Rethinking the Effects of Financial Liberalization

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Financial globalization and financial crises

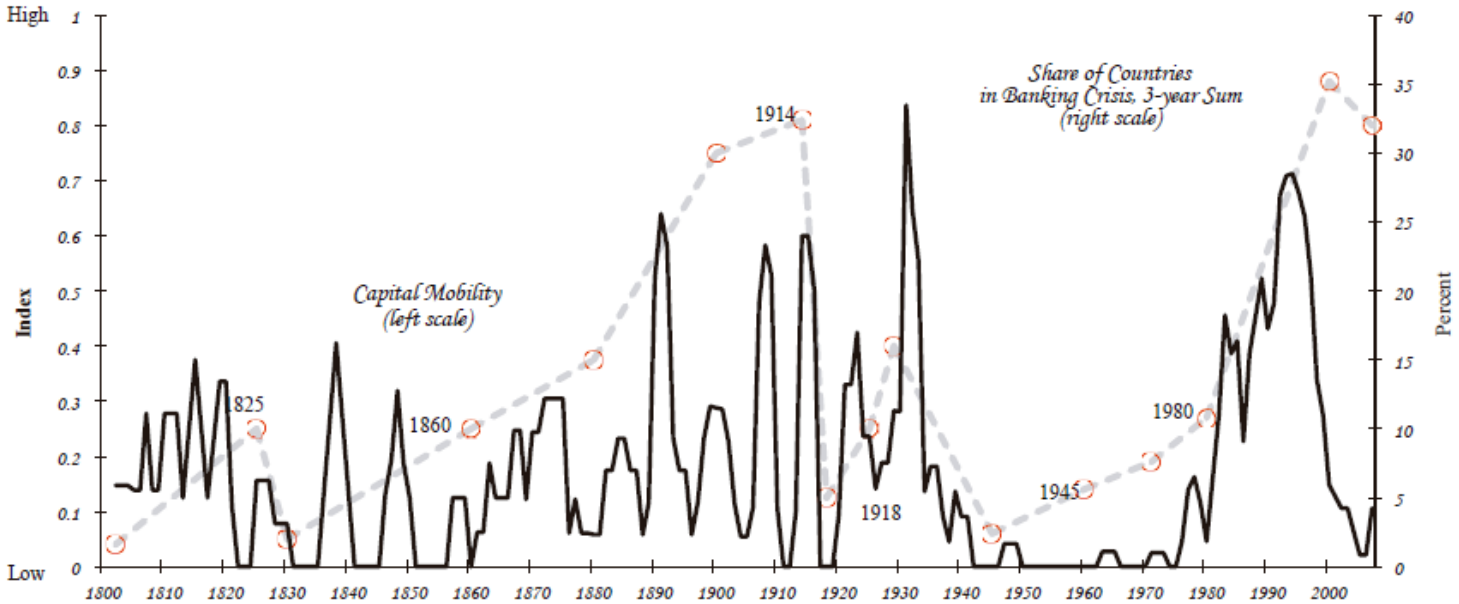


FIGURE I: *Capital Mobility and Incidence of Banking Crises.* Sources: Reinhart and Rogoff (2009), who combine own data with Kaminsky and Reinhart (1999), Bordo et al. (2001), Obstfeld and Taylor (2004), and Caprio et al. (2005). The index of capital mobility is the subjective index from Obstfeld and Taylor (2004).

Working hypothesis

- Increased instability of domestic financial markets can be partly explained by a change in government behavior resulting from financial globalization:
  - The probability of a financial crisis depends on the nature of financial regulations and the judicial system's resolve to enforce contracts
  - Governments cannot fully discriminate between domestic and foreign asset trade when regulating and/or enforcing debt contracts
  - Globalization changes the mix of creditors, raising the number of foreign holders of domestic debts
- What are the implications of this view for the theory of financial globalization?

Overview

- Two interactions between domestic and foreign debts:
  - Foreign debts destroy domestic debts: the *capital-flight* effect
  - Domestic debts support foreign debts: the *financial-depth* effect
- Two equilibria after financial liberalization:
  - Pessimistic equilibrium if the capital-flight effect dominates
  - Optimistic equilibrium if the financial-depth effect dominates
- Poor countries with low savings and low quality of enforcement institutions are always in the pessimistic equilibrium
- Middle-income countries with high savings and high quality enforcement institutions alternate between both equilibria

Related literature

- Empirical work on financial liberalization
  - Díaz-Alejandro (1985), Kaminsky, Reinhart (1999), Bekaert, Harvey, Lundblad (2005, 2006), Broner, Rigobon (2006), Henry (2007), Prasad, Rajan, Subramanian (2007), Alfaro, Kalemli-Ozcan, Volosovych (2008), Bonfiglioli (2008), Kose, Prasad, Rogoff, Wei (2009), Levchenko, Ranciere, Thoenig (2009), Obstfeld (2009), Reinhart, Rogoff (2009), Gourinchas, Jeanne (2012), Alfaro, Kalemli-Ozcan, Volosovych (2014)

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

- However, financial globalization 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

Related literature

- Financial globalization with sovereign risk
  - Eaton, Gersovitz (1981), Bulow, Rogoff (1989), Eaton, Fernández (1995), Aguiar, Gopinath (2006), Arellano (2008)
- Financial globalization 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)
- Financial globalization with sovereign risk and domestic financial frictions
  - Caballero, Krishnamurthy (2001), Tirole (2003), Broner, Martin, Ventura (2010), Broner, Ventura (2011), Brutti (2011), Gennaioli, Martin, Rossi (2014)

Basic setup: preferences and technology

- Overlapping generations of constant size
- Two types: a fraction ε of entrepreneurs and the rest savers
  - Both have same preferences: $U_t^i = \ln c_{t,t}^i + \beta \cdot E_t \ln c_{t,t+1}^i$
  - Both have one unit of labor when young
  - Only entrepreneurs can invest one unit of good today and obtain A units of capital tomorrow
- Technology and factor markets:
  - Cobb-Douglas technology: $f(k_t) = k_t^{\alpha} \cdot I_t^{1-\alpha}$
  - Competitive factor markets: $w_t = (1-\alpha) \cdot k_t^{\alpha}$ and $r_t = \alpha \cdot k_t^{\alpha-1}$

Basic setup: theory of enforcement

- Focus on credit market:
  - Before financial liberalization, only domestic residents participate
  - Financial liberalization allows foreigners to participate too
- Theory of enforcement
  - Foreign assets are always enforced
  - Domestic/foreign debts might or might not be enforced:
    - ★ with prob. π, enforcement institutions work and debts are enforced
    - ★ with prob. $1-\pi$, institutions fail and the generation chooses whether to enforce debts or not
  - How is conflict within a generation resolved?
  - Is it possible to discriminate between domestic and foreign debts?

Basic setup: how is conflict resolved?

- Decisions are consistent with two principles:
  - an increase in the consumption of any member of the generation is good
  - a reduction in consumption inequality within the generation is also good
- A specific formulation:
  - $W_{t,t+1} = c_{t,t+1} - \frac{\omega}{2} \cdot \int_{i \in I_t} \left| c^i_{t,t+1} - c_{t,t+1} \right|$ with $\omega \in (0,1)$

Basic setup: is it possible to discriminate?

- There are three enforcement states $z_{t+1} \in \{E, D, N\}$
  - if $z_{t+1} = E$, all debts are enforced (prob p_t^E)
  - if $z_{t+1} = D$, domestic debts are enforced but foreign debts are not (prob p_t^D)
  - if $z_{t+1} = N$, neither domestic nor foreign debts are enforced (prob p_t^N)
- If generation enforces domestic debts and attempts to default on foreigners it succeeds with prob $\delta \in [0, 1]$
- Thus, generations choose among:
  - $z_{t+1} = E$ (never chosen, only arises when institutions work well)
  - $z_{t+1} = N$
  - $z_{t+1} = \begin{cases} D & \text{with prob. } \delta \\ E & \text{with prob. } 1 - \delta \end{cases}$ (discrimination lottery)

Before financial globalization

- There is a unique equilibrium with:
  - $p_t^E = 1$, and $p_t^D = p_t^N = 0$
- Interest rate:
  - $R_{t+1} = A \cdot \alpha \cdot k_t^{\alpha - 1}$
- Capital accumulation:
  - $k_{t+1} = A \cdot s \cdot k_t^{\alpha}$ with $s \equiv \frac{\beta}{1+\beta} \cdot (1 - \alpha)$
- Economy converges to $R_{\infty}^A = \frac{\alpha}{s} > 1$ and $k_{\infty}^A = (A \cdot s)^{\frac{1}{1-\alpha}}$

Before financial globalization

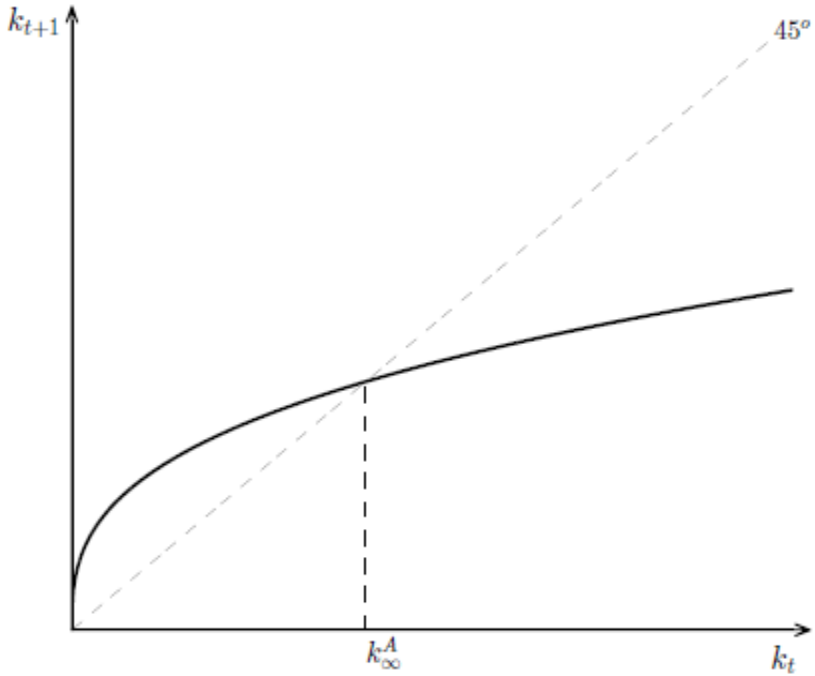


FIGURE II: *The Autarky Economy.* The solid line shows the law of motion of the capital stock in autarky, for parameters $\{\alpha = 0.3, \beta = 0.9, \rho = 0.1, \omega = 0.2, A = 1, \delta = 0.6, \varepsilon = 0.8, \pi = 0.7\}$. All figures in the paper are based on variations of $\{\delta, \varepsilon, \pi\}$, while sharing the same values of $\{\alpha, \beta, \rho, \omega, A\}$.

Financial globalization

- Foreigners are willing to buy or sell debt contracts offering an expected gross return of one
- Enforcement trade-off:
  - Enforcing domestic debts reduces consumption inequality
  - Enforcing foreign debts reduces average consumption

Multiple equilibria?

- Optimistic equilibrium
  - expect low default risk $\Rightarrow$ domestic savings purchase domestic debts $\Rightarrow$ domestic debts are enforced
- Pessimistic equilibrium
  - expect high default risk $\Rightarrow$ domestic savers purchase foreign assets $\Rightarrow$ domestic debts are not enforced

After financial globalization: optimistic equilibrium

- If $k_t \geq \bar{\kappa}$, there is an equilibrium with:
  - $p_t^E = \pi + (1-\pi)\cdot(1-\delta)\,,\;\; p_t^D = (1-\pi)\cdot\delta$ and $p_t^N = 0$
- Interest rates:
  - $R_{t+1} = A\cdot\alpha\cdot k_{t+1}^{\alpha-1}$ and $R_{t+1}^* = \dfrac{1}{\pi + (1-\pi)\cdot(1-\delta)}$
- Capital accumulation:
  - $$A\cdot\alpha\cdot k_{t+1}^{\alpha-1} = \begin{cases} 1 + \dfrac{(1-\pi)\cdot\delta}{\pi + (1-\pi)\cdot(1-\delta)} \cdot \dfrac{k_{t+1} - A\cdot s\cdot k_t^{\alpha}}{k_{t+1}} & \text{if } \; k_t < \kappa \\ 1 & \text{if } \; k_t \geq \kappa \end{cases}$$
  - The threshold $\bar{\kappa}$ declines with:
    - ⋆ How easy it is to discriminate against foreigners: δ
    - ⋆ The distaste for inequality: ε and ω

After financial globalization: optimistic equilibrium

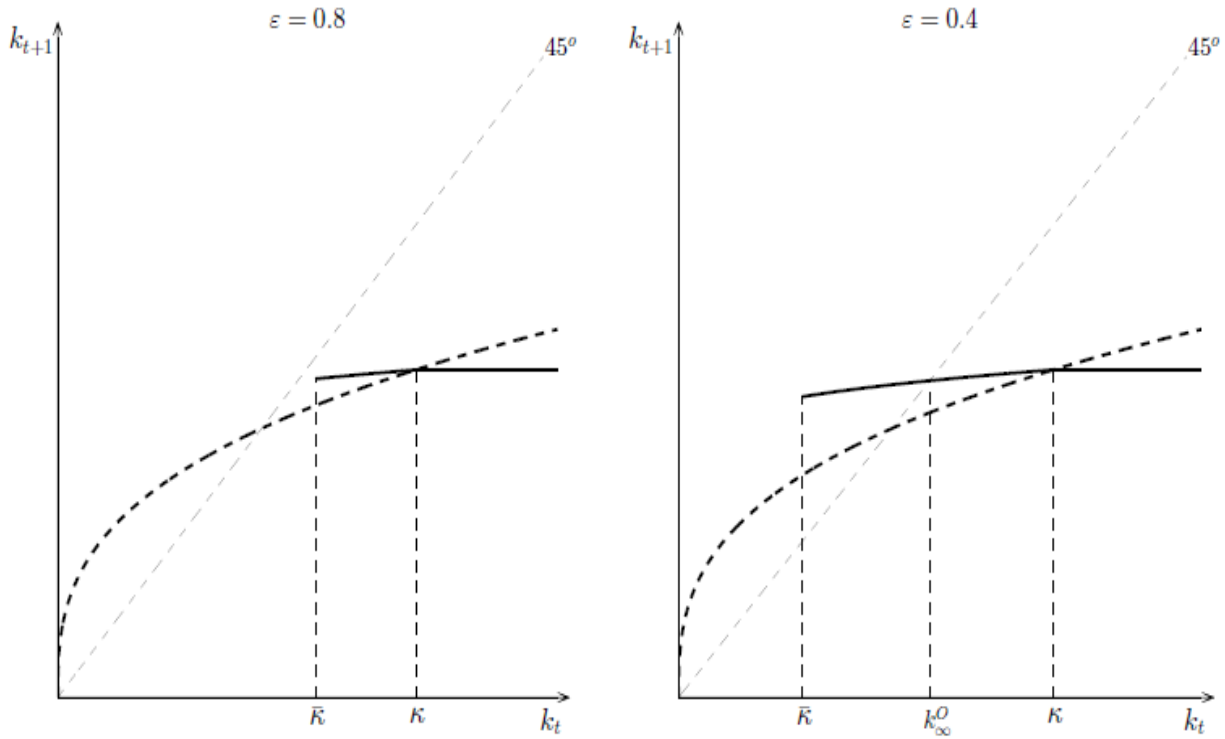


FIGURE III: *Financial Globalization - Optimistic Equilibrium.* The dashed line shows the law of motion of the capital stock in autarky while the solid line shows the law of motion in the optimistic equilibrium in the integrated economy. The left panel is for parameters $\{\delta = 0.6, \varepsilon = 0.8, \pi = 0.7\}$, while the right panel is for parameters $\{\delta = 0.6, \varepsilon = 0.4, \pi = 0.7\}$.

After financial globalization: pessimistic equilibrium

- There is an equilibrium with:
  - $p_t^E = \pi$, $p_t^D = 0$ and $p_t^N = 1 - \pi$
- Interest rates:
  - $R_{t+1} = R_{t+1}^* = \dfrac{1}{\pi}$
- Capital accumulation:
  - $$A \cdot \alpha \cdot k_{t+1}^{\alpha-1} = \begin{cases} 1 + \dfrac{1-\pi}{\pi} \cdot \dfrac{k_{t+1} - A \cdot \varepsilon \cdot s \cdot k_t^{\alpha}}{k_{t+1}} & \text{if} \quad k_t < \varepsilon^{-\frac{1}{\alpha}} \cdot \kappa \\ 1 & \text{if} \quad k_t \geq \varepsilon^{-\frac{1}{\alpha}} \cdot \kappa \end{cases}$$

After financial globalization: pessimistic equilibrium

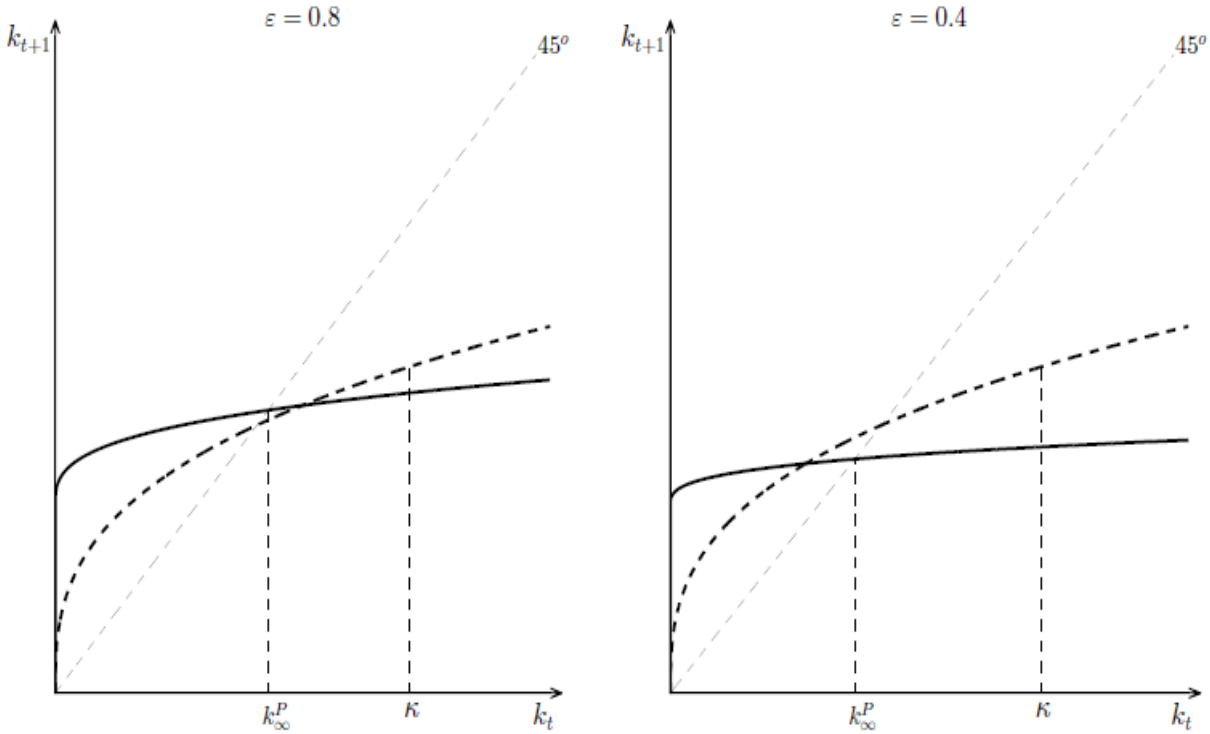
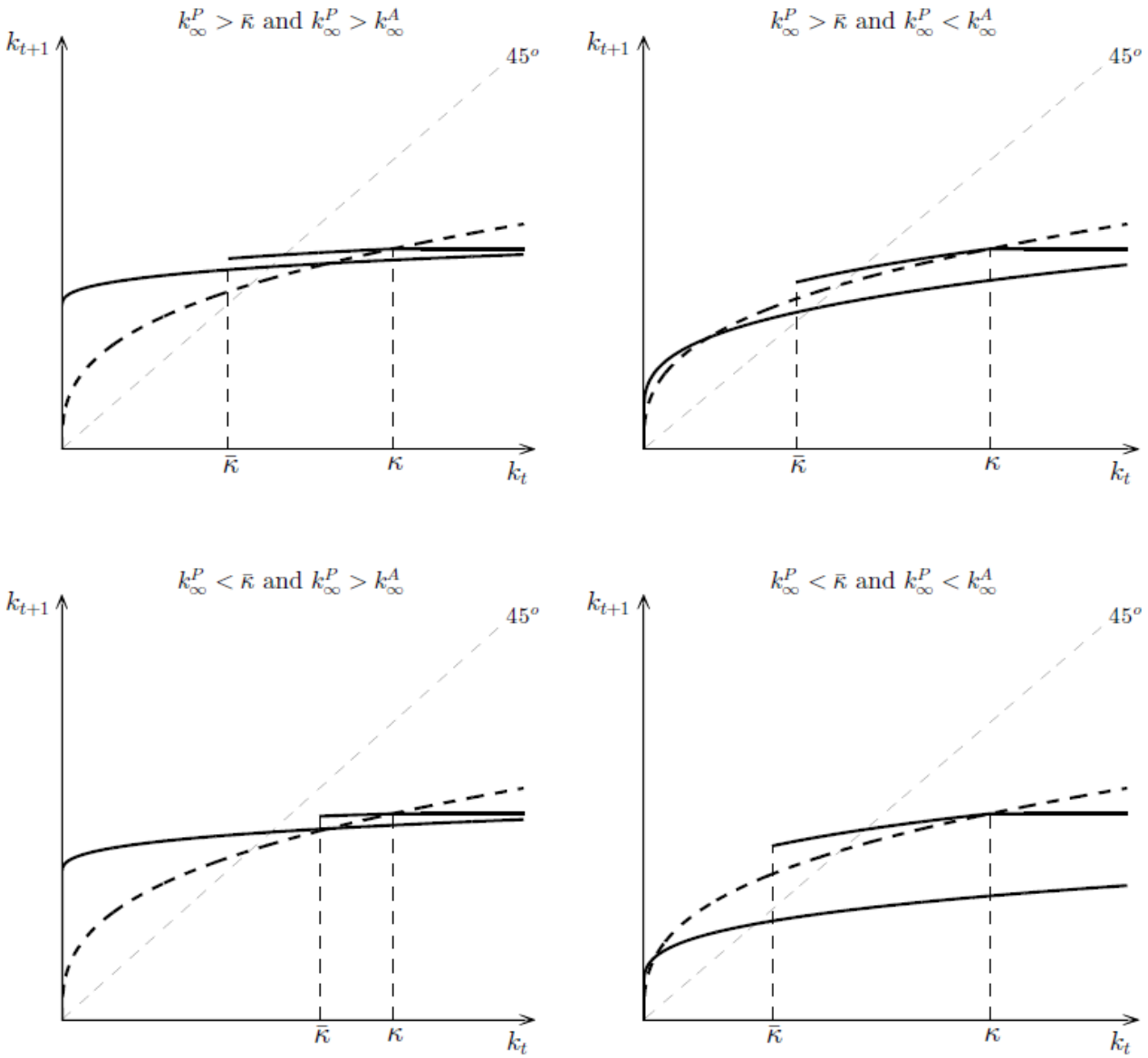


FIGURE IV: *Financial Globalization - Pessimistic Equilibrium.* The dashed line shows the law of motion of the capital stock in autarky while the solid line shows the law of motion in the pessimistic equilibrium in the integrated economy. The left panel is for parameters $\{\delta = 0.6, \varepsilon = 0.8, \pi = 0.7\}$ while the right panel is for parameters $\{\delta = 0.6, \varepsilon = 0.4, \pi = 0.7\}$.

Multiple equilibria

- Optimistic equilibrium
  - expect low default risk $\Rightarrow$ domestic savings purchase domestic debts $\Rightarrow$ domestic debts are enforced
- Pessimistic equilibrium
  - expect high default risk $\Rightarrow$ domestic savers purchase foreign assets $\Rightarrow$ domestic debts are not enforced
- If both equilibria exist, we transition among them with probability $q_t \in (0, 1)$

Dynamics after financial globalization



Financial globalization in the PD/RA benchmark

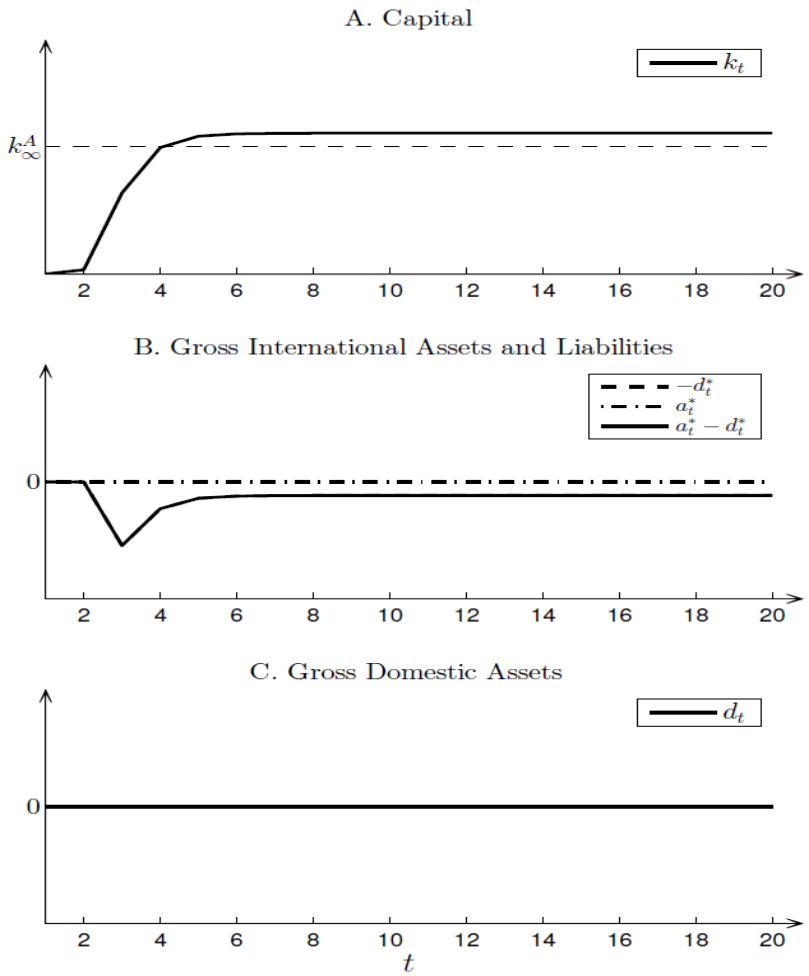


FIGURE VII: *The effects of financial globalization in the representative-agent economy.* Financial integration takes place at $t = 2$, in an economy characterized by parameters $\{\delta = 0.6, \varepsilon = 1, \pi = 0.5\}$. The laws of motion of the capital stock are those in the middle panel of Figure VI.

Moving away from the PD/RA benchmark

- *Capital-flight effect* (pessimistic equilibrium)
  - foreign debts destroy domestic debts
  - savers lend abroad and there is less (net) foreign borrowing than in the PD/RA case
- *Financial-depth effect* (optimistic equilibrium)
  - domestic debts support foreign debts improving enforcement
  - there is more foreign borrowing than in the PD/RA case

Financial globalization away from the PD/RA benchmark

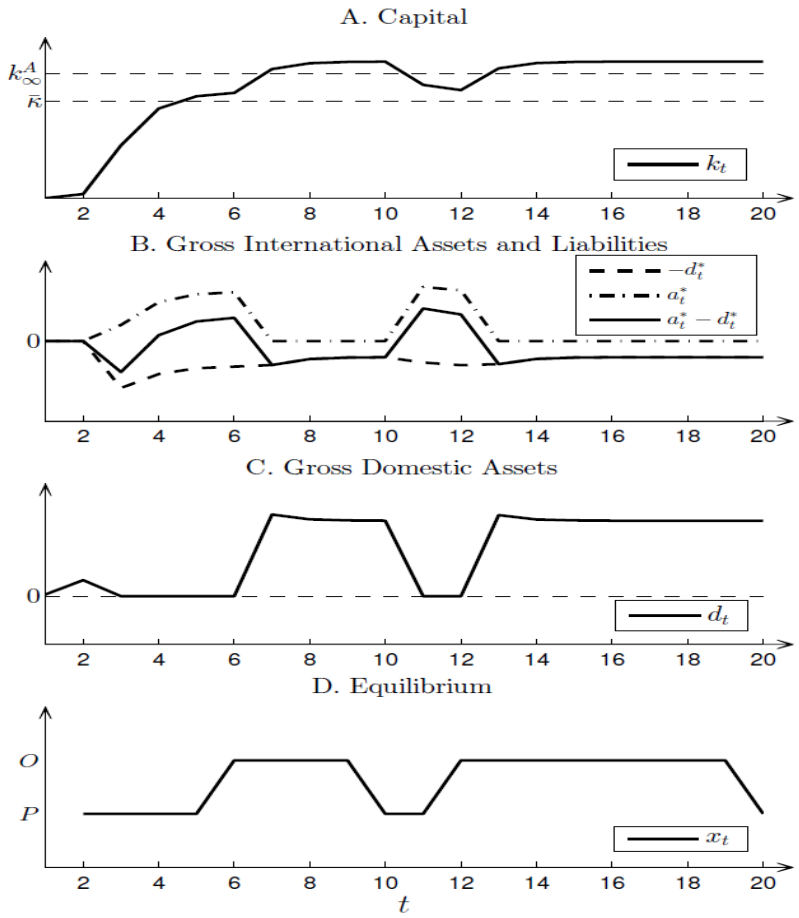


FIGURE IX: *Effects of financial globalization in the new benchmark.* Financial integration takes place at $t = 2$, in an economy characterized by parameters $\{\delta = 0.8, \varepsilon = 0.8, \pi = 0.3\}$ and $Pr[P|O] = 0.15$ and $Pr[O|P] = 0.5$. Under these parameters $k_0 < \hat{k} < \overline{k} < k_\infty^P$.

Reinterpreting the evidence

- *Threshold effects*
  - financial globalization more beneficial in countries with strong institutions, developed financial markets, and high initial income
    - ⋆ Arteta, Eichengreen, Wyplosz (2001), Bekaert, Harvey, Lundblad (2005), Alfaro, Kalemli-Ozcan, Volosovych (2008), Kose, Prasad, Taylor (2011)
- *Allocation puzzle*
  - capital flows to (from) countries with low (high) productivity growth
    - ⋆ Prasad, Rajan, Subramanian (2007), Gourinchas, Jeanne (2013), Alfaro, Kalemli-Ozcan, Volosovych (2014)
- *Collateral effects*
  - financial globalization increases incidence of domestic financial crises
    - ⋆ Demirgüç-Kunt, Detragiache (1998), Kaminsky Reinhart (1999), Reinhart, Rogoff (2009, 2011), Bonfiglioli (2009), Gennaioli, Martin, Rossi (2014)
- *Sudden stops*
  - episodes of large reversals in inflows, investment and growth
    - ⋆ Dornbusch, Goldfajn, Valdés (1995), Milesi-Ferretti, Razin (2000), Calvo, Reinhart (2000), Calvo, Izquierdo, Talvi (2006)

Managing financial globalization

- Financial globalization makes institutions more important
- Timing of globalization
  - some countries should wait until they are developed enough
  - others should wait until they improve their institutions
- 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
    - ★ new domestic underlending externality
  - but such policies assume ex-ante discrimination (secondary markets?)

Managing financial globalization

- Design of financial systems
  - when poor ($k_t < \bar{\kappa}$), facilitate discrimination
    - ★ financial system based on banks and non-tradable contracts
    - ★ avoids worsening of enforcement of domestic debts
  - when rich ($k_t \geq \bar{\kappa}$), make discrimination difficult
    - ★ develop capital markets and standardized financial instruments
    - ★ improves enforcement of foreign debts