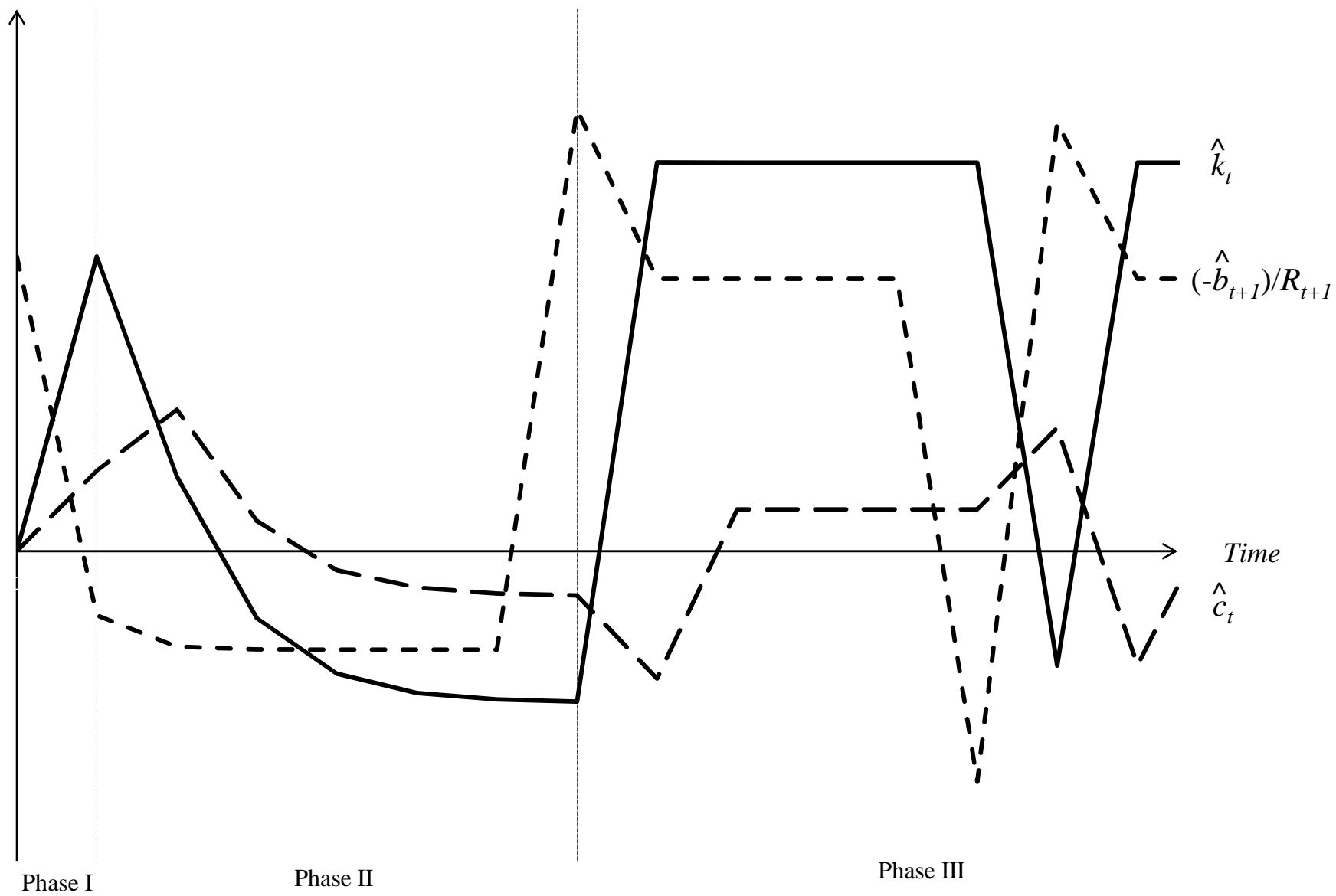


Figure 5: Effects of Financial Liberalization without Discrimination

Rethinking the effects of financial liberalization: dynamics

- Effects depend on initial level of development k_{t_L} , institutions π , and savings s

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- Initial level of development k_{t_L}
 - at higher k_{t_L} , Phase I or even Phase II may be skipped
- Institutions π
 - a higher π raises the law of motion in the pessimistic equilibrium and thus \hat{k}
 - * less likely to observe net capital outflows in Phase II
 - * higher average output and lower volatility in Phase III
 - a lower π lowers the law of motion in the pessimistic equilibrium and thus k_{SS}^P
 - * Phase III may disappear

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 - * less likely to observe net capital outflows in Phase II
 - * higher average output and lower volatility in Phase III
 - a lower π lowers the law of motion in the pessimistic equilibrium and thus k_{SS}^P
 - * Phase III may disappear
- Savings s
 - a higher s lowers both \hat{k} and \bar{k}
 - * more likely to observe net capital outflows in Phase II
 - * less volatility in Phase III

Rethinking the effects of financial liberalization: dynamics

- Effects depend on initial level of development k_{t_L} , institutions π , and savings s
- Initial level of development k_{t_L}
 - at higher k_{t_L} , Phase I or even Phase II may be skipped
- Institutions π
 - a higher π raises the law of motion in the pessimistic equilibrium and thus \hat{k}
 - * less likely to observe net capital outflows in Phase II
 - * higher average output and lower volatility in Phase III
 - a lower π lowers the law of motion in the pessimistic equilibrium and thus k_{SS}^P
 - * Phase III may disappear
- Savings s
 - a higher s lowers both \hat{k} and \bar{k}
 - * more likely to observe net capital outflows in Phase II
 - * less volatility in Phase III
- May explain experiences of Latin America, Eastern Europe, East Asia, China, Africa (rich countries?)

Policy

- Improving institutions
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 - others should never liberalize
- Capital controls
 - on inflows
 - * makes the optimistic equilibrium more likely to exist
 - * standard foreign overborrowing externality
 - on outflows
 - * makes the pessimistic equilibrium less likely to exist
 - * domestic “underlending” externality
 - but such policies assume ex-ante discrimination

Policy

- Financial systems
 - when poor ($k_t < \bar{k}$), facilitate discrimination
 - * financial system based on financial intermediaries and financial contracts that are not easily tradable
 - * avoids worsening of enforcement of domestic debts
 - when rich ($k_t \geq \bar{k}$), make discrimination difficult
 - * develop standardized financial instruments and markets where stocks and bonds can be traded
 - * improves enforcement of foreign debts

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- Can account for change in institutional set up for emerging market borrowing?
 - Perfect discrimination more applicable to emerging markets in 1970's and 1980's:
 - * governments borrowed from foreign banks using syndicated loans
 - * private sector shut out from international financial markets
 - Non-discrimination more applicable to emerging markets in 1990's and 2000's:
 - * governments borrow from foreigners by selling bonds
 - * private sector borrows by selling bonds and stocks and through a variety of financial intermediaries

Final remarks

- We propose a simple model that can account for effects of financial liberalization in emerging markets
 - ambiguous effect on investment and growth
 - higher volatility
 - domestic markets unstable and prone to crises
 - effects depend on level of development, institutions, and savings
- In traditional models (with representative agent or discriminatory enforcement)
 - results qualitatively similar to complete-markets model
- In our model (with heterogeneity and non-discriminatory enforcement)
 - interactions between domestic and international asset trade
 - results qualitatively different from complete-markets model
- Important implications for
 - the role of institutions
 - timing of liberalization
 - capital controls
 - financial systems