

Financial Integration and Crises

Gianluca Benigno

Graduate Institute Geneva

Lecture 3

Introduction

Lecture 3 Asian Crises A model of Sudden stop

Asian Crisis Facts

- Until 1997, Asian model was a successful one: high growth rates ($> 5\%$), low inflation rates (highest was Indonesia in 1995 with 9%), competitive export sector and quite high private saving rate.
- Countries affected: Thailand, Indonesia, South Korea, Malaysia, Philippines. Japan and China were not directly affected.
- Crisis started in July 1997 with the devaluation of the Thai Baht. Banking sector was affected as it borrowed in low yield foreign currency to invest in real estate market. It then spreads to other countries. In South Korea, the issue were financial conglomerates that overborrowed, overinvested and overemployed. Indonesia faced a spectacular collapse where the rupiah fell to 15% of the pre-crisis level and the stock market fell to 10% of the pre-crisis level.
- Key aspect was the net outflow of capital compared to the pre-crisis period.

Asian Crisis Literature

- What are the key features of the Asian crisis?
 - ▶ Role of banking and financial sector.
 - ▶ Mechanism through which the crisis spread across countries (contagion).

Asian Crisis Literature

The role of banking and financial sector

- Key aspect in the role of banking and financial sector is the interaction with currency depreciation. (twin crises)
- A currency crisis has an adverse effect on the banking sector when banks' liabilities are denominated in a foreign currency. A devaluation suddenly and sharply increases the value, expressed in the domestic currency, of these liabilities. Lending in domestic currency exposes them to a currency mismatch and a deterioration of their balance sheets.
- In turn, a banking crisis can lead to a currency crisis through the burden it imposes on the fiscal side of the economy.
- The cost of addressing the consequences of a banking crisis, such as the liquidation of insolvent banks, is borne by the public sector. A banking crisis is therefore associated with a large, and possibly unexpected, worsening of the fiscal position of a country. A drastic change in effective public liabilities can trigger expectations of monetization of the fiscal deficit and exchange rate depreciation. The mechanism is similar to the one in first generation models of currency crises stressing the role of unsustainable fiscal policies.

Asian Crisis Literature

The role of banking and financial sector

- Chang and Velasco (1998) have stressed the possibility of self-fulfilling international liquidity crises and international bank runs in an open economy with unrestricted capital markets;
- Domestic banks are free to accept deposits from both domestic and foreign residents, in both domestic and foreign currencies. These liabilities are used primarily to fund longer term illiquid investments that cannot be readily converted to cash.
- If bank depositors—both foreign and domestic—anticipate a speculative run, they will seek to exchange their claims on financial institutions for the foreign currency. Banks are then forced to liquidate their investments in order to raise the cash needed to pay off their depositors. Since investments are long-term, they can be liquidated only at highly discounted prices.
- As a result, even a well-managed bank can quickly exhaust its cash reserves and become insolvent, thereby validating the initial expectation of a run. Because of systemic links, the run could spread out to the entire banking and financial sector. If such an event were to occur, extreme strain on the exchange rate and a rapid loss of official reserves are likely to ensue.

Asian Crisis Literature

The mechanism of transmission: contagion

- A striking aspect of the crises in the 1990s was their occurrence across several countries and their fast regional spread.
- For instance, the devaluation of the Thai baht in July 1997 was followed by currency crises in Malaysia and Indonesia within a month and in Korea a few months later.

Asian Crisis Literature

The mechanism of transmission: contagion

Various ways in which a crisis can be transmitted across countries

- 1 First, several countries can be similarly affected by a common shock (although a crisis can spread even in the absence of such a shock).
- 2 Trade linkages can transmit a crisis, as a currency depreciation in one country weakens fundamentals in other countries by reducing the competitiveness of their exports. The transmission can occur even if two countries do not trade with each other. The key feature is that their exports compete in other foreign markets. The strength of the transmission mechanism through the trade channel depends on the substitutability of their exports. The strength of the channel will be higher also when the two countries sell their products in the same market.
- 3 Financial interdependence can also contribute to the transmission of a crisis, as initial turmoil in one country can lead outside creditors to recall their loans elsewhere, thereby creating a credit crunch in other debtor countries.

Asian Crisis Literature

Summary of the Asian case

- Synthesized view on the Asian crisis combines the feature of both fundamental and self-fulfilling approach where the crisis was generated by the interaction between structural weaknesses and volatility of the international capital markets.
- Role of fundamental: Taiwan, Singapore and Hong Kong were less affected by the regional crisis and indeed share similar fundamental characteristics:
 - trade and current account surplus, large stock of foreign reserves, low foreign debt.

Asian Crisis Literature

Summary of the Asian case

- Key factor behind financial crashes in the 1990s is international illiquidity.
- What is international illiquidity? It is defined as the situation in which a country's financial system has potential short-term obligation in foreign currency that exceed the amount of foreign currency available at short notice.
- International illiquidity could be sufficient but not necessary condition for crisis to occur.

Sudden Stops

What are sudden stops?

- Empirical regularities in Capital Market Crises in the 1990s: Calvo (1998) labeled these episodes "Sudden Stops".
- What are the main features?
 - ▶ periods of relative calm
 - ▶ sharp reversal in private capital flows associated with:
 - a) Large and sudden declines in output and consumption;
 - b) Significant drop in relative prices;
 - c) Collapse in asset prices;

Sudden Stops

Evidence on sudden stops: cross-country perspective

- Calvo and Reinhart (1999) conducted a comprehensive cross-country analysis of Sudden Stops. They documented 15 recent episodes of large reversals in net private capital inflows into emerging countries.
- Reversals exceeded 10 percent of GDP in 7 of the 15 cases. The adjustments in real GDP that accompanied these Sudden Stops were also large.
- Sudden Stops produced impact effects on output equivalent to an average decline of 13.3 percent for countries that experienced banking crises, and 12.3 percent for countries that experienced currency crises.
- These impact effects were much larger than those corresponding to average crises data for the period 1970-1994, which showed declines of 3.2 and 2.7 percent for banking-crisis countries and currency-crisis countries respectively.
- Calvo and Reinhart also showed that Sudden Stops produced larger adjustments in reserves and real exchange rates, and higher bills for bailing out bankrupt banking systems, than those produced by previous BOP crises.

Sudden Stops

Evidence on sudden stops: cross-country perspective

- This is particularly the case for the East Asian crisis compared to other regions and to East Asia's recent historical record.
- Equity price effects: (Calvo and Reinhart, 1999)
 - ▶ By the end of January 1995, nearly a month after the devaluation of the peso, Mexico's stock market index had fallen by more than 50 percent in dollar terms relative to November 1, 1994.
 - ▶ The indexes in Brazil and Argentina fell about 20 percent in the same period.
 - ▶ In the East Asian crisis, the collapses of equity prices between September 1 and December 31, 1997 ranged from about 20 percent in Hong Kong to almost 70 percent in South Korea.
- Sudden Stops were also associated with higher asset price volatility. The volatility of weekly emerging-market dollar returns doubled from 2 to 4 percent during the East Asian crisis in 1997 and the Russian collapse in 1998.

Liquidity Crises in Emerging Markets

Evidence on sudden stops: cross-country perspective

Table from Calvo and Reinhart (1999)

Table 2. Selected Large Reversals in Net Private Capital Flows
(as a percent of GDP)

Country/Episode	Reversal
Argentina, 1982-83	20
Argentina, 1994-95	4
Chile, 1981-83	7
Chile ¹ , 1990-91	8
Ecuador, 1995-96	19
Hungary, 1995-96	7
Indonesia, 1996-97	5
Malaysia ¹ , 1993-94	15
Mexico, 1981-83	12
Mexico, 1993-95	6
Philippines, 1996-97	7
Venezuela, 1992-94	9
South Korea, 1996-97	11
Thailand, 1996-97	26
Turkey, 1993-94	10

Sources: World Bank, *World Debt Tables*, various issues and Institute for International Economics, *Comparative Statistics for Emerging market Economies, 1998*.

¹ Reversal owing to the introduction of controls on capital inflows.

Sudden Stop

Evidence on Sudden Stops: time-series and cross country evidence

Figure from Mendoza (2010): classification based on Calvo, Izquierdo, and Talvi (2006): episodes with mild and large output collapses that coincide with large spikes in the EMBI spread and large reversals in capital flows.

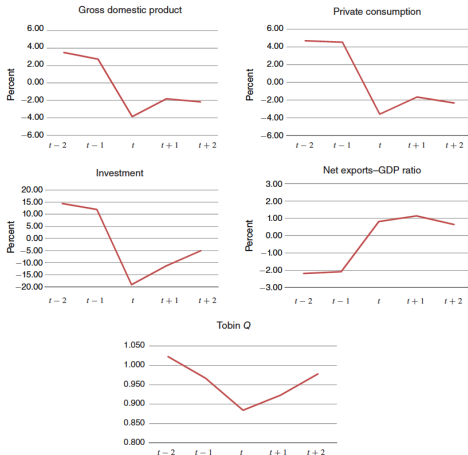


FIGURE 1. MACROECONOMIC DYNAMICS AROUND SUDDEN STOP EVENTS IN EMERGING ECONOMIES
(cross-country medians of deviations from HP trends)

Sudden Stops

More recent evidence on sudden stops

- Central and Eastern European countries (CEE) contracted in 2009, with almost every country in recession
- Baltics (Estonia, Latvia, Lithuania) faced double-digit contractions, while countries relatively less affected by the crisis (i.e. Czech Republic, Slovakia and Slovenia) did not post positive growth. Hungary and Latvia's economies deteriorated to the point in which they asked for IMF help.
- The CEE's problem driven by two factors – collapsing exports and the drying-up of capital inflows.
- Exports were key to the region's economic success, accounting for a significant 80-90% of GDP in the Czech Republic, Hungary and Slovakia. By far the biggest market for CEE goods is the Eurozone, which was in recession. Meanwhile, the global credit crunch dried up capital inflows to the region.
- Fall in net private capital flows to Emerging Europe in the period 2008-2009.

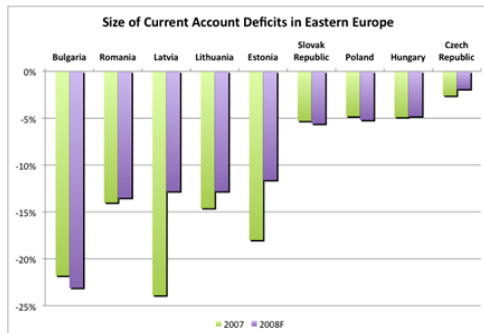
Sudden Stops

evidence on sudden stops

- Parallel with Asian Crisis
- Easy credit flows were accompanied by rising external imbalances that exceed the build-up of imbalances in pre-crisis Asia – e.g. current account deficits in Southeast Asia from 1995-97 fell within the 3.0-8.5% of GDP range, while those in CEE were in the double-digits in Romania, Bulgaria and the Baltics in 2008.
- The vulnerabilities in many CEE countries – high foreign currency borrowing, hefty levels of external debt and massive current-account deficits – suggest the classic makings of a capital account crisis a la Asia in the late 1990s.

Sudden Stops

Sudden stops in CEE



Liquidity Crises in Emerging Markets

Understanding Sudden Stops: How to model them?

- We need to depart from the assumption of perfect financial markets; (~cost to access to international financial markets)
- 1 Financial frictions take the form of international borrowing constraint
 - 2 The constraint is not always binding
 - 3 Action can start even when the constraint is not binding (forward-looking behavior by agents)
 - 4 Liability dollarization: debt in units of international currency but leveraged on income valued at different relative prices.

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: How to model them?

2 period, **2-good (tradeable and non-tradeables)** small open endowment economy:

Consumer's behavior

- ▶ Preferences

$$u(c_1^T, c_1^N, c_2^T) = \gamma \log c_1^T + (1 - \gamma) \log c_1^N + \beta \gamma \log c_2^T$$

- ▶ Period budget constraints:

$$y_1^T + p_1^N y_1^N + b_1(1 + r) = p_1^N c_1^N + c_1^T + b_2$$

$$c_2^T = b_2(1 + r) + y_2^T,$$

- ▶ Borrowing constraint:

$$b_2 \geq -\kappa \left(y_1^T + p_1^N y_1^N \right).$$

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: How to model them?

Consumer's behavior

- ▶ First order conditions:

$$\frac{\gamma}{c_1^T} = \lambda_1$$

$$\frac{1 - \gamma}{c_1^N} = p_1^N \lambda_1$$

$$\frac{\beta \gamma}{c_2^T} = \lambda_2$$

$$-\lambda_1 + \lambda_2(1 + r) + \mu = 0$$

$$\mu(b_2 + \kappa(y_1^T + p_1^N y_1^N)) = 0$$

where λ_1, λ_2 and μ are the multiplier on the period constraints and the borrowing constraint.

- ▶ Note that the first two equations implies

$$\frac{(1 - \gamma) c_1^T}{\gamma c_1^N} = p_1^N$$

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: How to model them?

- Equilibrium conditions:

- ▶ Equilibrium in non-tradeable goods market

$$c_1^N = y_1^N$$

- ▶ Combining the previous equations, we obtain the current account equation for period 1 or otherwise the equilibrium condition for tradeable goods market:

$$y_1^T + b_1(1 + r) = c_1^T + b_2$$

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: Solution

We focus on the case in which $\beta = \frac{1}{1+r}$

- No binding case ($\mu = 0$) :

$$c^T = \frac{1}{1+\beta} (W_1 + (1+r)b_1)$$

where $W_1 \equiv y_1^T + \frac{y_2^T}{1+r}$.

$$\frac{(1-\gamma)c^T}{\gamma y_1^N} = p_1^N$$

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: Solution

- Consider the following shock to the endowment of tradable in period 1 (wealth neutral shock)

$$y_2^T - \bar{y}^T = \frac{1}{\beta} (\bar{y}^T - y_1^T)$$

where $\bar{y}^T = \frac{1}{1-\beta} W_1$ is the permanent output level of tradeable.

- No binding case ($\mu = 0$) :

$$c^T = \frac{1}{1+\beta} (W_1 + (1+r)b_1)$$

$$\frac{(1-\gamma)c^T}{\gamma y_1^N} = p_1^N$$

$$b_2 - b_1 = \bar{y}^T - y_1^T$$

$$-b_2 = -(\bar{y}^T - y_1^T)$$

First period deficit of CA and surplus in the second period.

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: Solution

- Consider now the binding case (i.e. the shock in the first period is bigger than critical level that triggers the constraint):

$$c_1^T = y_1^T + b_1(1+r) + \kappa (y_1^T + p_1^N y_1^N)$$

$$p_1^N = \frac{(1-\gamma) c_1^T}{\gamma y_1^N}$$

$$b_2 - b_1 = -\kappa (y_1^T + p_1^N y_1^N) - b_1$$

$$-b_2 = -(\bar{y}^T - y_1^T)$$

We have that balance-sheet effect reduces the borrowing ability through a reduction in the price of non-tradeable caused by a reduction in the consumption of tradeable (when the borrowing constraint binds).

Liquidity Crises in Emerging Markets

Understanding Sudden Stops: Solution

- This mechanism through which a drop in tradeable consumption reduces the relative prices and further tightens the credit constraint resembles the Fisher debt-deflation mechanism.
- It is possible to show that consumption is now lower, current account has improved (capital reversal), relative prices have dropped.

Liquidity Crises in Emerging Markets

Exogenous debt limit case

- Exogenous debt limit:

$$b_2 \geq -\kappa \bar{b}$$

- When the constraint is binding we have:

$$c_1^T = y_1^T + b_1(1+r) + \kappa \bar{b}$$

$$p_1^N = \frac{(1-\gamma)c_1^T}{\gamma y_1^N}$$

$$b_2 - b_1 = -\kappa \bar{b} - b_1$$

$$-b_2 = \kappa \bar{b}$$

- Note that in this case there is no amplification mechanism caused by balance-sheet effect on tradable consumption.

Liquidity Crises in Emerging Markets

Graphical analysis:

