ความเห็นต่อบทวิจัย “Potential Buyers and Fire Sales in Financial Networks”

โดย ผศ.ดร.ไทยศิริ เวทไว

รุ่งพร เริงพิทยา
กลุ่มงานด้านเสถียรภาพระบบการเงิน ธนาคารแห่งประเทศไทย

PIER Research Workshop

6 กรกฎาคม 2560

ภาพรวมการบรรยาย

1. Overall concept
2. Advantageous
3. Areas of improvement
4. Extension

1. Overall concept

- Theoretical model modeling banks' behavior under stress and the network of banks that can cause a Fire Sale
- Provide conditions that can cause a Fire Sale if there is a shock to banks and asset prices
- Provide a closed form equilibrium for loan price required to have the Fire Sale
- Provide characteristics of banks (risk aversion, holding of loan portfolio, buy-sell of loan portfolios, etc) which eventually result in the contribution of Fire Sale

2. Advantages

1. The model has a closed form solution for the condition of loan price decrease which can lead to 

with a comprehensive interpretation of the price and wealth effect
2. Factoring in bank-specific characteristics to reflect the real behavior of banks such as risk aversion, expertise in each type of loan, equity and deposit levels, etc.
3. The results allow for the detailed classification of how the variation in parameters affect the 

behaviors as well as the potential buyers/sellers of the assets
4. The results are somewhat intuitive from the perspective of bank behavior analysis and network, especially the relationship in the interbank market

3. Areas of improvement

1. The model has yet to factor in the SIZE of a bank, since the price drop and 

level will be much worse if a large bank is insolvent and initiates 

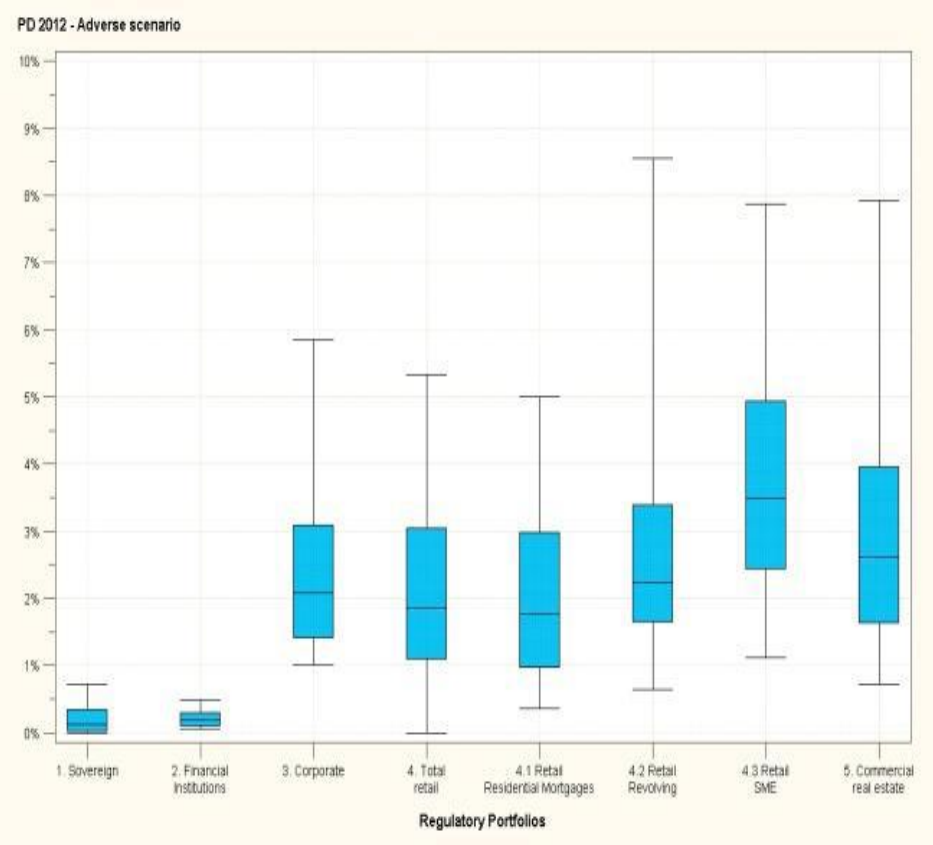
compared to a small one.
Suggestion: making *loan price* or *premium* sensitive to bank size

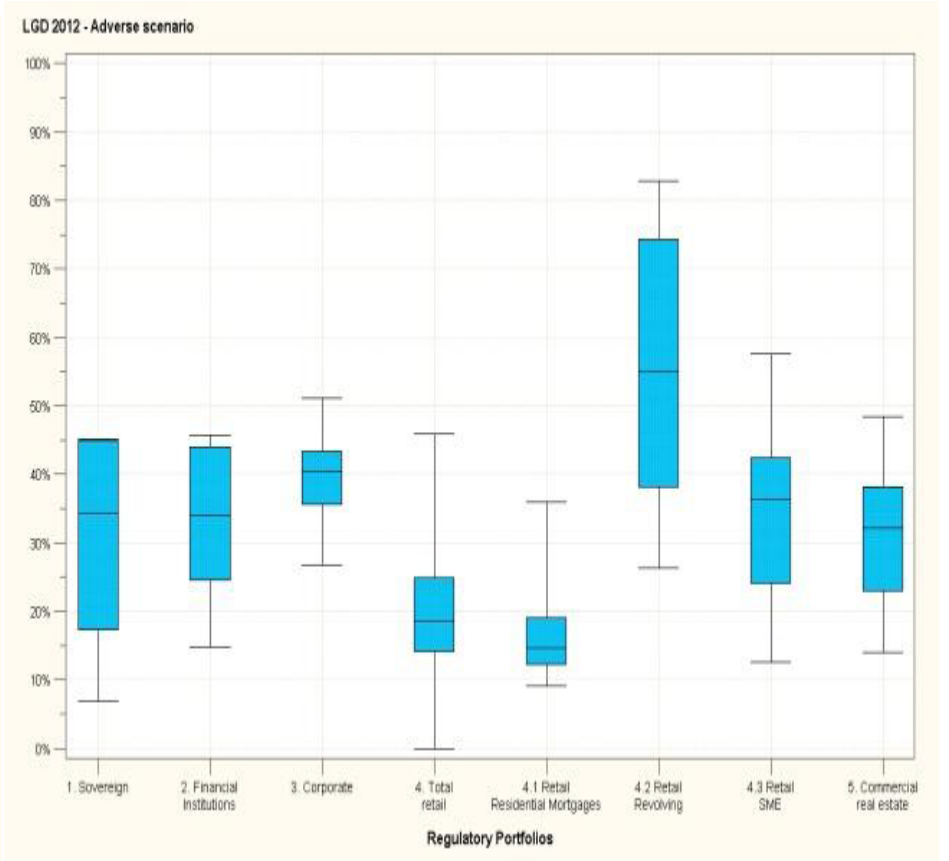
2. Probability of default on the same type of loans can vary across banks, depending on what types of borrowers they targeted. This also ties in with the level of risk aversion of banks.
Suggestion: making probability of default *depend on a bank and may also depend on risk aversion*

$$\lambda_k \Rightarrow \lambda_k^i(\gamma_i) \quad \text{and} \quad \sum_{i=1}^{N} \frac{\theta_k^i}{\sum_{i=1}^{N} \theta_k^i} \lambda_k^i(\gamma_i) = \lambda_k$$

Variation of risk parameter estimations

Probability of default on the same type of loans can vary across banks





Source: European Banking Authority

3. Areas of improvement

3. The cost of managing the loans of banks can be made more realistic by assuming further that banks have economy of scale in managing loans instead of being linear.
   Suggestion: making management cost *a function of loans held*

$$f_k^i \Rightarrow f_k^i(\theta_k^i)$$

4. Extend the universe of Fire Sale from just illiquid assets to include the Fire Sale of liquid assets. This is because most interbank transactions are repos, which are backed by mostly the government bonds—considered liquid assets.
   Suggestion: making interbank borrowing *a function of liquid assets*

$$l_{i,j} \Rightarrow l_{i,j}(\delta_a^i) \quad \text{and} \quad x_{i,j} \Rightarrow x_{i,j}(\delta_a^i)$$

3. Areas of improvement

5. Including the investment portfolio of banks instead of having all assets are loans. This serves as another channel for the 

to affect the value of assets of banks.
Suggestion: making assets of banks consist of loans and investments in other assets (may be liquid or illiquid)

6. Banks don't want diversification effect? The model assumes that it is not optimal for banks in one sector to buy loans in other sector. But now banks may consider extending to segments they have no direct expertise but have economy of scope.
Suggestion: incorporating the economy of scope (loan i and j may have similar cost or high correlation with loans that banks have expertise) into the maximization function

Investment portfolio is important for some banks

Business model profiles

Average values of ratios to total assets[1] (in per cent) Table 1

Choice variable[2]	Retail-funded	Wholesale-funded	Trading	All banks
Gross loans	62.2	65.2	25.5	57.5
Trade	22.4	20.7	51.2	26.5
Trading book	5.1	7.1	17.3	7.1
Interbank lending	8.5	8.2	21.8	10.5
Interbank borrowing	7.8	13.8	19.1	11.2
Wholesale debt	10.8	36.7	18.2	19.1
Stable funding	73.8	63.1	48.6	66.9
Deposits	66.7	35.6	38.0	53.6
Memo: number of bank/years	*737*	*359*	*203*	*1,299*

Trade = trading assets plus liabilities, net of derivatives; trading book = trading securities plus fair value through income book; interbank lending = loans and advances to banks plus reverse repos and cash collateral; wholesale debt = other deposits plus short-term borrowing plus long-term funding; stable funding = total customer deposits plus long-term funding; interbank borrowing = deposits from banks plus repos and cash collateral.

[1] Total assets are net of derivatives. [2] Variables in **bold** are those that were selected as the key drivers in defining the partition.

Sources: Bankscope; authors' calculations.

Source: BIS Quarterly Review December 2014

3. Areas of improvement

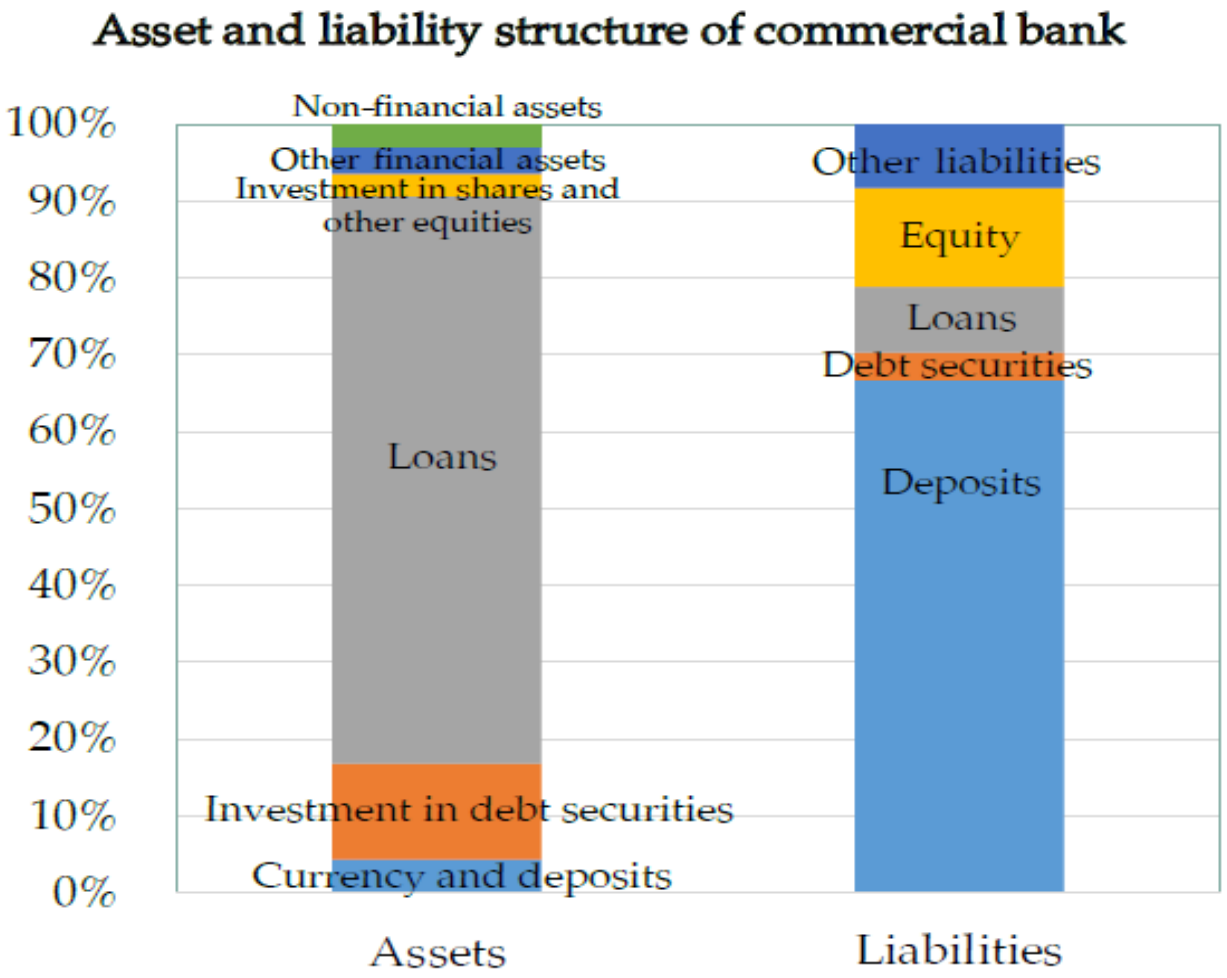
7. Role of macroeconomic shock is unclear. The contagion may come from macroeconomic shock hitting loan types with similar risk profile (or they are complements so to say) and may cause further price drop. The term $\psi_{k,k'}$ doesn't appear in the equilibrium price ph

   Suggestion: incorporating $\psi_{k,k'}$ into the maximization problem

8. Roles of deposits withdrawal can be crucial. Deposits are assumed to be constant throughout the bank shock events while in reality it can create an additional (and quite severe) outflow and may affect the amount banks can pay to their interbank counterparts.

   Suggestion: incorporating deposit run-off into the function $x_{i,j}$ may make the model capture additional outflow dynamics

Deposits can be a major source of outflow



Source: Bank of Thailand's Financial Stability Report 2016

3. Areas of improvement

9. Discussion: do aggressive (risk-loving) banks sell off more assets than conservative (risk-averse) banks under 

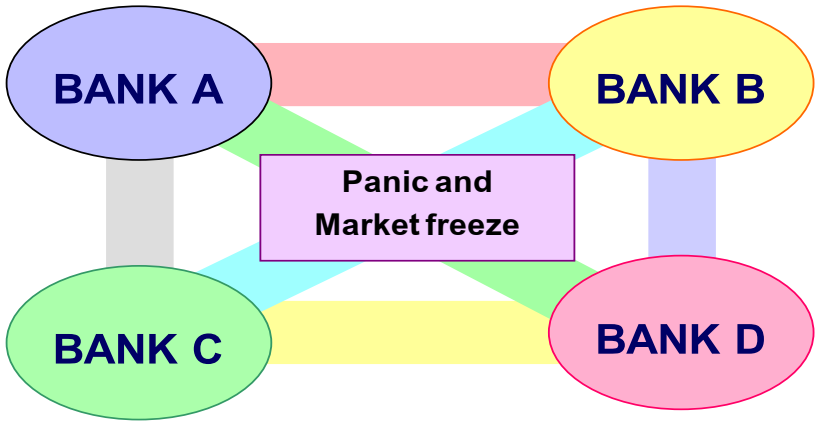
? Possible that aggressive banks have higher tendency to cut loss but also possible that conservative banks have higher risk tolerance (and therefore setting the cut-loss limit earlier) as well.

10. Discussion: relationship between liquidity and solvency. This paper assumed that the shocks hitting the bank led it to face the "solvency problem" followed by the bank having the "liquidity problem." Can the model be adjusted so that it fits the scenario of the bank having a "liquidity problem" that eventually leads to "solvency problem"? Bear Stearn's case.

Solvency doesn't guarantee liquidity

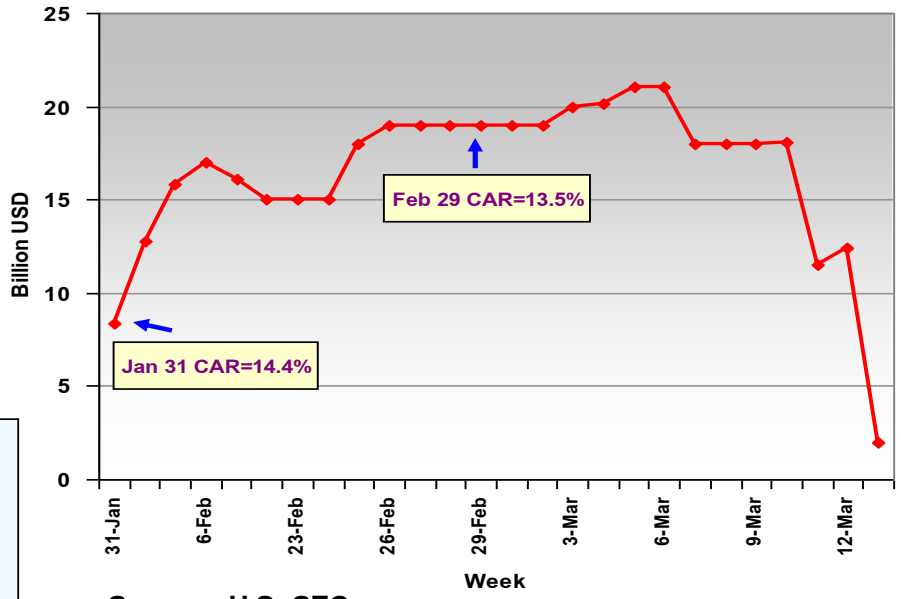
Lack of liquidity

Asymmetric information leads to the failure to recapitalize of illiquid but otherwise solvent banks when there is a confidence crisis in the market



The lack of confidence leads to market freeze, panic and consequently liquidity crisis, spreading to other banks in the system

Bear Stearn's Liquidity Position



Source: U.S. SEC

4. Model extension

1. Including the market behavior as another channel of contagion.
   Generally, the contagion has 3 possible transmissions:
   - Direct channel: via one bank's insolvency/illiquidity directly affects another bank
   - Indirect channel: via one bank's insolvency/illiquidity affects the market (esp market maker) and in turn causes other banks to register a loss via the fall in market value
   - Strategic complementarities: via banks taking the same action/strategy (loss amplification)

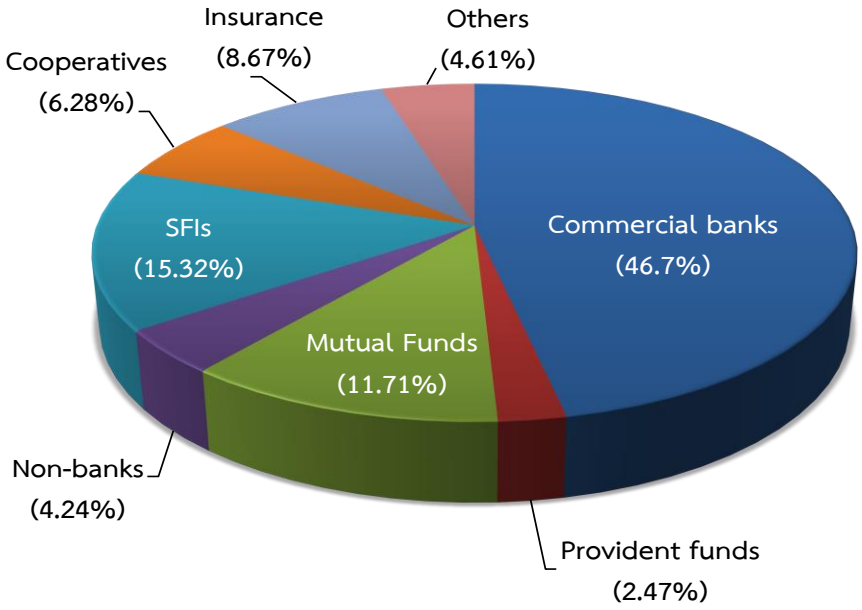
   → Example: Cifuentes, Ferrucci and Shin (2005), Diamond and Rajan (2011), Goldstein (2005), Bebchuk and Goldstein (2011)

   → The paper can be extended to include the market effect from cross default or through bank's investment portfolio

4. Model extension

2. Including other types of financial institutions in the model.
   Because the contagion effect does not have to come from banks only. Other players (mutual funds, securities companies, insurance companies, non-banks) may be the origination of the contagion, especially through the common exposure channel.

   Thai banks have less than 50% share of the banking assets now.



Thank you

Q&A