

# Discussion of “Liquidity risk and financial stability regulation” by Lutz and Pichler

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**The opinions in this presentation are those of the authors and do not necessarily reflect the views of the European Central Bank or the Eurosystem**

# Overview

- The paper presents a didactic extension of Stein (2012)
  - ✓ Add a risk-free asset held by banks referred as “Reserves”
  - ✓ Add a more sophisticated risky investment technology of banks, referred as “Idiosyncratic liquidity risk”
  - ✓ Comparison of competitive and constrained-efficient equilibrium
  
- The paper turns around some features and normative prescriptions of Stein (2012) through its new features
  - ✓ The model can give rise to inefficient short-term under-borrowing, under-investment and under-holding of liquidity buffers.
  - ✓ Role for state-contingent reserve requirement policy
  
- Two main interpretative comments of the paper:
  - ✓ What are exactly those “Reserves”?
  - ✓ What does such an “Idiosyncratic liquidity risk” represent ?

*\*See Stein, J. “Monetary Policy as Financial Stability Regulation”, Quarterly Journal of Economics 127(1)*

# Model features

- **Small open economy**
- **Agents:** Households, Firms, Banks, Outside investors, International investors
- **Assets:**
  - ✓ Short-term Bank debt: held by Households and International investors
  - ✓ long-term Bank debt: held by Households
  - ✓ Risky investment projects: originated by Banks but can be traded in secondary markets as distressed banks sell to sound banks and outside investors => this could lead to fire sales
  - ✓ Productive capital: held by Outside investors and rented out to Firms
  - ✓ Risk-free non-remunerated asset (Reverses): held by banks
- **3 periods:**  $t=0,1,2$ 
  - ✓ Aggregate and **idiosyncratic** uncertainty on risky investment projects
  - ✓ News signal on asset returns in period 1
  - ✓ Short-term debt matures in period 1 and can be made risk free via secondary market sales

## Banks decision problem in the competitive equilibrium

### ➤ Ex ante Banks profit

$$\begin{aligned}\mathbb{E}\Pi(\theta) = & p \left\{ f(I) - R^s B^s - \tilde{R}^l(g) B^l + L \right\} \\ & + (1-p)q \left\{ f(I) - R^s B^s - \tilde{R}^l(b) B^l + L + \left( \frac{1}{k} - 1 \right) L \right\} \\ & + (1-p)(1-q) \left\{ \lambda I - R^s B^s - \tilde{R}^l(b) B^l + L - \left( \frac{1}{k} - 1 \right) (R^s B^s - L) \right\}\end{aligned}$$

Subject to the collateral constraint  $k\lambda I \geq R^s B^s - L$

✓ Banks takes the fire sales price  $k$  as given

➤ Choice for  $B^s$ :  $>0$  in equilibrium

➤ Choice for  $L$  :  $>0$  if  $q$  is large enough and the Outside investors demand for distressed Bank assets is not too elastic

➤ Fire sales in equilibrium as Banks do not fully self-insure via Reserves

## Comparison with the constrained-efficient allocation

➤ **The planner's problem internalizes the fire-sale externality:**

- ✓ Maximize Household welfare subject to the collateral constraint ...
- ✓ .... and FOCs of Outside investors portfolio decisions

$$\frac{1}{k} = \alpha A(W + L - (1 - q)R^s B^s)^{\alpha-1}$$

- When the issuance of short-term debt is optimal, liquidity reserves are built up to fully absorb the secondary market asset sales within the banking system.  
=> No fire-sales and no crowding out of Outside investors productive investment
- When there is under-borrowing in the competitive equilibrium, the constrained-efficient allocation can be implemented via
- ✓ A tax on short-term borrowing and interest on reserves
- or
- ✓ A reserve requirement to be released in the bad state of the world

# Reverses, liquidity risk and monetary policy implementation

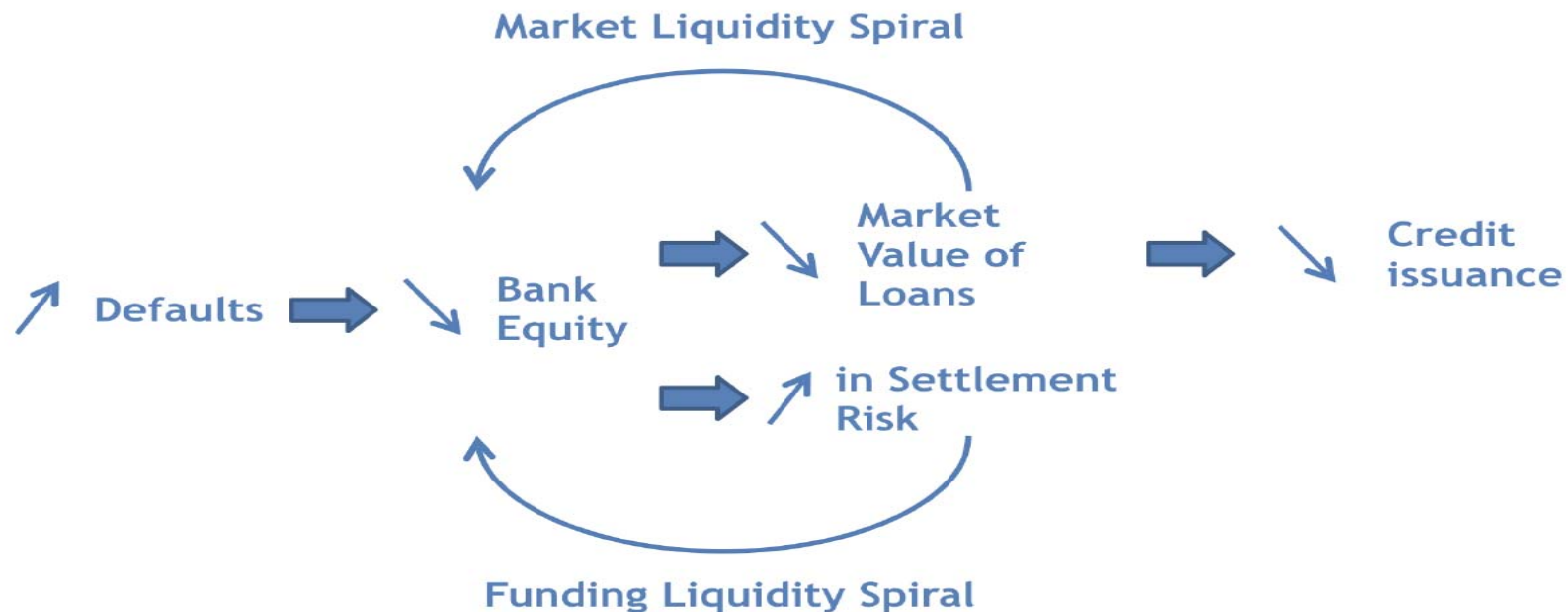
- How are “**Reserves**” related to Stein (2012) digressions?
  - ✓ Introducing inflation and nominal rates: Fiscal Theory of the Price Level
  - ✓ Taylor-rule policy conduct and interest rate on reserves
  - ✓ Liquidity regulation and the endowment of Outside Investors
- Are “**Reserves**” actually safe and liquid assets i.e. safe storage technology?
  - ✓ Only traded by the banking system?
  - ✓ In fixed supply?
  - ✓ Could we consider fire sales of safe assets?
- “**Reverse**” and the collateral constraint
  - ✓ Mitigating risky assets fire sales or ensuring against settlement risk?
  - ✓ What is the friction that prevents to Banks to access liquidity in the interim stage? And how long is this friction likely to stay?

In normal times, banks will access liquidity fast enough to prevent most deviation from the NPV of the asset.

In crisis times, liquidity frictions appear: fire-sale (market liquidity) and liquidity (funding liquidity) spirals amplifies each others.

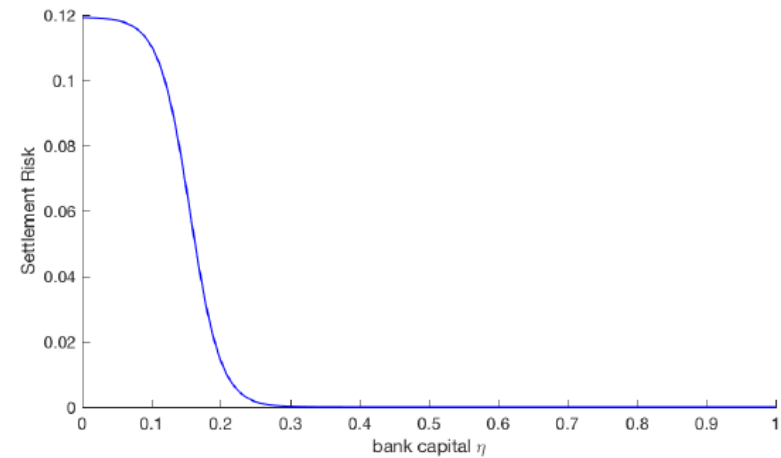
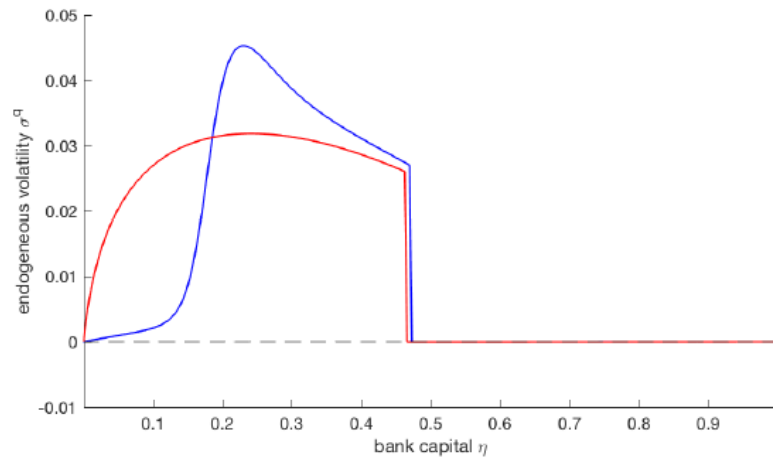
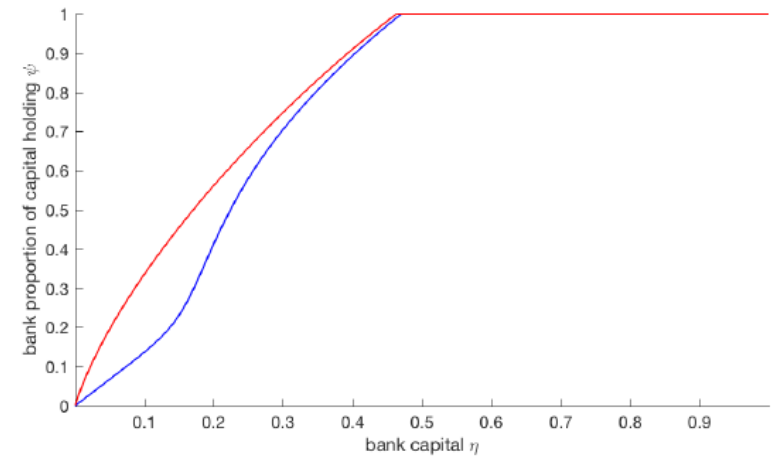
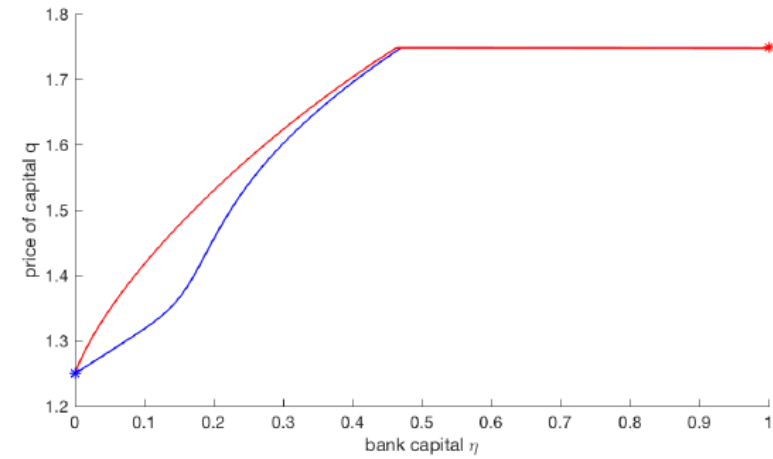
# Reverses, liquidity risk in a general equilibrium asset pricing model

- General Equilibrium Asset pricing Model with Heterogeneous Agents\*
  - ✓ Frictions in the interbank money market (Bigio and Bianchi, 2014)
  - ✓ Incomplete financial markets (Brunnermeier and Sannikov, 2014)
  - ✓ When bank capital is below a certain threshold, economy enters crisis regime where banks start fire-selling assets to households and money market becomes disrupted.



\*See Darracq Pariès and Vandeweyer (2017) mimeo

# Reverses, liquidity risk in a general equilibrium asset pricing model



Red: Fire-sale spiral only ; Blue: Fire-sale + liquidity spiral.

*Darracq Pariès and Vandeweyer (2017) mimeo*



## Idiosyncratic risks or multiple banking strategies or both?

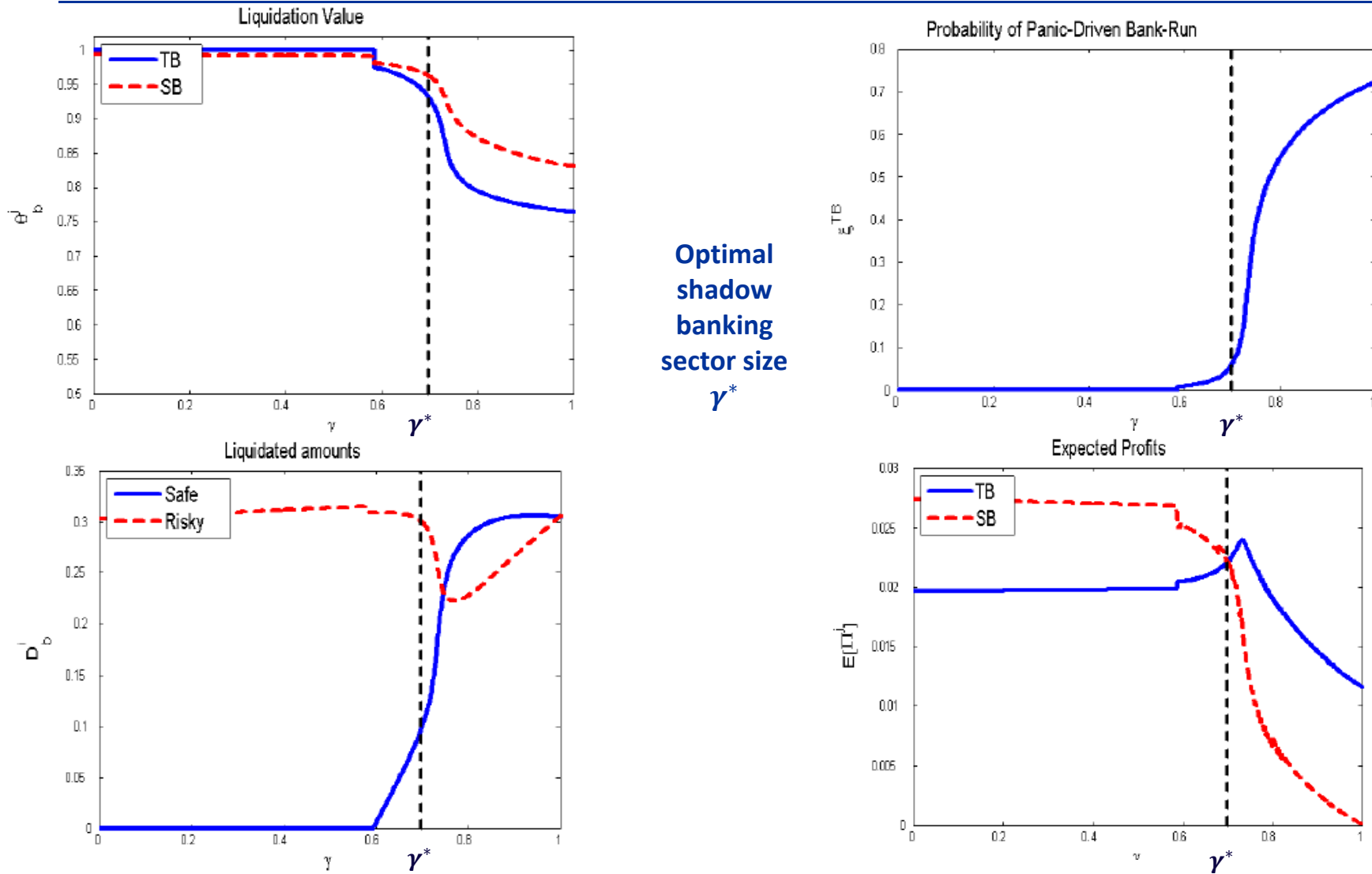
*A General Equilibrium model with endogenous fire-sales and bank-runs exploring the systemic relevance of shadow banks\**

- 3-period model with three assets: one ST liquid asset, two LT assets (safe and risky)
- Two types of bank runs: news driven *versus* panic driven
- Two equilibrium banking strategies with relative size determined by a free entry condition (in the spirit of Hanson et al (2014))
  - ✓ Shadow banking (SB) with high leverage and greater risk-taking, subject to news-driven bank runs
  - ✓ Traditional banking (TB) build more conservative portfolios to avert news-driven bank runs but remain exposed to panic (or self-fulfilling) runs
- SB and TB interactions in secondary markets for LT assets with the possibility of fire sales

\*See Ari, Darracq Pariès, Kok and Zochowski (2016) "Shadow Banking in General Equilibrium" ECB working paper 1943

# Idiosyncratic liquidity risks or multiple banking strategies or both?

Model solutions after bad news revelations for different values of the shadow banking sector size  $\gamma \in [0, 1]$

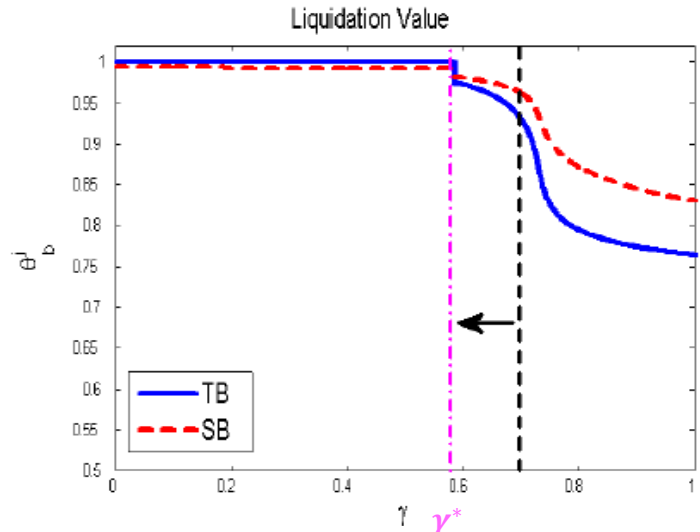


Optimal shadow banking sector size  $\gamma^*$

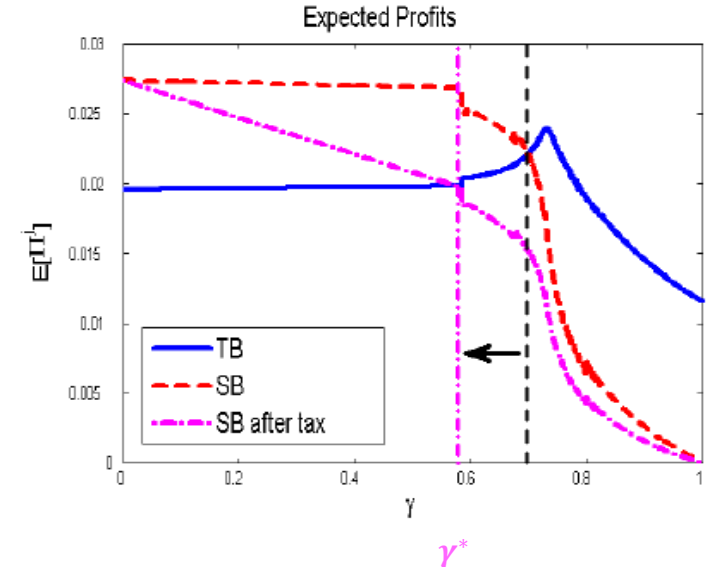
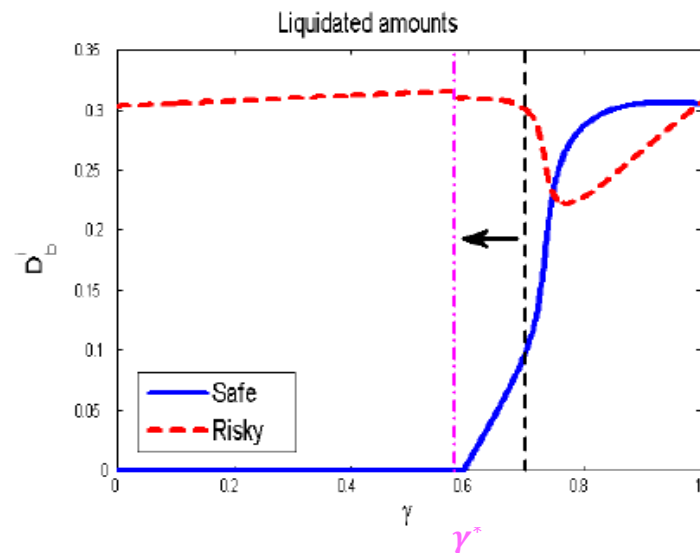
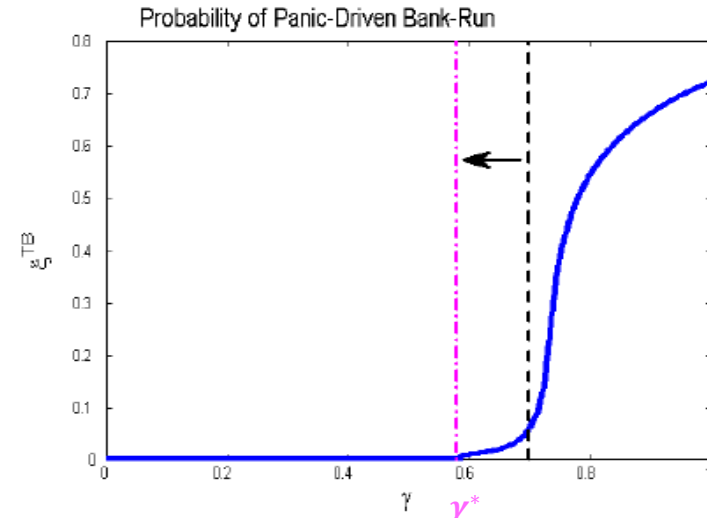
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# Idiosyncratic liquidity risks or multiple banking strategies or both?

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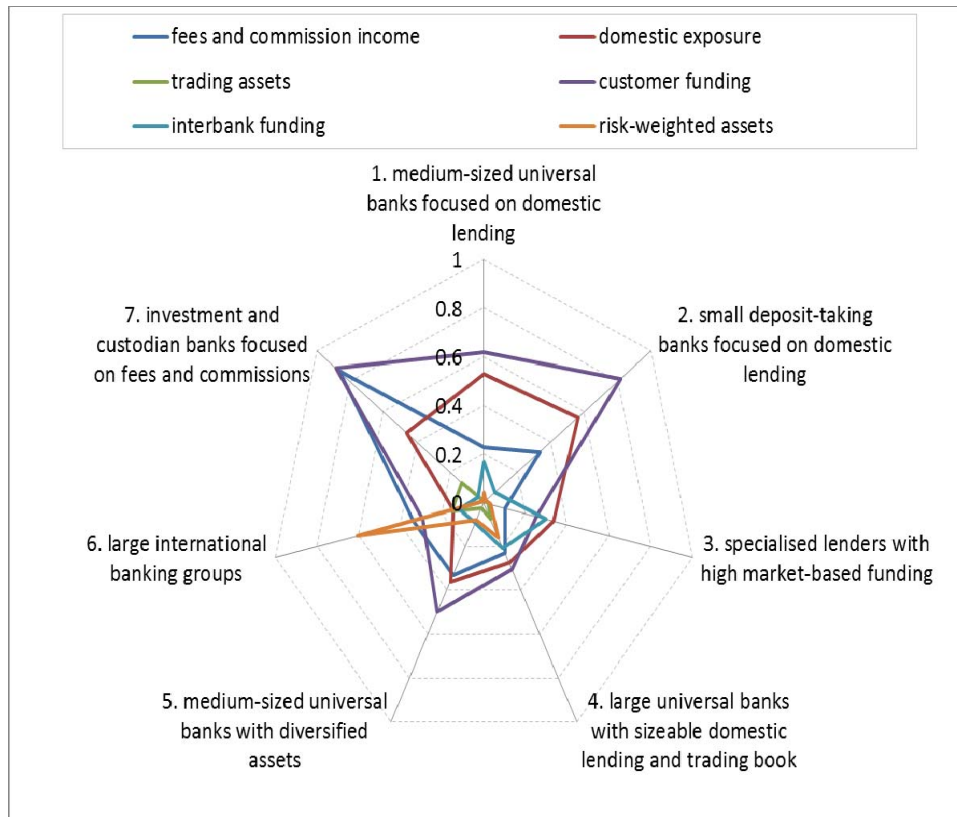
Optimal shadow banking sector size with tax  $\gamma^*$



\*See Ari, Darracq Pariès, Kok and Zochowski (2016) "Shadow Banking in General Equilibrium" ECB working paper 1943

# Heterogeneity in the financial system

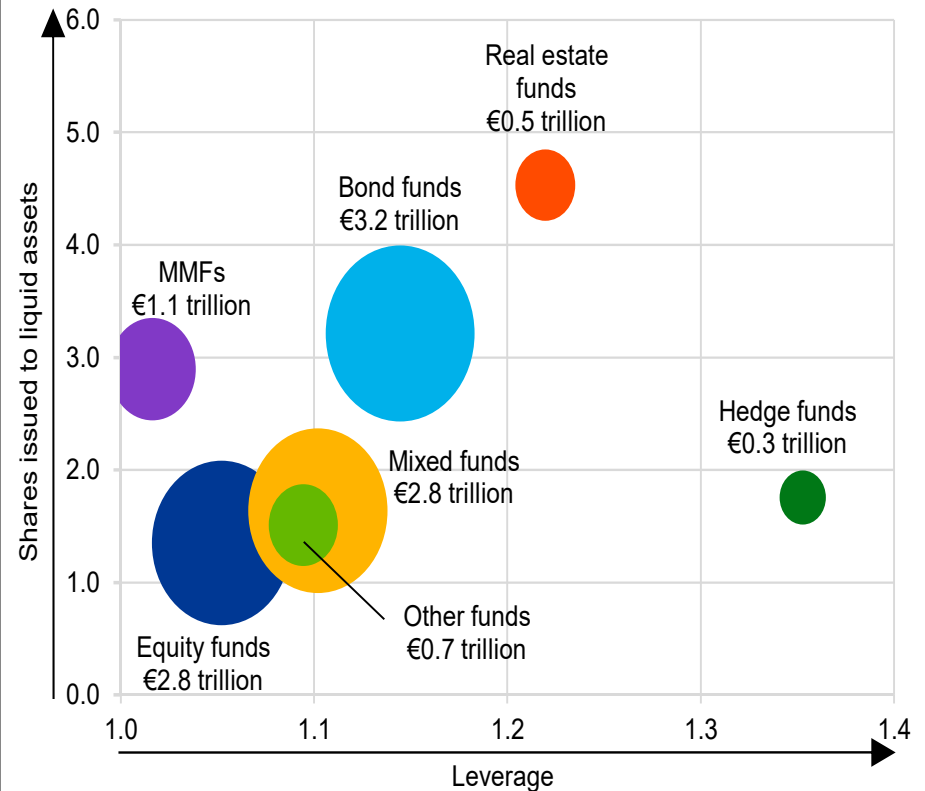
## Balance sheet structure of different business models (2014; ratios and shares in %)



Sources: *Bankscope, Bloomberg, SNL and ECB calculations. See Franch and Żochowski (2016), ECB mimeo.*

Note: The chart shows the median of variables used for the identification of clusters for each of the seven clusters identified for the year 2014.

## Total assets, liquidity mismatch and leverage multiplier by type of fund (data as of Q4-2015)



Sources: *ECB and ECB calculations. See Doyle, Hermans, Molitor and Weistroffer (2016), ECB Occasional paper forthcoming.*

Bubble size: total assets in EUR tr

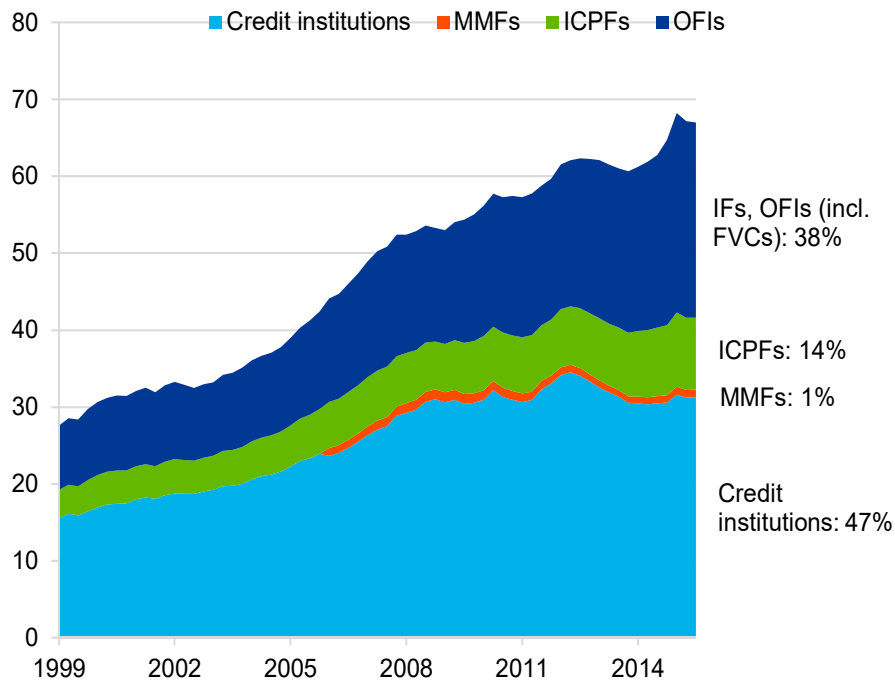
x-axis: Leverage (total assets / shares and units issued)

y-axis: Liquidity mismatch (shares and units issued / liquid assets)

Note: Liquid assets include equity shares, EA government bonds, and other debt securities with an original maturity smaller than 1 year.

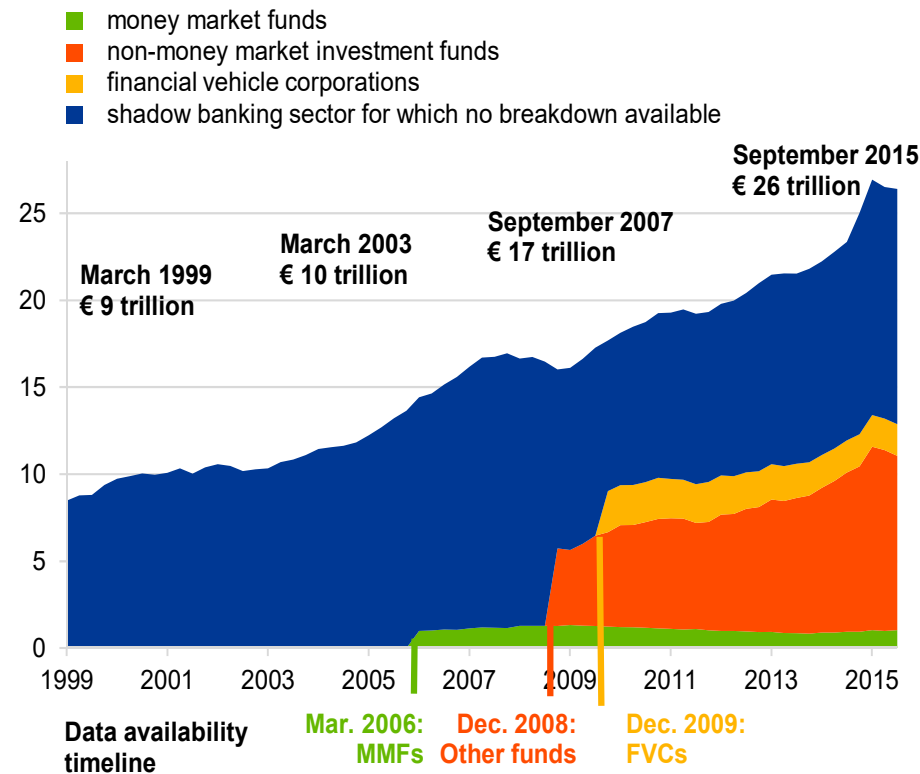
# Heterogeneity in the financial system

**Euro area total financial system assets**  
(Q1 1999 to Q3 2015; EUR trillions)



Sources: ECB and ECB calculations. See Doyle, Hermans, Molitor and Weistroffer (2016), ECB Occasional paper forthcoming.

**Euro area shadow banking assets**  
(Q1 1999 to Q3 2015; EUR trillions)



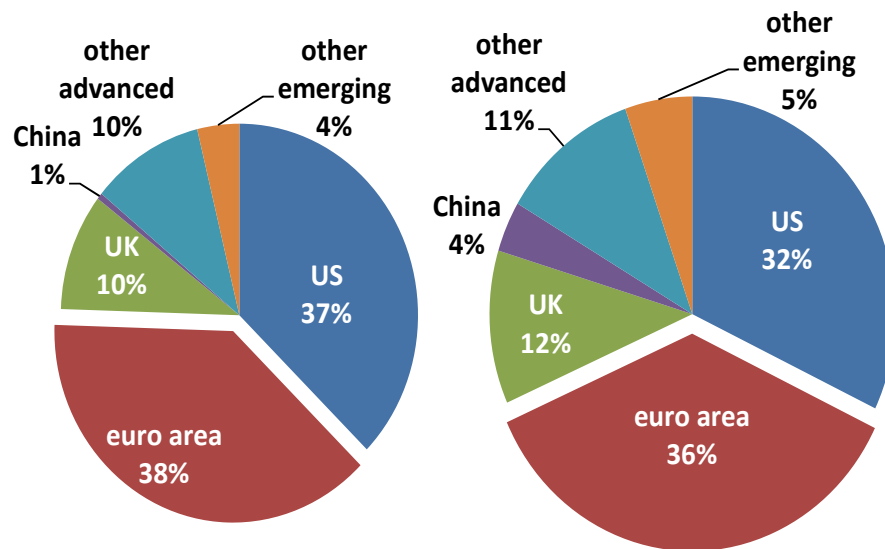
Sources: ECB and ECB calculations. See Doyle, Hermans, Molitor and Weistroffer (2016), ECB Occasional paper forthcoming.

# Heterogeneity in the financial system

## FSB global OFI assets by region

2007: USD 67tr

2014: USD 80tr



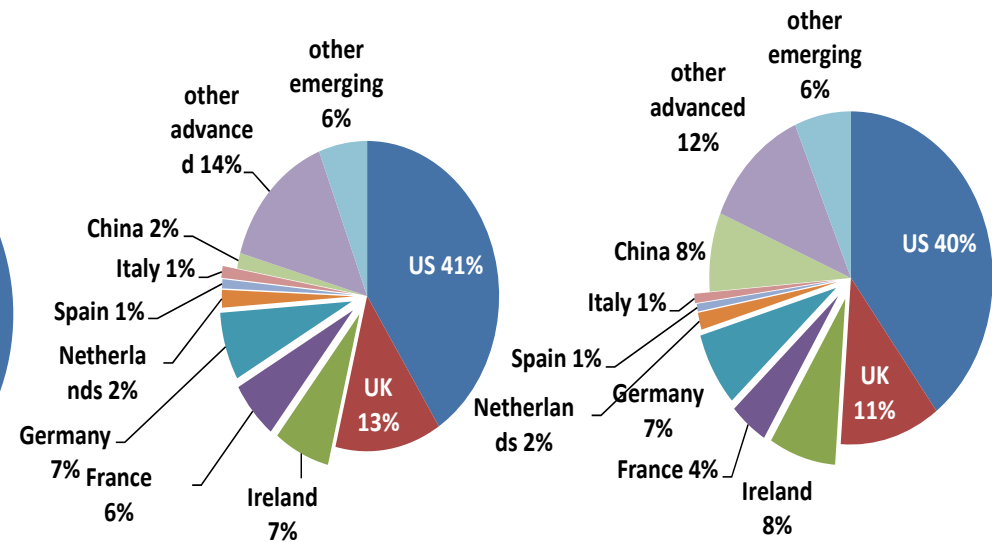
Sources: FSB and ECB calculations. See Doyle, Hermans, Molitor and Weistroffer (2016), ECB Occasional paper forthcoming.

Note: "OFIs" by the FSB definition include all financial institutions that are not classified as banks, insurance companies, pension funds, public financial institutions, central banks, or financial auxiliaries. According to FSB definitions, OFIs include money-market funds, finance companies, structured finance vehicles, hedge funds, other funds, broker-dealers, real-estate investment trusts and funds, and additional sectors.

## FSB shadow banking assets by region

2010: USD 31tr

2014: USD 36tr



Sources: FSB and ECB calculations. See Doyle, Hermans, Molitor and Weistroffer (2016), ECB Occasional paper forthcoming.

Note: The FSB shadow banking measure cannot be calculated for the euro area as a whole as only six euro area jurisdictions participate in the data gathering exercise. These six euro area countries represent 22.5% (USD 8.1tr) of global shadow banking assets, covering the five FSB members France, Germany, Italy, the Netherlands and Spain, plus Ireland.