

# Complex financial institutions and systemic risk

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### Abstract

The objective of this paper is to identify the bank organizational structures that generate substantial systemic risk and to explain why banks have incentives for creating them. We seek the explanation in a bank's incentive to exploit financial synergies by choosing an organizational structure that maximizes the benefits the bank can derive from an interest tax shield, reduced default cost and the possibility of a state bailout in the presence of limited liability for legally separate entities. In both a calibrated and some stressed scenarios, we show that subsidiaries generate the highest value and the highest systemic risk. Complexity exacerbates the incentive to lever up in subsidiary structures. It blows up expected losses without having a comparable effect on value. The main sources of complexity in this paper are differences in asset risk and size across bank affiliates in different countries or with different financial activities. We also provide a perspective on current reform efforts with respect to the organization of banks..

KEYWORDS: bank organization, bank risk, bank complexity, financial synergies, endogenous leverage in banking, default costs, bailouts

JEL classification numbers: G210, G32, G33

# Goals and research question

- ▶ Complex financial institutions
- ▶ Systemic Risk

# Goals and research question

Complex financial institutions - organizational structures

## Goals and research question

Systemic Risk - the expected loss as a measure of the systemic risk of a bank with a particular structure

## Goals and research question

- ▶ Your goal is to highlight the value of integrating **modern developments in IO with developments in monetary and financial economics**, including portfolio theory.

## Goals and research question

“This paper shows that complexity arising from different sizes and return distributions of affiliates exacerbates the incentive to lever up in subsidiary structures that produce the greatest value and the greatest systemic risk even in the absence of complexity.”

# Hypotheses

- ▶ The main sources of complexity in this paper are differences in asset risk and size across bank affiliates in different countries or with different financial activities.
- ▶ Investors are risk-averse and assess their portfolios in the mean-variance framework,
- ▶ Markets are perfect,
- ▶ The assumption of an absence of arbitrage opportunities,
- ▶ Expectations on returns (mean, variance, covariance) are identical.



## Some thoughts

- ▶ complexity and systemic risk
- ▶ complexity - uncertainty - systemic risk

## Some references

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## Some thoughts

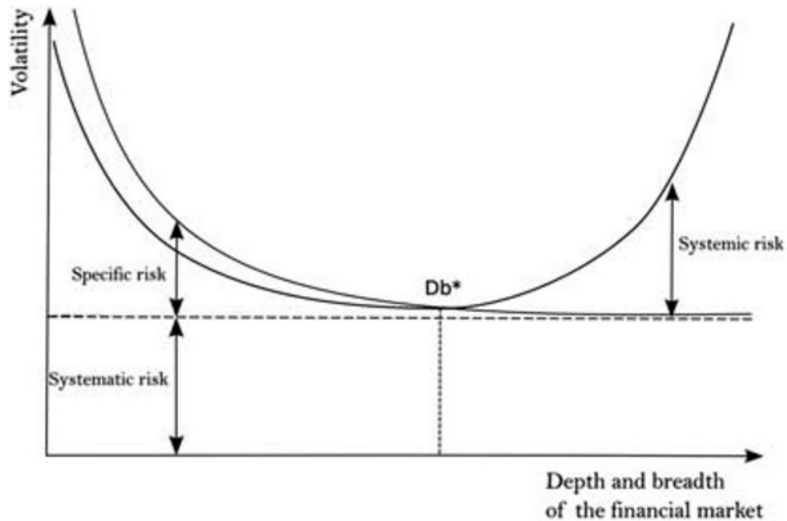


Figure 2: Prasch & Warin, 2016

## Some thoughts

- ▶ Financial broadening and deepening is seen to be beneficial as a consequence of diversification.
- ▶ However, at some point the costs associated with the complexity of the market begin to outweigh these benefits.
- ▶ Complexity enters the picture as a result of the continued broadening and deepening of the financial market.
- ▶ Beyond point A, complexity contributes to higher market risks and thereby higher volatility. What causes this volatility to reassert itself?

## Some thoughts

- ▶ Three varieties of risks are represented on this graph: (i) the specific risk, (ii) the systematic or market risk, and (iii) the systemic risk.
- ▶ Volatility is increasing: we can imagine that the specific and the market risks remain at the same level, but that the rise is because of the increase in the systemic risk.

## Some thoughts

- ▶ Beyond a certain point (point Db\* here), the financial sector is too broad and too deep to have a clear vision of the degree of interdependence of the different products and different players.
- ▶ The market is thus becoming too complex, and probably too interdependent.
- ▶ Complexity becomes opacity, thereby contributing to fragility.

## Some thoughts

$$\begin{aligned} D_{0h} = & \underbrace{+\exp(-rT) \left[ F_h - \mathbb{E} \max(0, F_h - \bar{L}_h(T)) \right]}_{\text{value without bailout and rescue}} + \\ & \underbrace{+\exp(-rT) \mathbb{E} \left\{ \left[ F_h - \bar{L}_h(T) \right] \mathbf{1}_{\{R'\}} \right\}}_{\text{rescue received}} + \\ & \underbrace{+\pi \exp(-rT) \mathbb{E} \left\{ \max(F_h - \bar{L}_h(T), 0) \mathbf{1}_{\{Q'\}} \right\}}_{\text{government bailout}} \\ & \underbrace{- \exp(-rT) (1 - \pi) \alpha \mathbb{E} \left[ \bar{L}_h(T) \mathbf{1}_{\{Q'\}} \right]}_{\text{default costs}}, \end{aligned}$$

Figure 3:



## Some thoughts

Luciano and Wihlborg (2015)

- ▶ Game Theory: perfect, symmetric information game, in which the behavior of the bank is perfectly observable by the government

## Some thoughts

- ▶ It is more the possibility of a bailing out that leads to the results found in this paper.

## Some thoughts

- ▶ The importance of adding systemic risk to the traditional dual of specific (firm level) and systematic (economy wide) risks, several lessons follow that should inform regulatory practice.
- ▶ These might be usefully listed under the headings of (i) Simplicity, (ii) Firewalls and (iii) Backstops.

## Some thoughts

“We also provide a perspective on current reform efforts with respect to the organization of banks.”

## In short

1. Very interesting paper, tackling different concepts
2. Augment the literature review
3. Refine, clarify and make the definitions explicit
4. Make the game a little more sophisticated (repeated game, asymmetric information)
5. Contextualize a little more the results with the current macroprudential regulations