

Asian Finance and the Role of Bankruptcy

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The 1997 Asian Financial Crisis

Until 1997, we all know most observers ignored the warning signs. Causes included:

- *A Speculative Bubble*, resulting from expectation that high growth rates would continue. Asset prices rose dramatically, drawing speculative investments. Foreign capital inflows stabilized exchange rate management and masked monetary expansion.
- *A Foreign Exchange Crisis*, resulting from fixed exchange rates, rising imports, suddenly slowing foreign capital inflows, and capital flight.
- *A Debt Crisis*, resulting from excessive short-term dollar-denominated (or yen-denominated) borrowing.
- *A Banking Crisis*, resulting from inadequately regulated banks lending for excessively risky, low-return projects on the basis of big firm / bank / state relationships (e.g., "Crony Capitalism").
- *Financial Liberalization and Economic Globalization*, which put the country at greater risk to external shocks.

When the bubble burst, we all know these problems became suddenly obvious.

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Other questions?

- Why is the Japanese economy in its 11th year of stagnation?
- Why is it so difficult for South Korea (and other countries) to implement financial reforms?
- What will happen if China follows through on its agreement to allow U.S. banks to do Renminbi business in 5 years?
- If financial liberalization creates the condition for financial crises, can it be avoided?
- As central banks learn to reduce inflation rates, can this cause a rise in non-performing loans?

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Banking: Bankruptcy and Lending Policies

“Japanese” or Asian financial regime

- Keiretsu or Chaebol style linkages between firm, bank, and state
- Lending based on firm size and connection
- “convoy system” of risk-sharing between firms
- No failure of financial institutions and markets
- Minimum imposition of bankruptcy on large borrowers

Western financial regime

- Relatively independent banks with little intervention by state (other than regulation) or large borrowers
- Lending based on evaluation of creditworthiness for both firm and project
- Deposit insurance and some financial bailouts, but financial institutions do fail
- Bankruptcy is commonly imposed on both large and small borrowers

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The Benefits of Bankruptcy?

- **Managerial Incentive:** Firm managers are more likely to look after the interests of stockholders if their firm might be shut down for poor performance.
- **Moral Hazard:** Not enforcing bankruptcy acts as a substitute for funded deposit insurance, and encourages risky lending.
- **Capital allocation:** Savings should be directed towards the best use (but bankruptcy may destroy potentially productive existing capital).
- **Price adjustment:** Shutting down unprofitable firms increases profits for the remaining competitors (but bankruptcy reduces demand for suppliers).
- **Selection:** Technological growth is a function of Schumpeterian evolution. Shutting down poor performers raises the average level of performance for the remainder.

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Background Literature

- Parker, "Schumpeterian Creative Destruction and the Growth of Chinese Enterprises, *China Econ Rev*, 1995.

Assumptions:

- Fixed Population of 1000 Heterogenous Firms, 50 periods
- Swan-Solow Savings, no capital or labor markets, simple firm production
- Random Technological Shocks
- Exogenous Bankruptcy
- Technological Replacement with Survivor Offspring
- Potential for Capital Salvage

Simulation with 1250 trials each for 6 different strategies

Random variation of underlying parameters, random shocks to firm technology each period

Estimation of Response Function

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Background Literature (2)

- Parker (1995) continued...

Conclusions:

- Socialist-style finance can potentially dominate western-style finance in short-run due to faster capital accumulation, but inefficient firms can become very large and absorb a large share of investment.
- Western-style finance dominates in long-run, since bankruptcy selects for more efficient technologies, and technology dominates in long-run (due in part to diminishing returns to investment, and large inefficient firms).
- Metaphor of changing forest management policy in the Sierras: a simple switch might cause a catastrophe due to the accumulation of deadwood.

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Background Literature (3)

- Cargill, Hutchison, & Ito, *The Political Economy of Japanese Monetary Policy* (MIT Press, 1997); *Financial Policy and Central Banking in Japan* (MIT Press, 2000).
 - Historical Overview of Japanese Financial Institutions and Policy
 - Japanese Financial Liberalization and its Limits
 - Examination of the Bubble Economy, its Collapse, and the resulting Banking Crisis
 - Structure of financial oversight in the 1990s, and remaining problems
- Cargill & Parker, "Financial liberalization in China: Limitations and lessons of the Japanese regime," *Journal of the Asia Pacific Economy*, 2001.
 - Discussion of similarities of Japanese, South Korean, and China's post-Mao banking policies
 - Various policy lessons (transparency, sequencing, costs of delay, etc.)

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The Basic Model

- Three Sectors: Agriculture, Manufacturing, and Banking
- Fixed Population, initially all in homogenous agriculture
- One-person, heterogenous manufacturing firms with random technological shocks each period
- Wages determined by agricultural marginal product
- Equilibrium migration between agriculture and manufacturing based on next-period estimated expected incomes, with entry/exit cost
- Solow-Swan savings deposited with banking sector
- Capital rental rates determined by Walrasian tatonnement process
- Banks earn interest equal to existing capital stock times rental rate (less depreciation rate), lend out all savings, and write off the entire value of capital stock for bankrupt firms (including their current interest and principal repayment)

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The Basic Model (2)

$$L = F_t + M_t$$

$$Y_t = Q_t^A + Q_t^M$$

$$C_t = Y_t - S_t = (1-\sigma)Y_t$$

$$Q_t^A = F_t^\alpha A^{1-\alpha}$$

$$Q_t^M = \sum q_{it}$$

$$q_{it} = \tau_{it} k_{it}^\beta$$

$$\tau_{it} = \text{lag}(\tau_{it}) \exp(\varepsilon_{it})$$

$$K_t^S = \sum k_{it}^S = \sum \text{lag}(k_{it}) (1-\delta) - \sum k_{it}^{BR} + \sigma \text{lag}(Y_t)$$

$$k_{it}^D = (E(R_{it}) / \beta \tau_{it})^{1/(\beta-1)}$$

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The Basic Model (3)

$$W_t^A = \alpha (A / F_t)^{1-\alpha}$$

$$W_{it}^M = \tau_{it} k_{it}^\beta - R_{it} k_{it}$$

Farmers move to manufacturing if

$$E(W_t^M) > E(W_t^A) (1+\Omega), \text{ or}$$

$$(E(\tau_t) E(K_t)^\beta - E(R_t) E(K_t)) / E(M_t)$$

$$> \alpha (A/(1-E(M_t)))^{1-\alpha} (1+\Omega)$$

M_t found through “Walrasian tatonnement”

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Abstracting a “State-Directed” or “Non-market” Finance Strategy

- New savings are allocated to existing firms on the basis of their prior period share of output
- Credit constraints:
 - New firms may borrow up to per-capita income
- Rental rate of capital is firm-specific
- Unprofitable firms are not shut down

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A “Market-Directed” Finance Strategy

- New savings are allocated to new and existing firms on the basis of their marginal product of capital, if optimal capital stock exceeds existing depreciated stock
- Credit constraints:
 - New firms may borrow up to per-capita income
 - Unprofitable firms may not borrow any more
 - No firm can more than double its capital stock in a period
- Rental rate of capital is not firm-specific. Equilibrium rate equates sum of credit-constrained capital demand with capital supply through “Walrasian tatonnement”
- Unprofitable firms are shut down if:

$$W_{it}^M < W_t^A (1+\Omega)$$

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A Simulation, not a Solution

- Easy to solve if all firms are identical, ugly otherwise
- We compare the state-directed strategy, the market strategy, and four alternatives of “switching” from the former to the latter
- We run a single simulation for each using the same set of 50,000 random technological shocks (50 periods, up to 1000 firms)
- Initial parameter values:
 $L = 1000, A = 1000, \alpha = 0.50, \beta = 0.75, \delta = 0.10,$
 $\sigma = 0.15, \Omega = 0.30, \tau_{i0} = 1.000, \text{ and } \varepsilon \sim N(0,0.04)$

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Comparing Non-market to Market Strategies

- Market strategy leads to higher consumption in every period. Because bankruptcy rates are endogenous, starting off small and then rising, these results are different from those of Parker (1995).
- Technology grows much faster with the market strategy, capital stock grows more slowly at first (but faster eventually), bank cash flow is higher, wages and rental rates are higher. Bankruptcy rates average 5% per period, and solvency (profitability) rates average 70%.
- In non-market strategy, solvency rates average 43%.

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Switching from Non-market to Market Strategies: Alternatives

- 1) Full liberalization occurs after 25 periods.
- 2) Unprofitable firms are no longer given loans after 20 periods. Liberalization comes 5 periods later.
- 3) After 20 periods, unprofitable firms are no longer given loans and capital is allocated based on its marginal product. Bankruptcy is enforced 5 periods later, and full liberalization is complete.
- 4) After 25 periods, unprofitable firms are no longer given loans and capital is allocated based on its marginal product. Bankruptcy is enforced 5 periods later, and full liberalization is complete.

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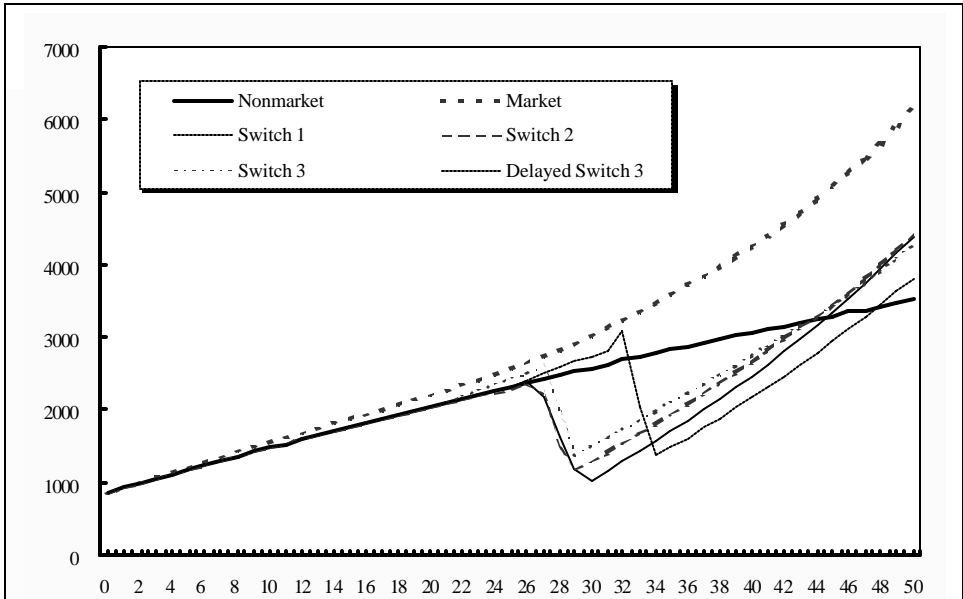


Figure 1: Consumption under Alternative Strategies

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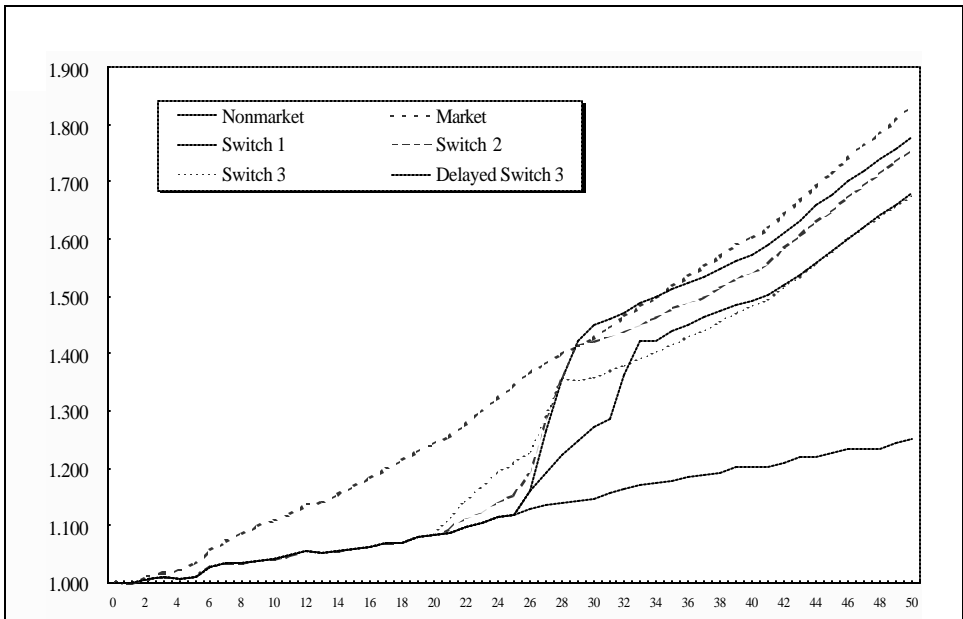


Figure 2: Technology under Alternative Strategies

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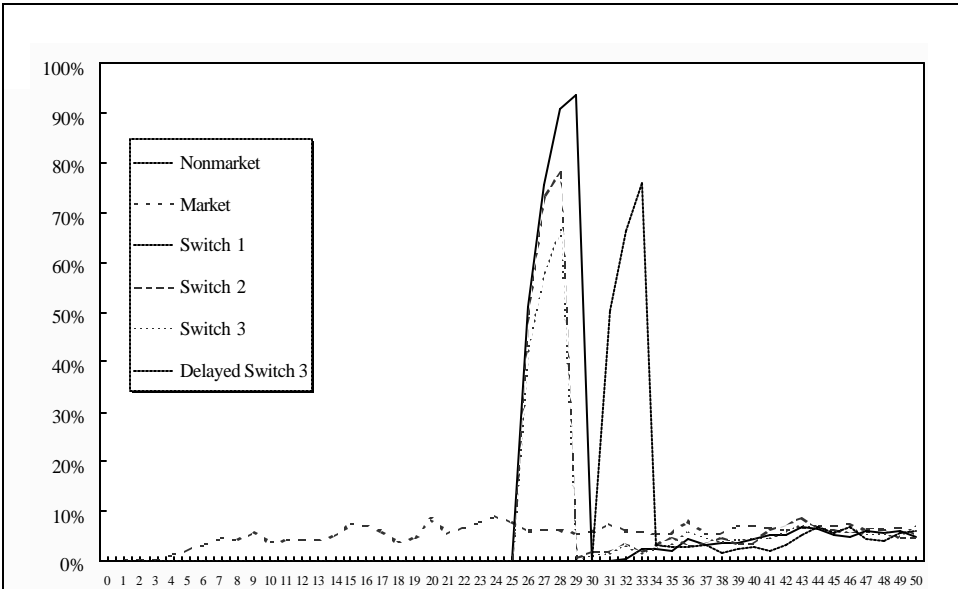


Figure 3: Bankruptcy Rates under Alternative Strategies

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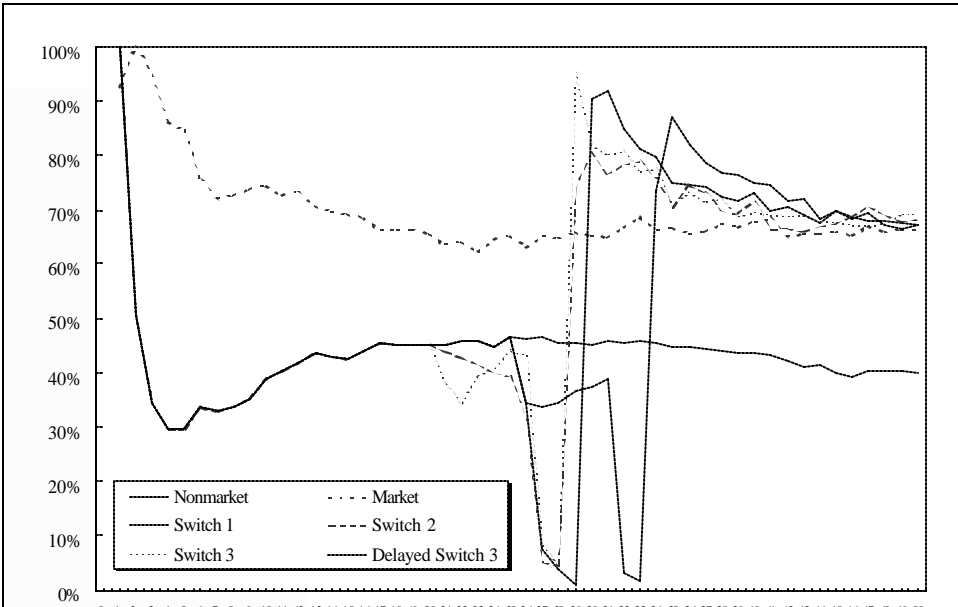


Figure 4: Solvency Rates under Alternative Strategies

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Results of Switching

- Sudden financial liberalization can be catastrophic: in our simulation, a severe depression occurs.
- Switching also causes severe banking crises.
- Phasing in liberalization makes sense, but somehow doesn't seem to help that much.
- Delaying liberalization to phase it in may ease the recession somewhat, but ultimately results in lower consumption in the long-run.

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Conclusions?

- The western financial regime – which better allocates capital to the most productive use and enforces bankruptcy -- may be theoretically superior, but switching to it might be dangerous.
- Delaying liberalization, however, hampers growth, increases the accumulation of non-performing loans, and worsens financial distress.
- More work needs to be done on theory of appropriate sequencing of financial liberalization.

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Weaknesses and Future Work

- A model and simulation do not constitute a mathematical proof; at minimum, we need to test for sensitivity to assumptions and initial parameters.
- Simulation results need to be calibrated so they correspond better to actual data.
- Bankruptcy also affects managerial incentives, not just technological selection.
- Current work focuses on generating testable hypotheses from the model, creating other possible switching strategies, and exploring the distributional implications for incentive versus selection.

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