The Contagion Effect

Hannah Chow & Fabio Della Coletta
There are two main definitions for contagion

**Non-crisis contingent**
Transmission of shocks from one country to another
(Implies that linkages between countries remain the same after a shock)

Pre-shock: A ↔ B
Post-shock: A ↔ B

**Crisis contingent**
Significant increase in cross-market linkages between countries after a shock
(Implies that linkages change after shock)

Pre-shock: A → B
Post-shock: A → B
Why do we distinguish the two definitions?

1. Evaluating the effectiveness of international diversification
2. Justifying multilateral intervention
3. Differentiating between various transmission mechanisms
Crisis-contingent

Shocks are transmitted internationally through three mechanisms:

1. Multiple equilibria based on investors psychology
2. Endogenous liquidity shocks causing a portfolio recomposition
3. Political economy affecting exchange rate regimes

Pre-shock: A  B
Post-shock: A  B
Non-crisis-contingent

Transmission mechanisms after an initial shock are not significantly different than before the crisis (real linkages: based on economic fundamentals)

1. Trade links
2. Financial links
3. Pure contagion (bandwagon)
4. Random aggregate global shocks

Pre-shock: A ← B
Post-shock: A ← B
Empirical evidence

Different approaches have been utilized to measure the transmission of shocks and test for contagion:

1. Cross-market correlation coefficient
2. Estimate of variance-covariance transmission mechanisms
3. Probit models

Results based on the above techniques arrive at the same general conclusion: some contagion occurred.
Interpretation of Contagion

Although the above test appear straightforward, they might be biased in the presence of heteroskedasticity and omitted variables. Heteroskedasticity in market returns can have a significant impact on estimates of cross-market correlations: when market volatility increases after a crisis the unadjusted correlation coefficient is biased upward.
Interpretation of Contagion

When market volatility increases, which tends to happen during crises, tests for contagion that do not adjust for heteroskedasticity may suggest that contagion occurred, even when cross-market transmission mechanism are stable and shift-contagion does not occur.

Each of the papers that attempted to correct for heteroscedasticity find that cross-market linkages do not change significantly during recent financial crisis, this evidence suggests that most shocks are transmitted through non-crisis-contingent channels.
Contagion channels

- Trade links
- Financial links
- Pure contagion (bandwagon)
Domestic vs. International contagion

Domestic: starts at local banks → Wall Street

International: between countries
Contagion channels

- Trade links
- Financial links
- Pure contagion (bandwagon)
Trade Links

Most direct channel of contagion

Competition in international trade

Devaluing of currency A → devaluing of currency B
Currency Devaluation

Why would a currency become devalued?

Central bank does not have enough reserves

Reasons:

1. Large current account deficit
2. Drop in FDI
3. Lender’s reduced willingness to rollover country’s debt
Example: Asian Currency Crisis 1997
Thailand’s story

- Early 1900s - massive volumes of K inflow
  - Banks credit limiting, low inflation rate, high savings rate
- Japanese investors, other FDI

- But, 1) K inflow → non-productive sectors (CA)
  - Little investment in K goods, factories, inventories, land
- 2) non-bank lending
- 3) competitors
- → Current account deteriorated
Getting worse...
FDI pulls out (financial links)
Balance sheets: no K inflow or FDI
Forced to float (July 2, 1997)
Immediately devalued 15-20%
Contagion spread

Thai baht ↓

Thai exports look cheaper

US/Japan buy more Thai exports

↓ Indonesia’s current account

↓ Indonesian rupiah

Imports to Thailand more expensive

Thailand reduces Laos imports

↓ Laos current account

↓ Lao kip
Contagion spread
Contagion channels

- Trade links
- Financial links
- Pure contagion (bandwagon)
Foundation: Diamond-Dybvig model

Domestic

Type is important: patient vs. impatient

Bank’s job: provide liquidity to withdrawers

Too many impatient → excess demand for liquidity

What do banks do?
Interconnectedness of banks (Allen & Gale, 2000)

Connected through claims/deposits

Bank A: early withdrawers, excess demand for liquidity (impatient)

Find those with excess supply

Short asset form = liquidity
Figure 10.2. Achieving the first-best allocation in state $S_1$. 

<table>
<thead>
<tr>
<th>Date 1:</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>Liquidity demand:</td>
<td>0.75</td>
<td>0.25</td>
<td>0.75</td>
<td>0.25</td>
</tr>
<tr>
<td>Liquidity supply:</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Transfer</td>
<td>← 0.25 →</td>
<td></td>
<td>← 0.25 →</td>
<td></td>
</tr>
</tbody>
</table>

| Date 2: | | | | |
|--------|---|---|---|
| Liquidity demand: | $0.25 \times 1.5 = 0.375$ | $0.75 \times 1.5 = 1.125$ | 0.375 | 1.125 |
| Liquidity supply: | $0.5 \times 1.5 = 0.75$ | 0.75 | 0.75 | 0.75 |
| Transfer | 0.375 | 0.375 | |


Liquidity shortage

Too much excess demand > short asset stock

Forced to liquidate long asset stock (illiquid)

Dangerous: costly. Overliquidation → bankrupt
Which bank system do we want?
Complete Market

Incomplete Market

[Diagram of a network showing connections between nodes A, B, C, and D for both complete and incomplete markets]
Example: 2008 recession

- Cross-depositing/holding claims in banks
- Small local banks could not meet liquidity demand
- Eventually moves up levels
- Beliefs!
  - Lose confidence in banks repaying short term loans
  - Belief about asset quality
Contagion channels

- Trade links
- Financial links
- Pure contagion (bandwagon)
Pure contagion

Disinclined to lend to a country with similar characteristics (association effect)

Self-fulfilling expectations

Sunspots (random external shock, randomizing device = confidence index, may or may not be legitimate concerns)

Strengthens co-movement of these countries = contagion
Example: Asian crisis spreads to Mexico

- Other than trade links
- Mexico “looks like” Thailand
  - Lumping emerging economies
- Even though monitoring banks’ balance sheets, keeping peso competitive
- Peso devalued

Pull out FDI/capital flight
Solutions to prevent contagion spread?
Potential Solutions

Risk sharing!

1. Market completeness
   a. Countries have balanced dependence on each
   b. Diversification

2. Each bank liquidate a little bit of long asset