Mundell-Fleming Lecture


Jean Tirole
IDEI and MIT

Presented at the 9th Jacques Polak Annual Research Conference
Hosted by the International Monetary Fund
Washington, DC—November 13-14, 2008

The views expressed in this paper are those of the author(s) only, and the presence of them, or of links to them, on the IMF website does not imply that the IMF, its Executive Board, or its management endorses or shares the views expressed in the paper.

Mundell-Fleming lecture, IMF

November 13, 2008

Jean TIROLE

TSE and MIT
I. Diagnostic

[many accounts of crisis. Quick overview of my take on it.]
I. Diagnostic

[many accounts of crisis. Quick overview of my take on it.]

II. Crisis management: 1. Liquidity provision
I. Diagnostic

[many accounts of crisis. Quick overview of my take on it.]

II. Crisis management: 1. Liquidity provision

III. Crisis management: 2. Recapitalization
Outline

I. Diagnostic
   [many accounts of crisis. Quick overview of my take on it.]

II. Crisis management: 1. Liquidity provision

III. Crisis management: 2. Recapitalization

IV. The future of financial regulation
   [next Saturday’s G20 Washington summit: towards a new Bretton Woods?]
I. WHAT WENT WRONG?

(Not-so-original) diagnostic of widespread regulatory failure.
I. WHAT WENT WRONG?

(Not-so-original) diagnostic of widespread regulatory failure.

(1) *Excess liquidity*

[boom-bust cycle]
I. WHAT WENT WRONG?

(Not-so-original) diagnostic of widespread regulatory failure.

(1) *Excess liquidity*

[boom-bust cycle]

(2) *Risky real-estate and other loans*

- failure of consumer protection
- risk taking (exposure to real estate price and interest rate).
I. WHAT WENT WRONG?

(Not-so-original) diagnostic of widespread regulatory failure.

(1) *Excess liquidity*

[boom-bust cycle]

(2) *Risky real-estate and other loans*

- failure of consumer protection
- risk taking (exposure to real estate price and interest rate).

(3) *Excess securitization*

- benefits of securitization: (a) diversification, (b) certification (ratings, investment banks), (c) transformation of dead into live capital (creation of stores of value)
- loss of accountability: evidence of moral hazard.
(4) *Rating agencies*

- wrong models
- incentive misalignment (including conflicts of interest)
- lack of normalization.
(4) **Rating agencies**

- wrong models
- incentive misalignment (including conflicts of interest)
- lack of normalization.

(5) **Intense maturity transformation**

including by entities wo. or w. little stable retail deposits

[5 large ex investment banks. Northern Rock: 75% borrowing in wholesale ST market.]

High sensitivity to interest rates.
(4) **Rating agencies**
   - wrong models
   - incentive misalignment (including conflicts of interest)
   - lack of normalization.

(5) **Intense maturity transformation**
   including by entities wo. or w. little stable retail deposits
   [5 large ex investment banks. Northern Rock: 75% borrowing in wholesale ST market.]

   High sensitivity to interest rates.

(6) **Imperfect/evasion of prudential capital requirements**
   - measurement of risk
   - implicit exposures
   - risky credit lines, off-balance sheet vehicles
   - (strategic) overconfidence in ratings.
(7) **Procyclical regulation**

[MTM and the fire sales spiral/negative bubble.]
(7) **Procyclical regulation**

[MTM and the fire sales spiral/negative bubble.]

(8) **Overall liquidity shortage**

[real-estate and other losses, market liquidity grinding to a halt, decrease in funding liquidity.]
(7) **Procyclical regulation**

[MTM and the fire sales spiral/negative bubble.]

(8) **Overall liquidity shortage**

[real-estate and other losses, market liquidity grinding to a halt, decrease in funding liquidity.]

(9) **Wasted liquidity**

[Example: Sovereign funds invest their $2 or $3,000bn of free cash flow into safe T securities. Money market funds, banks with liquidity,... have large deposits at CBs.]
(7) **Procyclical regulation**

[MTM and the fire sales spiral/negative bubble.]

(8) **Overall liquidity shortage**

[real-estate and other losses, market liquidity grinding to a halt, decrease in funding liquidity.]

(9) **Wasted liquidity**

[Example: Sovereign funds invest their $2 or $3,000bn of free cash flow into safe T securities. Money market funds, banks with liquidity,... have large deposits at CBs.]

(10) **Mutual exposures and unregulated entities’ access to taxpayer money**

[yesterday: LTCM; today: Bear Stearns, Lehman’s “close call”; tomorrow: GE Capital, hedge fund?]
Huge provision of liquidity to banks, primary dealers, money market funds, and even industrial companies. Conceptual framework to assess relevance and impact?
II. LIQUIDITY PROVISION

✓ Huge provision of liquidity to banks, primary dealers, money market funds, and even industrial companies. Conceptual framework to assess relevance and impact?

✓ Standard (Arrow-Debreu) theory fails to explain why:

same players spend billions of $ on risk management, CDS,...
II. LIQUIDITY PROVISION

✓ Huge provision of liquidity to banks, primary dealers, money market funds, and even industrial companies. Conceptual framework to assess relevance and impact?

✓ Standard (Arrow-Debreu) theory fails to explain why:

- financial institutions, industrial companies and households hold low-yield T bills and other ST assets

  [risk free rate puzzle. Negative real rates today!
  Contrast Keynes, Hicks, Gurley-Shaw: “liquid assets allow investors to better weather income shortages”.
]
Huge provision of liquidity to banks, primary dealers, money market funds, and even industrial companies. Conceptual framework to assess relevance and impact?

Standard (Arrow-Debreu) theory fails to explain why:

- financial institutions, industrial companies and households hold low-yield T bills and other ST assets
  - risk free rate puzzle. Negative real rates today!
  - Contrast Keynes, Hicks, Gurley-Shaw: “liquid assets allow investors to better weather income shortages”.

- same players spend billions of $ on risk management, CDS,...
A conceptual framework

Based on joint research with Bengt Holmström, in particular *JPE* 1998 article and book in progress *Inside and Outside Liquidity*. 
A conceptual framework

Based on joint research with Bengt Holmström, in particular _JPE_ 1998 article and book in progress _Inside and Outside Liquidity_.

Premise:
A conceptual framework

Based on joint research with Bengt Holmström, in particular *JPE* 1998 article and book in progress *Inside and Outside Liquidity*.

Premise:

- some of the proceeds attached to an investment cannot be pledged to uninformed investors

  [incentive payments, lack of verifiability, private benefits,...],
A conceptual framework

Based on joint research with Bengt Holmström, in particular *JPE* 1998 article and book in progress *Inside and Outside Liquidity*.

Premise:

- some of the proceeds attached to an investment cannot be pledged to uninformed investors
  
  [incentive payments, lack of verifiability, private benefits,...],

- can write financial claims only on pledgeable income.
Bare-bones model

- Consumer rate of interest normalized at 0.
Bare-bones model

- Consumer rate of interest normalized at 0.
- Representative entrepreneur has initial wealth (equity) $A$
- Technology: 1 unit of investment $z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

1 unit of investment  $\rightarrow$ $z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

Diagram:

- $0$  pledgeable
- $z_0$ non-pledgeable
- $1$ non-pledgeable
- $z_1$ non-pledgeable

Determinants of wealth $z_1 - z_0$:
- Larger when riskier project, when possibility of asset substitution reduced by intermediation, transparency (going public), collateral, ...

Interesting questions in corporate finance relate to trade-off between value $z_1$ and pledgeable income $z_0$. 
Bare-bones model

- Consumer rate of interest normalized at 0.

- Representative entrepreneur has initial wealth (equity) $A$ technology:
  
  1 unit of investment $\rightarrow z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

✓ Determinants of wedge $z_1 - z_0$: 

![Diagram showing pledgeable and non-pledgeable zones]
Bare-bones model

- Consumer rate of interest normalized at 0.
- Representative entrepreneur has initial wealth (equity) $A$ and technology:

  $1$ unit of investment $\rightarrow z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

✓ Determinants of wedge $z_1 - z_0$:
  - larger when riskier project, when possibility of asset substitution
Bare-bones model

- Consumer rate of interest normalized at 0.
- Representative entrepreneur has initial wealth (equity) $A$
- technology:

  1 unit of investment $\rightarrow z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

\[
\begin{align*}
0 & \quad \text{pledgeable} & \quad z_0 & \quad 1 & \quad \text{non-pledgeable} & \quad z_1
\end{align*}
\]

✓ Determinants of wedge $z_1 - z_0$:
  - larger when riskier project, when possibility of asset substitution
  - reduced by intermediation, transparency (going public), collateral pledging,...
Bare-bones model

- Consumer rate of interest normalized at 0.
- Representative entrepreneur has initial wealth (equity) $A$ technology:

  1 unit of investment $\rightarrow z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

✓ Determinants of wedge $z_1 - z_0$:

- larger when riskier project, when possibility of asset substitution
- reduced by intermediation, transparency (going public), collateral pledging,...
Bare-bones model

- Consumer rate of interest normalized at 0.
- Representative entrepreneur has initial wealth (equity) $A$ technology:

  1 unit of investment $z_1 > 1$ units, of which $z_0 < 1$ is pledgeable

✓ Determinants of wedge $z_1 - z_0$:
  - larger when riskier project, when possibility of asset substitution
  - reduced by intermediation, transparency (going public), collateral pledging,...

✓ Interesting questions in corporate finance relate to trade-offs between value $z_1$ and pledgeable income $z_0$.  

Diagram:

0 $\rightarrow z_0$ pledgeable
1 $\rightarrow z_1$ non-pledgeable
No liquidity needs: solvency requirement

Investors’ RoR condition:

\[ I - A \leq z_0 I \quad \Rightarrow \quad I = \frac{A}{1 - z_0} \]

- Multiplier increases with pledgeability
Intermediate liquidity need: liquidity demand

✓ Illustration:

\[ 0 \leq i \leq I \]

- learn \( \tilde{z} \)
- continue at scale \( i \)
- and cost \( \tilde{z}i \)

- liquidate \( I - i \),
- no liquidation value \( (p(I - i) = 0) \)
- no date-1 income \( (r = 0) \)

produces \( z_1i \),
of which \( z_0i \) is pledgeable

Investment \( I \)
✓ $\tilde{z}$ can take two values

$$[f_L + f_H = 1]$$
✓ $\tilde{z}$ can take two values

\[
0 \quad \tilde{z}_L \quad \tilde{z}_0 \quad \tilde{z}_H
\]

\[
\text{prob} \quad f_L \quad \text{prob} \quad f_H
\]

\[f_L + f_H = 1\]

✓ Remark: shock on reinvestment need: Could be on
✓ \( \tilde{z} \) can take two values

\[
0 \quad \tilde{z}_L \quad \tilde{z}_0 \quad \tilde{z}_H
\]

\[
\text{prob} \quad f_L \quad \text{prob} \quad f_H
\]

\[f_L + f_H = 1\]

✓ Remark: shock on reinvestment need: Could be on
data-1 income (\( \tilde{r} \))
✓ \( \tilde{z} \) can take two values

\[
0 \quad \tilde{z}_L \quad \tilde{z}_0 \quad \tilde{z}_H
\]

prob \( f_L \) \quad prob \( f_H \)

\[ f_L + f_H = 1 \]

✓ Remark: shock on reinvestment need: Could be on

- date-1 income (\( \tilde{r} \))
- funding liquidity (\( \tilde{z}_0 \))
✓ \( \tilde{z} \) can take two values

\[
\begin{align*}
0 & \quad \text{prob } f_L \\
\tilde{z}_L & \quad \text{prob } f_L \\
\tilde{z}_0 & \quad \text{prob } f_H \\
\tilde{z}_H & \quad \text{prob } f_H
\end{align*}
\]

\[f_L + f_H = 1\]

✓ Remark: shock on reinvestment need: Could be on

- date-1 income (\( \tilde{r} \))
- funding liquidity (\( \tilde{z}_0 \))
- market liquidity (\( \tilde{p} \))

[funding and market liquidity can be shown to be correlated.]
Key insight:

returning to capital market at date 1 (issuing new securities) yields at most $z_0 i$ cannot weather high shock without having hoarded liquidity at date 0.
Key insight:

returning to capital market at date 1 (issuing new securities) yields at most $z_0i \implies$ cannot weather high shock without having hoarded liquidity at date 0.

Date-1 feasible-continuation rule in state H:

\[
\ell + z_0i \geq z_H i
\]

$\ell$: hoarded liquidity

$z_0i$: funding liquidity
Key insight:

returning to capital market at date 1 (issuing new securities) yields at most $z_0i$ cannot weather high shock without having hoarded liquidity at date 0.

- Date-1 feasible-continuation rule in state H:

$$\ell + z_0i \geq z_H i$$

- hoarded liquidity
- funding liquidity

- Let $q \geq 1$ denote the date-0 price of liquid assets (stores of value yielding 1 at date 1)

[liquidity premium if $q > 1 \iff r < 0$ where $q = \frac{1}{1+r}$]
Investment (and liquidity demand) grow as liquidity becomes cheaper.

Upper bound on liquidity premium.
SUPPLY SIDE: WHERE DOES LIQUIDITY COME FROM?

Q. Can distressed (\(z_H\)) firms use the value created by healthy (\(z_L\)) ones?

✓ A1. (completely general). Yes if no macro-economic shock; furthermore \(q = 1\).

However allocation of liquidity needs to be arranged ex ante. Ex post is too late: \(z_H > z_0\) no lending [analogy with current money market] Wasted liquidity.

Instruments for contractual redistribution:
- credit lines
- holdings, conglomerates
- CDS/swaps/risk management tools
(1) Inside Liquidity

✓ Q. Can distressed ($z_H$) firms use the value created by healthy ($z_L$) ones?
(1) Inside Liquidity

✓ Q. Can distressed \((z_H)\) firms use the value created by healthy \((z_L)\) ones?

✓ A1. (completely general).
   Yes if no macroeconomic shock; furthermore \(q = 1\).
(1) Inside Liquidity

✓ Q. Can distressed \((z_H)\) firms use the value created by healthy \((z_L)\) ones?

✓ A1. (completely general).
   Yes if no macroeconomic shock; furthermore \(q = 1\).

✓ However allocation of liquidity needs to be arranged ex ante.
   - Ex post is too late: \(z_H > z_0\) \(\implies\) no lending
     [analogy with current money market]
   Wasted liquidity.
(1) Inside Liquidity

✓ Q. Can distressed \(z_H\) firms use the value created by healthy \(z_L\) ones?

✓ A1. (completely general).
  Yes if no macroeconomic shock; furthermore \(q = 1\).

✓ However allocation of liquidity needs to be arranged ex ante.

  • Ex post is too late: \(z_H > z_0\) \(\implies\) no lending
    [analogy with current money market]
    Wasted liquidity.

  • Instruments for contractual redispaching:
    - credit lines
    - X holdings, conglomerates
    - CDS/swaps/risk management tools
✓ A2. (also general). No for sufficiently large macroeconomic shock.

Perfect correlation example: when all face $z_H$, cannot weather it.
✓ A2. (also general). No for sufficiently large macroeconomic shock.

Perfect correlation example: when all face $z_H$, cannot weather it.

- Private sector can/must then invest in low-yield, liquid projects that yield cash at date 1.

- Alternative = outside liquidity.
(2) Outside liquidity: public supply

✓ What can government do that private sector cannot do? Regalian taxation power.
(2) Outside liquidity: public supply

✓ What can government do that private sector cannot do? Regalian taxation power.

✓ In practice, creates a large amount of liquidity, most of it state-contingent:
  - monetary policy (low interest rates in bad times)
  - discount window, bailouts
  - guarantees in interbank, money and other short-term markets
  - asset repurchases (Paulson plan)
  - non-indexed deposit and unemployment insurance
  - fiscal policy, etc.
(2) Outside liquidity: public supply

✓ What can government do that private sector cannot do? Regalian taxation power.

✓ In practice, creates a large amount of liquidity, most of it state-contingent:

- monetary policy (low interest rates in bad times)
- discount window, bailouts
- guarantees in interbank, money and other short-term markets
- asset repurchases (Paulson plan)
- non-indexed deposit and unemployment insurance
- fiscal policy, etc.

Government provision much more efficient for rare events ($f_H$ low)
Equilibrium in market for liquid assets

Application 1: boom-bust episodes

At date 0, liquidty shortages at date 1 (lower i in H state)
Application#2: bad news (news $\hat{f}_H > f_H$)

Investment $I$, prior $f_H$

learn $\hat{z}$

continue at scale $i$

and cost $\tilde{z}_i$

$0 \leq i \leq I$

produces $z_1i$, of which $z_0i$ is pledgeable

liquidate $(I - i)$

Short-term impact ($I$ fixed): $|\hat{r}| \simeq |r| \frac{\hat{f}_H}{f_H}$
A few further implications

(1) Strategic complementarity in taking bets on yield curve

- Alone in taking massive gamble on wholesale borrowing market $\implies$ no “Bernanke put”
- Widespread gamble $\implies$ CB has no choice but keep the interest rate low
(1) *Strategic complementarity in taking bets on yield curve*

- Alone in taking massive gamble on wholesale borrowing market \(\rightarrow\) no “‘Bernanke put’”
- Widespread gamble \(\rightarrow\) CB has no choice but keep the interest rate low

(2) *Securitization is a source of liquidity*

Source of funding liquidity that is not reliable however:

- financial muscle of buyers depleted in bad times
- adverse selection may increase in bad times.
A few further implications

(1) *Strategic complementarity in taking bets on yield curve*

- Alone in taking massive gamble on wholesale borrowing market $\implies$ no “‘Bernanke put”
- Widespread gamble $\implies$ CB has no choice but keep the interest rate low

(2) *Securitization is a source of liquidity*

Source of funding liquidity that is not reliable however:

- financial muscle of buyers depleted in bad times
- adverse selection may increase in bad times.
Add “financial stability” (in sense of pre-emptive bubble avoidance) to the Fed’s mandate?

Bubbles

Add “financial stability” (in sense of pre-emptive bubble avoidance) to the Fed’s mandate?


Working paper with Emmanuel Farhi. Bubbles

- boost investment, while crash induces recession,
- exhibit a liquidity discount if stochastic,
- have larger impact on low $z_0$ firms,
- are more likely in countries with underdeveloped financial markets.
III. RECAPITALIZING THE FINANCIAL SYSTEM

Liquidity injections do not address key issue: undercapitalization. Discussion of three (non-exclusive) interventions.
III. RECAPITALIZING THE FINANCIAL SYSTEM

Liquidity injections do not address key issue: undercapitalization. Discussion of three (non-exclusive) interventions.

(1) Asset repurchases (Japan in 90s, Paulson)

Hazards/assessment:

- wrong targeting,
- others (discretionary management – plan useful only if $p >$ market value; policy for later resale?; need to take preferred stocks w. warrants).
III. RECAPITALIZING THE FINANCIAL SYSTEM

Liquidity injections do not address key issue: undercapitalization. Discussion of three (non-exclusive) interventions.

(1) *Asset repurchases* (Japan in 90s, Paulson)

Hazards/assessment:

- wrong targeting,
- others (discretionary management – plan useful only if $p > \text{market value}$; policy for later resale?; need to take preferred stocks w. warrants).

(2) *Government guarantees in interbank and money markets*

- do not restore trust,
- de facto (uncontrolled) loans from government to financial intermediaries.
III. RECAPITALIZING THE FINANCIAL SYSTEM

Liquidity injections do not address key issue: undercapitalization. Discussion of three (non-exclusive) interventions.

(1) *Asset repurchases* (Japan in 90s, Paulson)

Hazards/assessment:

- wrong targeting,
- others (discretionary management – plan useful only if $p > \text{market value}$; policy for later resale?; need to take preferred stocks w. warrants).

(2) *Government guarantees in interbank and money markets*

- do not restore trust,
- de facto (uncontrolled) loans from government to financial intermediaries.
(3) *Direct recapitalization*

- last minute: set equity at 0, remove management
  
  [ex post efficient + defines an unfavorable end game for management and shareholders]

- before failure: desirable, but stigma avoidance
  
  [like discount window, Japan 90s, IMF CCL,...]
Ongoing research with Jean-Charles Rochet

Banks have two classes of assets

- Potentially contaminated assets: Investment, Liquidity need, Outcome
- Potentially toxic assets: Origination, Resale, Outcome

Suppose that in absence of government intervention at date 1, lemons problem in resale market breaks down to contagion to rest of balance sheet. Optimal public policy (mechanism design)?
Ongoing research with Jean-Charles Rochet

Banks have two classes of assets

- Potentially contaminated assets
  - Investment
  - Liquidity need
  - Outcome

- Potentially toxic assets
  - Origination
  - Resale
  - Outcome

Suppose that in absence of government intervention at date 1, lemons problem in resale market → breakdown → contagion to rest of balance sheet
Ongoing research with Jean-Charles Rochet

Banks have two classes of assets

- Potentially contaminated assets
  - Investment
  - Liquidity need
  - Outcome

- Potentially toxic assets
  - Origination
  - Resale
  - Outcome

- Suppose that in absence of government intervention at date 1, lemons problem in resale market → breakdown → contagion to rest of balance sheet

- Optimal public policy (mechanism design)?
Public intervention must mitigate selection problem:

(Privately known)
quality of assets in place

Superior: do not participate in plan.
Crucial that plan not be encompassing, as inclusiveness raises the cost of intervention

Mediocre: government brings capital in the form of debt

Toxic: asset repurchases at inflated price. Incentives restored by clean slate.
Large number of regulatory failures.

Technical. The devil is in the details.
IV. FUTURE OF FINANCIAL REGULATION


- Large number of regulatory failures.
- Technical. The devil is in the details.

1. Return to fundamentals
   What is regulation about?

   - Normal times: protect small depositors, insurance policy holders, pension plan holders, retail investors.

   *Representation hypothesis* drives existing prudential rules.
IV. FUTURE OF FINANCIAL REGULATION


- Large number of regulatory failures.
- Technical. The devil is in the details.

(1) **Return to fundamentals**

What is regulation about?

- Normal times: protect small depositors, insurance policy holders, pension plan holders, retail investors.

  *Representation hypothesis* drives existing prudential rules.

- *Systemic risk* is currently paramount. Should not have become so prominent! (Endogenously) opaque system of mutual exposures $\Rightarrow$ can’t prevent non-regulated sphere from contaminating regulated one.
Ring fencing: “Keeping toxic products away from public places”
[Jean-Charles Rochet]

Use capital adequacy requirements to encourage:

- standardization of products
  
  [exchanges ➞ OTC from a regulatory viewpoint. For all their flaws, fair value accounting and ratings are key to regulatory assessment of risk]

- centralized markets with known and limited counterparty risk.
(2) *Fair value accounting*

- rationales: ex *ante*: prospect of having to downsize discourages bad investments;
  
  ex *post*: early recognition and intervention.
(2) *Fair value accounting*

- **rationales:** *ex ante:* prospect of having to downsize discourages bad investments;
  
  *ex post:* early recognition and intervention.

- **drawback:** snowball effects (fire sales)
(2) *Fair value accounting*

- **rationales:** *ex ante:* prospect of having to downsize discourages bad investments;
  
  *ex post:* early recognition and intervention.

- **drawback:** snowball effects (fire sales)

- recent tinkering with reclassification.
(2) *Fair value accounting*

- rationales: ex ante: prospect of having to downsize discourages bad investments;
  
  ex post: early recognition and intervention.

- drawback: snowball effects (fire sales)

- recent tinkering with reclassification.

**My current view:**

- keep fair value accounting
- use dynamic provisioning

  [good theoretical reasons for this.]
(3) Rating agencies

Large failure, not the first one...

- Needed: just “let banks make their own judgment” won’t work.
  
  [(a) hard to get more than 3 agencies; will thousands of institutions have enough expertise? (b) can regulators believe internal assessments?]
(4) *Regulatory infrastructure*

✓ Domestic
(4) **Regulatory infrastructure**

- ✓ Domestic
- ✓ International: X-border financial institutions
(4) Regulatory infrastructure

✓ Domestic

✓ International: X-border financial institutions

- Game with externalities
  - capital requirement/supervision
  - bailouts
    [imagine failure of large swiss or dutch bank]
  - deposit insurance
  - bankruptcy laws
Regulatory infrastructure

✓ Domestic

✓ International: X-border financial institutions

- Game with externalities
  - capital requirement/supervision
  - bailouts
    [imagine failure of large Swiss or Dutch bank]
  - deposit insurance
  - bankruptcy laws

- Define rules ex ante, ex post determination of burden sharing harder. Europe:
  - centralize supervision?
  - absence of a Treasury (and X-subsidies problem).
(5) Many other important issues
(5) *Many other important issues*

- Liquidity and solvency regulations
  - definition of liquidity,
  - VaR,
  - other drawbacks of Basel II.
(5) Many other important issues

- Liquidity and solvency regulations
  - definition of liquidity,
  - VaR,
  - other drawbacks of Basel II.

- Compensation
(5) Many other important issues

- Liquidity and solvency regulations
  - definition of liquidity,
  - VaR,
  - other drawbacks of Basel II.

- Compensation

- Securitization
V. CONCLUDING REMARKS

✓ Policy

- Very worrisome situation, yet an opportunity to lay down new rules.
- Resist both political pressure (highly technical issues) and business as usual (which would prepare next crisis).

✓ Research

Call for macro-prudential regulation:
V. CONCLUDING REMARKS

✓ Policy

- Very worrisome situation, yet an opportunity to lay down new rules.
- Resist both political pressure (highly technical issues) and business as usual (which would prepare next crisis).

✓ Research

Call for macro-prudential regulation:

- Supervisors and economists interested in prudential matters have long ignored macroeconomic aspects.
V. CONCLUDING REMARKS

✓ **Policy**

- Very worrisome situation, yet an opportunity to lay down new rules.
- Resist both political pressure (highly technical issues) and business as usual (which would prepare next crisis).

✓ **Research**

Call for macro-prudential regulation:

- Supervisors and economists interested in prudential matters have long ignored macroeconomic aspects.
- Macroeconomists have paid insufficient attention to micro-foundations of prudential rules, solvency and liquidity.

Current crisis demonstrates need for unification.
Thank you very much!