Financial Market Globalization, Symmetry-Breaking
and Endogenous Inequality of Nations

By Kiminori Matsuyama
Northwestern University

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1. Introduction.

Question: The effects of international financial market integration on the inequality of nations

Background: the two contrasting views on the role of international financial markets

1. Textbook View: *An Equalizing Force*

- Facilitate the efficient allocation of the world saving
- Help the underdeveloped to achieve faster growth and catch up with the rich

2. Structualist View (Myrdall, Nurkse, etc.): *An Unequalizing Force*

- The poor cannot compete with the rich in the world capital market
- Magnifying the gap between the rich and the poor
- Creating the International Economic Order of the Rich and the Poor

How can we make sense of the structualist view? Can we reconcile the two opposing views of the world?

Two Approaches: Aggregate Increasing Returns versus Credit Market Imperfection

Aggregate increasing returns at the national levels (Endogenous Growth, Economic Geography)

Financial capital does not flow from the Rich to the Poor, *because* the return is higher in the rich countries (due to agglomeration economies).

- Inequality may be good for the world as a whole; it may be even good for the poor.
- The effect of financial globalization is similar to globalization via FDI (the movement of physical capital) or via immigration (the movement of human capital)

Imperfect credit markets (Boyd-Smith, Gertler-Rogoff, Ljungqvist)

Financial capital does not flow from the Rich to the Poor, *despite* that the return is higher in the poor countries.

- Inequality is always bad for the world as a whole, and bad for the poor
- The effect of financial globalization is different from those of globalization via FDI or via immigration

This paper deals with the second.

The Game Plan:

Step 1: Build a model of the world economy consisting of inherently identical nations (At any point in time, countries differ only in k_t the stock of the nontradeable capital good) with the two key features
- Aggregate Diminishing Returns at the national levels: Equalizing Force
- Imperfect Credit Market and Wealth-Dependent Borrowing Constraint: Unequalizing Force
- Home Bias in Investment Demand Spillovers: Persistence of Inequality

Step 2: Analyze the set of the stable steady states WITH/WITHOUT the international financial markets

The (Main) Result:

WITHOUT the international financial market, the steady state is Unique, Symmetric and Stable.
  The steady state is characterized by a (degenerate) unimodal distribution of k (and the income, the wage, etc.)

WITH the international financial market, **for some parameter values**,
- *the unique symmetric steady state becomes unstable*
- *(a continuum of) stable asymmetric steady states emerge.*
A steady state is characterized by a (degenerate) bimodal distribution of k (and the income, the wage, etc.)

  SYMMETRY-BREAKING and ENDOGENOUS INEQUALITY

Step 3: Characterize the parameter conditions for the symmetry-breaking case (and for other cases).

INTUITION:

Why Symmetry-Breaking?

WITHOUT the international financial market, the domestic interest rate adjusts to equate S = I, which offsets any country-specific shock, restoring the symmetry

WITH the international financial market, the domestic interest rates are all linked. Without offsetting changes in the domestic interest rate, positive (negative) country-specific shocks start virtuous (vicious) circles of high (low) wealth/high (low) investment

WHY ASYMMETRIC STABLE STEADY STATES?

Diminishing Returns eventually put a break on the spiral process

Symmetry-Breaking Approach versus Poverty Trap (Coordination Failure) Approach (Matsuyama AER 2002)

PovertyTrap (Coordination Failure)Approach; Murphy-Shliefer-Vishny, Azariadis-Drazen, Ciccone-Matsuyama, etc.

Symmetry-Breaking Approach; Krugman, Krugman-Venables, Matsuyama

- Poverty Trap treats the problem of underdevelopment as an isolated problem, Symmetry-Breaking explains the co-existence of the rich and the poor as an interrelated whole

- Symmetry-Breaking can make the definite prediction regarding the inequality. Poverty Trap cannot e.g., Symmetry-Breaking Case offers a new way of looking at the convergence hypothesis

Cautionary Remarks:

What this paper DOES

- examines the effects of the international financial market on the inequality of nations.
- conduct the following counterfactual thought experiment; How the inequality of nations would change under different degrees of the financial market globalization.
- show that a greater degree of the financial market globalization sometimes magnifies the inequality of nations.

This paper does NOT argue that
- The world economy has become increasingly unequal.
- The inequality of nations should be blamed for the international financial market
- Other sources of the inequality are unimportant

Symmetry-Breaking does NOT necessarily mean divergence
- Symmetry-Breaking can be consistent with convergence.
- Symmetry-Breaking means, however, that there is a limit to convergence.

Endogenous Inequality does NOT mean that exogenous heterogeneity is not important. It suggests that
- a small amount of exogenous heterogeneity can be magnified to generate a huge inequality
- possible endogeneity of observed heterogeneities that are treated as exogenous in the growth accounting, growth calibration literature (e.g., there may be the two-way causality between the Per Capita Income $\leftrightarrow$ the Monopoly or Investment distortions)

2. The Model

The World Economy: consists of (a continuum of) inherently identical countries.
  The countries may differ only in k_t (the stock of nontradeable capital good).

Demography: two-period lived OG agents as in the standard Diamond model.
- Each generation consists a continuum of homogenous agents with unit mass.
- Each agent is endowed with one unit of labor in the first period only, which is supplied inelastically.
- Each consumes only in the second. They save everything.

CRS Production Technology: $Y_t = F(K_t, L_t)$; $y_t \equiv Y_t/L_t = f(k_t)$, $k_t \equiv K_t/L_t$, $f' > 0 > f''$, $f(0) = 0$, $f'(0) = \infty$.
- K_t and L_t are aggregate domestic supplies of physical capital and labor in period t. They are nontradeable.
- Y, the final good, can be (intertemporally) traded.

Competitive Factor Markets: $\rho_t = f'(k_t)$; $w_t = f(k_t) - k_t f'(k_t) \equiv W(k_t)$.
- $\rho_t = f'(k_t)$ is decreasing! Aggregate diminishing returns at the country level
- $W(k)$ is increasing! A higher domestic investment leads to a higher domestic wealth

Remarks:
- The nontradeablity of the physical capital creates the home-biased demand spillover effects (The investment in country A increases the value of the labor endowment in country A more than those in other countries.)
- Why the Diamond model? Why not The Cass-Koopmans Model? To avoid the Becker-type indeterminacy.

Investment Technology:

The young in period t allocate their wealth, w_t, finance their consumption in period t+1. They have two options.

1.   lend at the gross rate of return, r_{t+1}.
2.   start and manage an investment project, which transforms one unit of the final good in period t into R > 0 units of physical capital in period t+1. The project is discrete and the agent needs to borrow by $1-w_t$ at r_{t+1}.

The young are willing to borrow and start the project iff $\rho_{t+1}R - r_{t+1}(1-w_t) \geq r_{t+1}w_t$

    (PC) $Rf'(k_{t+1}) \geq r_{t+1}$.

Borrowing Constraint:

The agent can pledge only a fraction of the project revenue to the lender: thus the repayment obligation of the agent cannot be greater than $\lambda\rho_{t+1}R$. The agent can start the project only if $r_t(1-w_t) \leq \lambda\rho_{t+1}R$, or

    (BC) $\lambda Rf'(k_{t+1}) \geq r_{t+1}(1-W(k_t))$.

The young invests if and only if both (PC) and (BC) are satisfied.

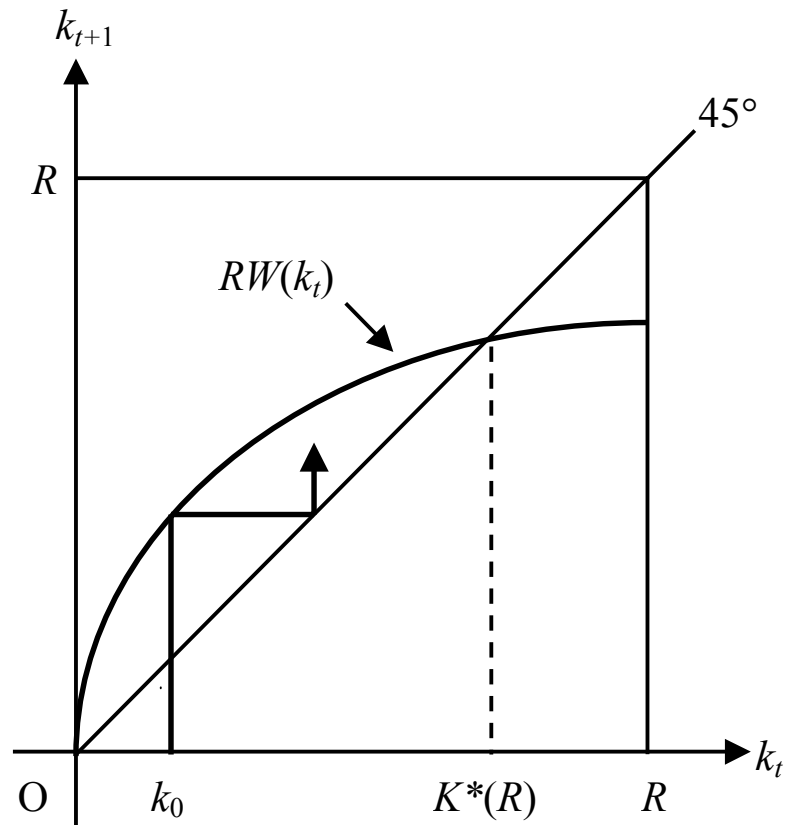   (PC) is the binding constraint when $W((k_t) > 1-\lambda$.
    (BC) is the binding constraint when $W(k_t) < 1-\lambda$.
Two preliminary cases: the Autarky and the Small Open Economy

Autarky ($I_t = S_t$).

$k_{t+1} = RI_t = RS_t = RW(k_t)$.

The dynamics is driven by the supply of credit.

a)

The Small Open Economy Case: $r_{t+1} = r;$ $S_t \neq I_t$
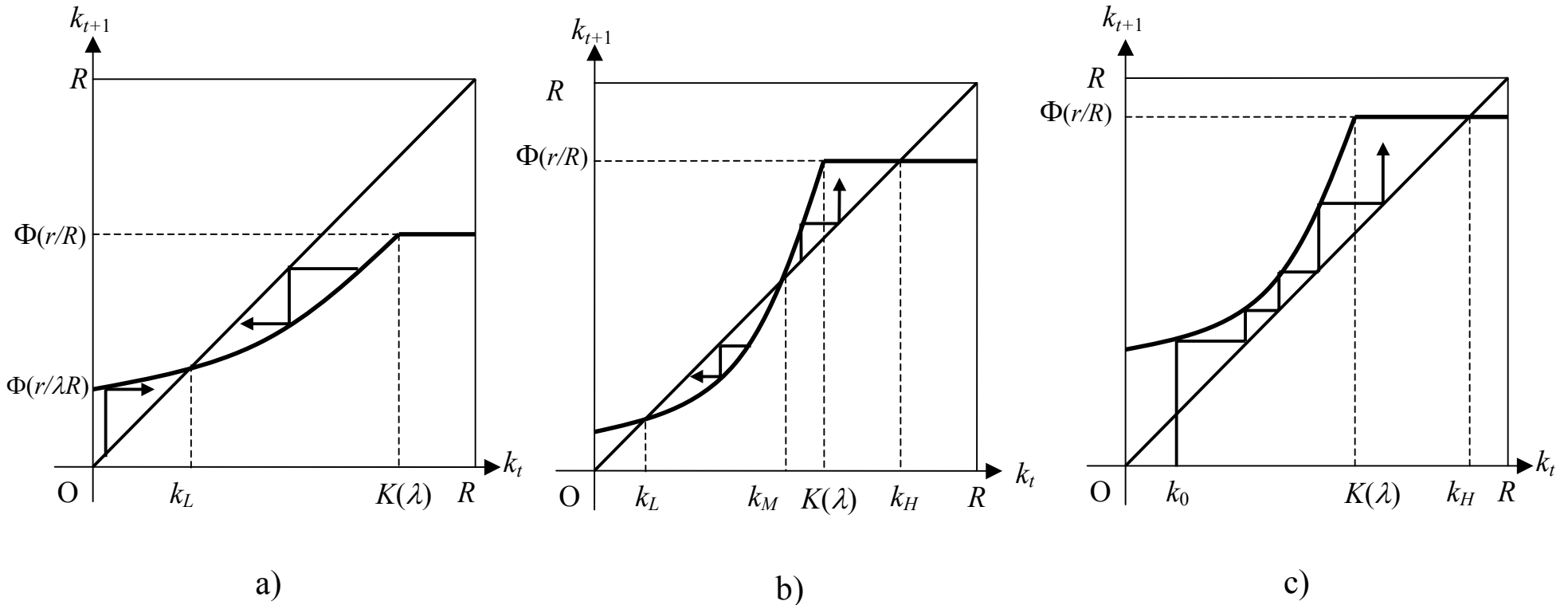
If $W(k_t) > 1-\lambda$, (PC) is binding, but (BC) is not. $Rf'(k_{t+1}) = r.$
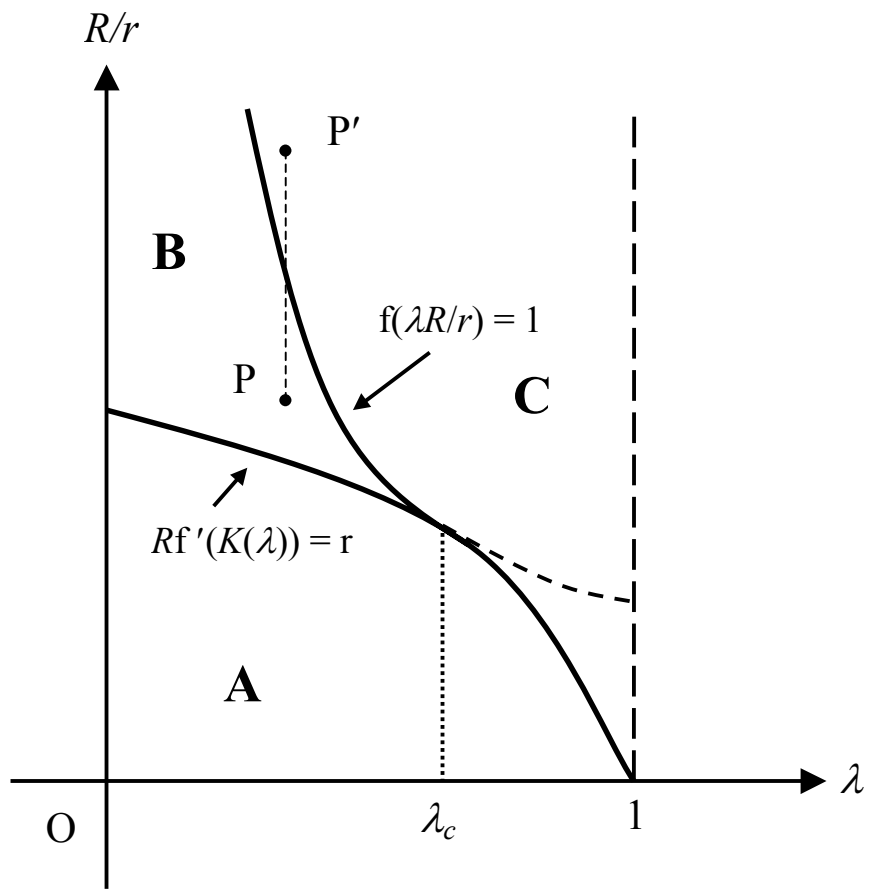
If $W(k_t) < 1-\lambda$, (BC) is binding, but (PC) is not. $\lambda Rf'(k_{t+1}) = r(1-W(k_t)).$

Only three generic cases of the dynamics.

a)   b)   c)

The World Economy

Without the international financial market, it is a collection of the autarky economies. Hence, each country holds $K^*(R)$ in the steady state.

With the international financial market,
- it is a collection of small open economies.
- the world interest rate is now endogenously determined to equate the world saving and the world investment.

There are only two possible types of stable steady states.

I.   *Symmetric Steady State*, where all the countries have the same level of capital, $k^* = K^*(R)$.

II.   *Asymmetric Steady States,* where some countries have k_H and others have k_L, where $k_H > K^*(R) > k_L$

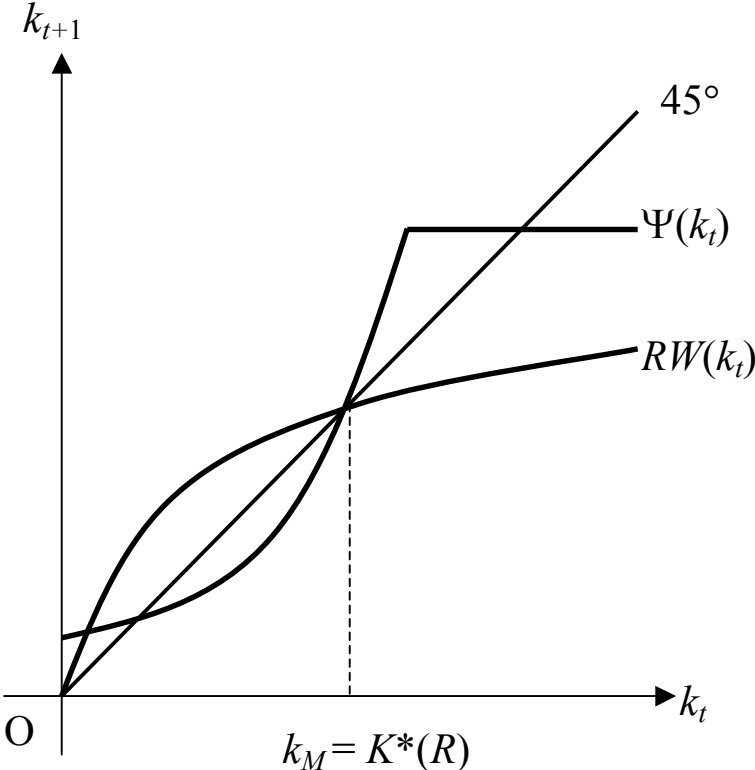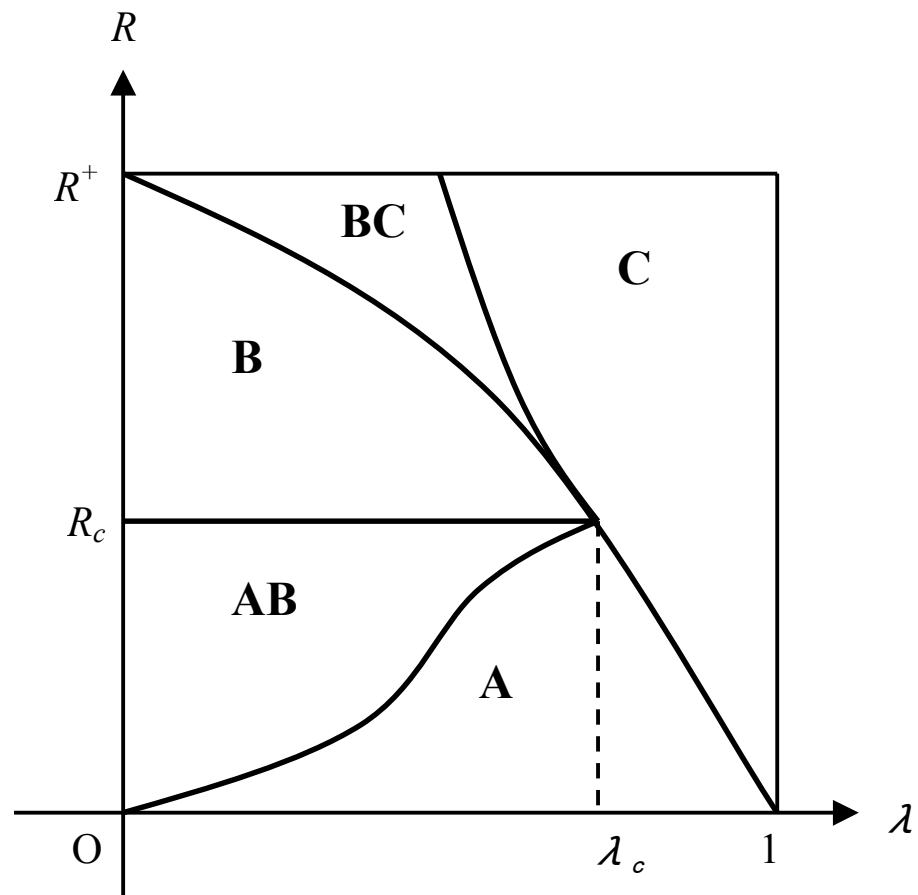Figure 4: Symmetry-Breaking when $K^*(R_c) < K^*(R) < K(\lambda)$

Figure 5: The World Economy

Discussions

Welfare Implication

Application: Technological Progress and U-Curve (Divergence then Convergence)

Robustness

Heterogeneity of the agents within each country (ability, endowment etc)

Allowing the agents to run more than one project (if they can afford it)

Factor Market Globalization

Aggregate Increasing Returns (Welfare Implications)

Infinite Lived Agents

Exogenous Heterogeneity across Nations