

Network-Based Measures of Credit Stress Contagion in ASEAN Banking

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The views expressed in this paper are those of the author and should not be interpreted as reflecting the views of the BSP.

The policy problem

Integration

Cross-border credit and funding links support growth and risk-sharing.

Contagion

The same links can transmit a localized credit event across jurisdictions.

Surveillance gap

Price spillovers are informative, but do not directly map expected credit losses.

Research question and contribution

How do loss-based network measures characterize cross-border contagion risk in ASEAN-6?

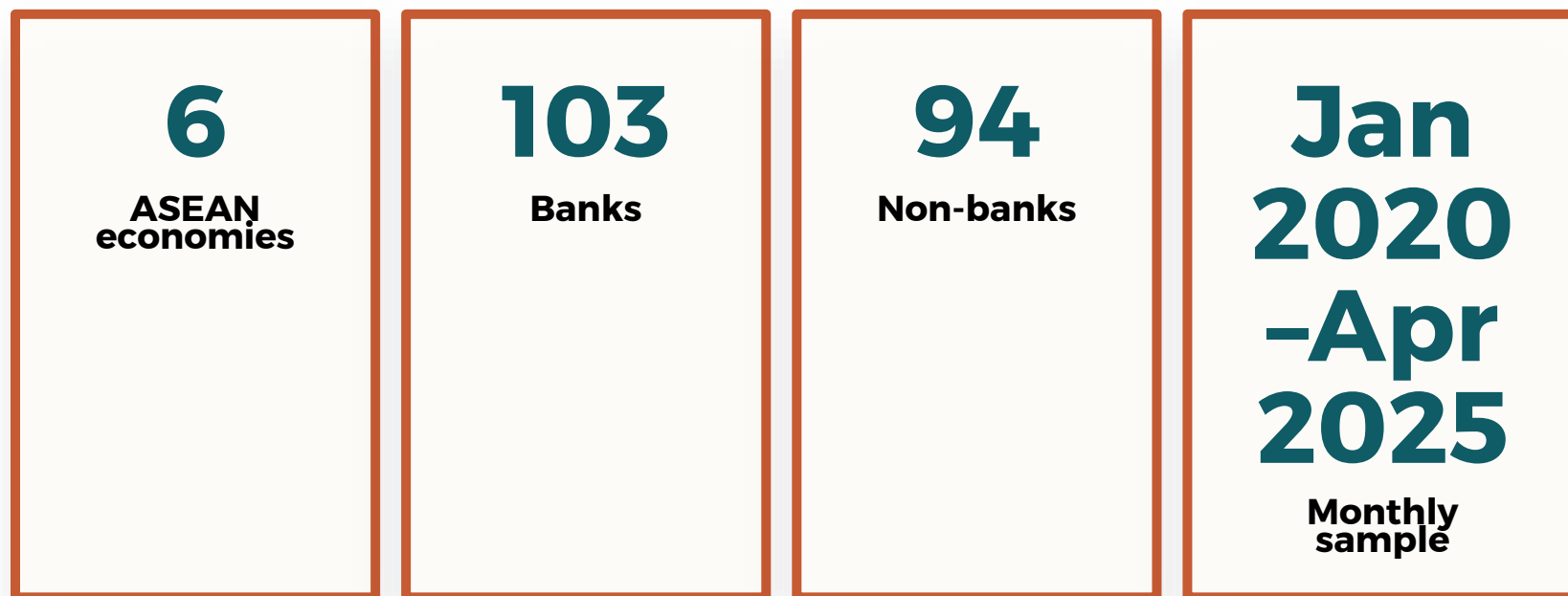
How did connectivity change during COVID-19 and the subsequent recovery?

1 Maps directional credit-loss networks

2 Identifies sender-receiver roles

3 Links stress testing to network surveillance

Data and analytical scope



Indonesia • Malaysia • Philippines • Singapore • Thailand • Vietnam

From PD shock to country network

01

Shock

Increase an originator's PD by 20 bps

02

Direct loss

Estimate incremental expected credit loss

03

Contagion

Propagate PD co-movements selected by LASSO

04

Aggregate

Sum institution losses into bilateral country links

05

Measure

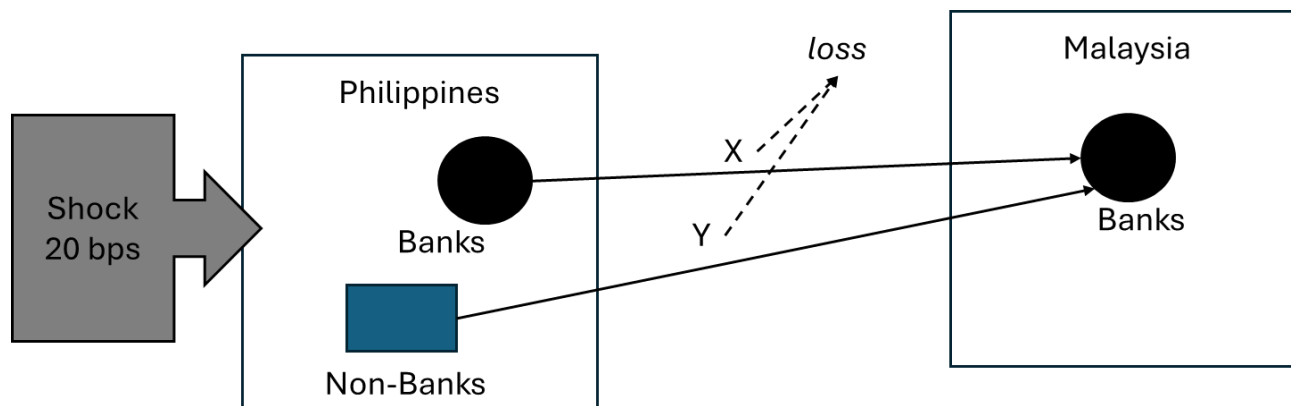
Compute DCI and OII

Estimation of Direct Credit Losses

$$\Delta EL_{Creditor} = \Delta PD_{Debtor} \times LGD \times EAD_{Creditors}$$

where ΔPD is the change in probability of default, which is set at 0.002, LGD is the loss given default, which is equal to 0.60, and $EAD_{Creditor}$ is the debtor's total liabilities.

Interpreting the network metrics



In-Degree Centrality Index (DCI)

Incoming links $\div 5$

Exposure to stress from other ASEAN-6 systems

Out-Degree Centrality Index (DCI)

Outgoing links $\div 5$

Reach of stress originating in the country

Overall Interconnectedness Index (OII)

Average of in- and out-DCI

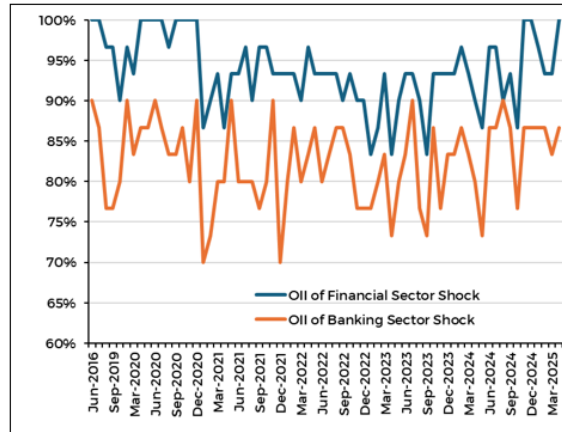
System-wide share of realized directional links

Indices range from 0% (disconnected) to 100% (fully connected).

Regional connectivity is high

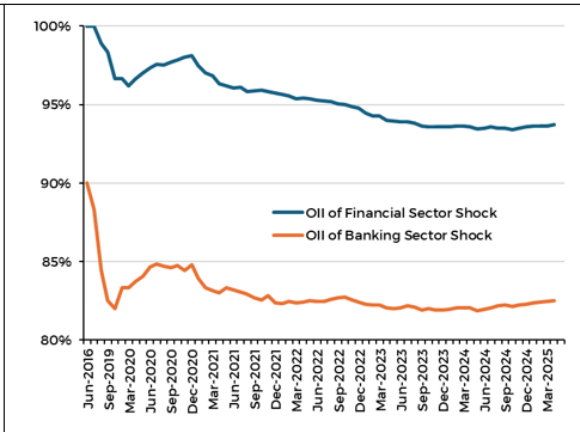
A local shock typically reaches most ASEAN-6 systems in the first round.

**Figure 3. Point-in-time
Interconnectedness of ASEAN-6**



Source: Author's Calculation

**Figure 4. Time-varying
Interconnectedness of ASEAN-6**



Source: Author's Calculation

Financial-sector shocks

83–100%



Non-banks widen contagion channels

Banking-sector shocks

70–90%



Transmission is more concentrated

Connectivity moved with the crisis cycle

2020 ●

Spike

COVID-19 uncertainty broadened PD co-movements and stress links.

2021 ●

Decline

Policy support and reopening coincided with normalization.

2022-Apr 2025 ●

Gradual rise

Integration resumed cautiously amid geopolitical and macro uncertainty.

Systemic roles differ across countries

Indonesia

**Central
sender and
receiver**

DCI is typically at least 80%, often 100%.

Vietnam

**Rising
centrality**

Connectivity strengthens during and after COVID-19.

Singapore

**Selective
regional hub**

Lower or more volatile first-round regional connectivity.

Malaysia • Philippines • Thailand

**Balanced
intermediaries**

Stable mid-to-high roles as both senders and receivers.

Interpret centrality with care



Coverage effect

Indonesia contributes 51 of 103 banks; Vietnam contributes 35 of 94 non-banks.



Binary topology

A small non-zero loss creates a link just as a large loss does.



External model dependence

Results inherit SuNWEI calibration, PD, LGD, and LASSO assumptions.



Short sample

January 2020–April 2025 is dominated by an exceptional crisis episode.

Next research steps

01

Weight the network

Use loss magnitudes, capital, or assets—not only link presence

02

Correct coverage

Normalize for the number and type of listed institutions

03

Add layers

Combine credit, funding, payment, and market networks

04

Test causality

Relate topology shifts to macro shocks and policy actions

05

Broaden validation

Compare with BIS exposures and supervisory data

Conclusion

ASEAN-6 is highly connected—but contagion roles are asymmetric and time-varying.

Loss-based DCI and OII turn stress-test outputs into an interpretable regional surveillance layer.

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