

2017 Biennial IADI Research Conference

Designing an optimal deposit insurance system – Theory and Practice



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Optimal Deposit Insurance

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Banks and the Threat of Runs



A run on American Union Bank, 1931

Banks and the Threat of Runs – Cont'd

- Banks provide maturity and liquidity transformation
- This can improve welfare, but
- It exposes banks to the risk of a run
 - Many investors demand early withdrawal out of the self fulfilling belief that others will do so
- History of many bank failures around the world

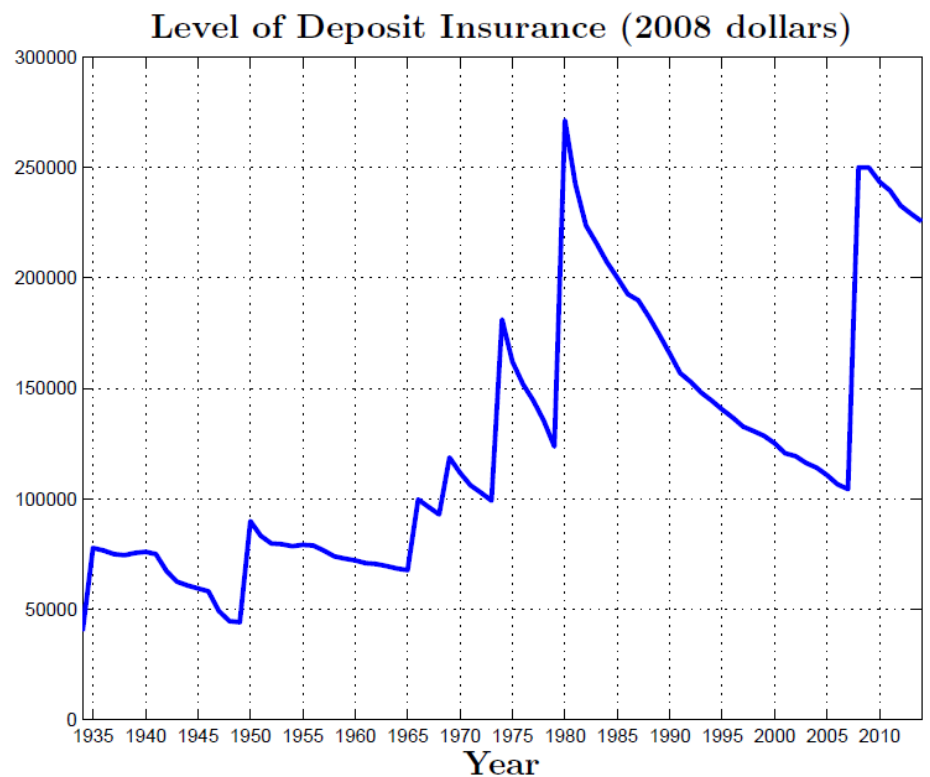
A Possible Solution: Deposit Insurance

- Insurance of deposits may reduce the incentive of investors to run
- Deposit insurance was enacted in the US in 1933 and had a great success in stabilizing the banking system
- Many countries in the world have followed this experience enacting different forms of deposit insurance
- Supported by theoretical literature, going back to Diamond and Dybvig (1983)

Optimal Amount of Coverage

- Key question in design of insurance:
 - How much should be insured?
- In Diamond and Dybvig (1983):
 - Unlimited insurance: insurance works to prevent failures altogether and so has no cost
- In the real world:
 - Insurance always limited; e.g., in US current maximum for insurance is \$250,000, which was increased from \$100,000 in 2008
- What is different in the real world?
 - Failures sometimes happen generating costs
 - Insurance causes frictions
- **How to set the optimal amount?**

History of Deposit Insurance Amount in the US



Ingredients of A Model

- Three dates: 0, 1, 2
- Banks:
 - Take deposits at time 0
 - Allow withdrawal in time 1 or 2
 - Invest in asset that pays uncertain return in time 2 (higher in expectation than liquidation value in time 1)
 - Set deposit amounts in competition for deposits
- Investors withdraw early in time 1 (run) if
 - Have early liquidity need or
 - Think return will be higher in time 1 (due to a run or to fundamentals)
 - Act based on information and coordination

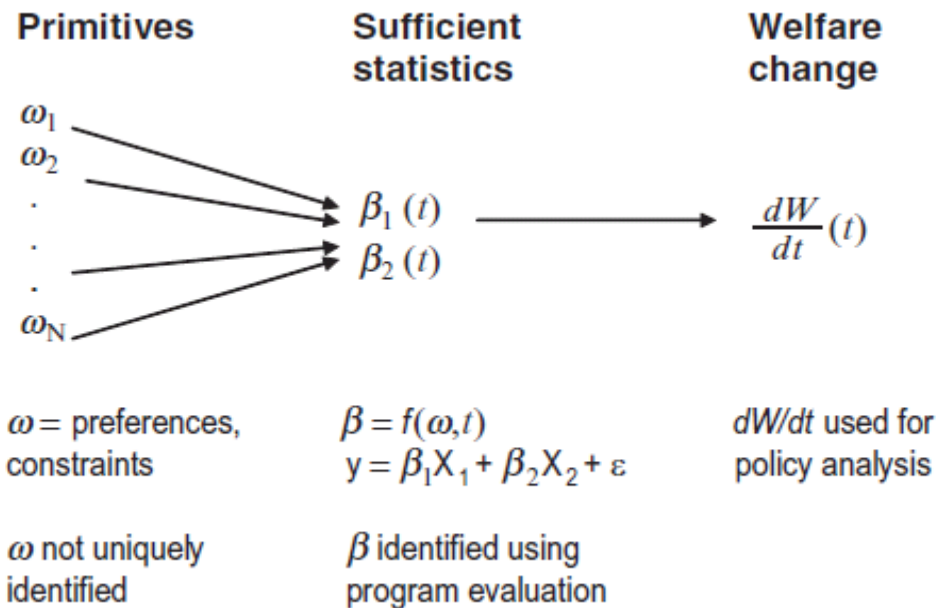
Ingredients of A Model – Cont'd

- Government:
 - Sets deposit insurance; determines amount covered in case of failure
 - Maximizes expected utility of depositors taking into account response of bank and depositors to insurance
- Equilibrium:
 - Government sets deposit insurance coverage
 - Banks set deposit rate, given insurance, and taking into account the effect on runs
 - Depositors choose whether to run, given insurance and deposit rates
 - **Runs happen if fundamentals are below threshold (panic and fundamental runs)**
 - **Higher insurance coverage reduces run probability**

Sufficient Statistic Approach

- Usually, getting quantitative prescriptions from a model of this kind requires calibration and estimation of **exogenous deep parameters** of the model
 - This is a difficult task
- The sufficient statistic approach targets **endogenous high level variables that are potentially observable**
- Illustration in next slide is based on Chetty (2009)

Sufficient Statistic Approach – Cont'd



Optimal Level of Deposit Insurance Based on Sufficient Statistic

Optimal level of DI $\delta^* = \frac{\boxed{A} \times \boxed{B}}{\boxed{C} \times \boxed{D}}$

- Marginal benefit
 - \boxed{A} Sensitivity of bank failure probability to DI change
 - \boxed{B} Drop in depositors consumption at failure threshold
- Marginal cost
 - \boxed{C} Probability of bank failure
 - \boxed{D} Expected marginal social cost of intervention in case of bank failure

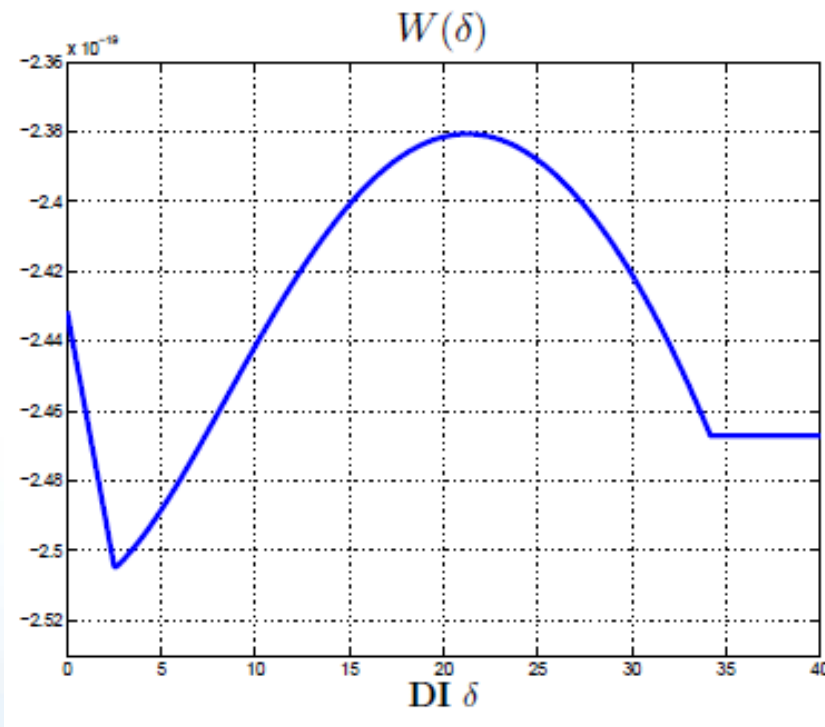
Intuition

- **Benefit from deposit insurance:** reducing the probability of a run and increasing consumption as a result
- **Cost of deposit insurance:** causes fiscal costs in case a failure does happen
- **Note:** moral hazard concerns associated with banks' behavior only enter the fiscal cost (which is not internalized by banks)
 - Other implications of banks' behavior are internalized (envelope theorem, competition)

Measurement

- The variables in the formula are either observable or could be inferred from the data
- In particular, B , C , and D are fairly easily observable or known from various other studies
- A is more difficult, need more data to figure out historical sensitivity
 - Theory tells us what we need to measure
 - Ideally, regression of failures on deposit insurance amount

Numerical Example: Effect of Coverage on Welfare



Uses of Formula

- Use formula to find optimal amount
 - Usually interim maximum
 - Welfare decreases initially, then increases, then decreases again
 - Too ambitious?
- Use cost vs. benefit to tell whether an increase or a decrease is desirable at current level of coverage
- Back out change in failure probability or sensitivity that would rationalize recent insurance coverage increases

Deposit Insurance Premium

- Paper extended to allow the government to set deposit insurance premium
 - Used to make banks internalize the effect of their deposit rates on fiscal costs
 - Can also be used for funding the insurance in addition to setting incentives
 - Deposit ceiling can also be used
- Formula can be adjusted to tell optimal coverage given the pricing of premiums

Extensions

- Cross-section of depositors (heterogeneity)
- General portfolio and investment decisions (moral hazard)
- Global game (information structure and equilibrium selection)
- Macro effects (spillovers)

Conclusion

- Optimal amount of deposit insurance is first-order question with little scientific guidance to date
- Paper provides characterization of optimal deposit insurance as a function of a few sufficient statistics
 - For a wide range of environments
 - Additional characterization of optimal ex-ante policies, such as insurance premium
- Paper provides guidance for what we need to measure in the data