Incentives
through the
cycle:
micropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

Incentives through the cycle: microfounded macroprudential regulation

Giovanni di Iasio, Mario Quagliariello

Bank of Italy and European Banking Authority

The Future of Risk Management

Helsinki, 22-23 September 2011

Motivations

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

- Financial system: excessive volatility, procyclicality (Brunnermeier et al. 2009).
- Flaws in (microprudential) regulation (Kashayp et al. (2007)).
- Incentive distortions: risk-taking, lending standards, socialize losses (Acharya et al. (2009)).
- Policy response, Basel III, countercyclical macro buffer.

Motivations

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

Open issues:

- Role of asset prices in the build up of risk. Procyclicality from interaction between funding liquidity, leverage and asset prices (Adrian and Shin (2010)).

- Why and how capital requirement should evolve along the cycle? "Narrow" or "broad" interpretation.

- In which sense is the cycle endogenous to the behavior of financial institutions (FIs)?

The idea

Incentives
through the
cycle:
micropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

- FI's (costly) effort affects the probability of adverse shocks on the balance sheet and assets liquidation.

- The marginal utility of effort depends
  - *positively* on the continuation value of the FI.
  - *negatively* on the liquidation (market) price of assets.

- Regulatory authority delegated to prevent low effort. The incentive compatibility constraint endogenously emerges as a countercyclical capital requirement.

The model

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
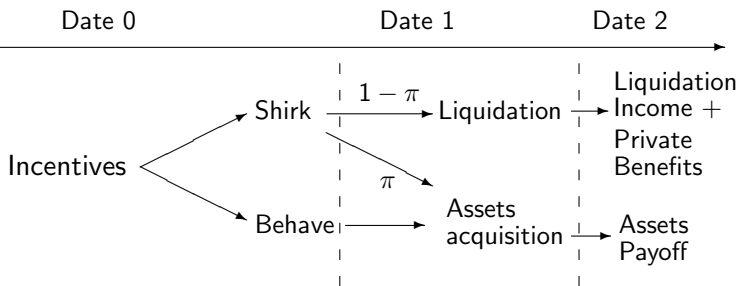Quagliariello

Table: FI's initial balance sheets

Assets	Liabilities
	$1 - e$, debt
1	
	e, equity

- At date 1 FI can purchase x new assets at the market clearing price p. Exogenous asset supply S.
- Date 2 asset value $\tilde{w}$, $E(\tilde{w}) = q$, $min(\tilde{w}) = q - z$.

The model: timing of events

Date 0	Date 1	Date 2

Incentives

Shirk $\xrightarrow{1-\pi}$ Liquidation $\longrightarrow$ Liquidation Income + Private Benefits

π

Behave $\longrightarrow$ Assets acquisition $\longrightarrow$ Assets Payoff

$1 - \pi$: probability of adverse shock.

The model: FI's utility

- Expected utility from high effort:

$$E(U_H) = (q - p)x + q - 1$$

- Expected utility from low effort:

$$E(U_L) = \pi[(q-p)x + q - 1] + (1-\pi)\max(p - c - 1; 0) + B$$

x: new assets purchased at date 1 if good state (note, disciplinary device)
q: expected (date 2) fundamental value of assets
p: equilibrium asset price
$p - c$: liquidation price
B: private benefits from low effort

The model: asset demand

Incentives through the cycle: microprudential macroprudential regulation

Giovanni di Iasio, Mario Quagliariello

- FI's demand of assets under a VaR constraint (equivalently, only secured funding)

$$(q - z)(x + 1) \geq 1 - e + px$$

- Demand x increasing in initial equity e:

$$x \leq \frac{e - 1 + q - z}{p - q + z}$$

- Equity e is a disciplinary device.

The model: Incentive compatibility

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

$E(U_H) \geq E(U_L))$

$E(U)$

U_H

U_L

$\bar{e}$

Incentive
compatible

e

The model

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello
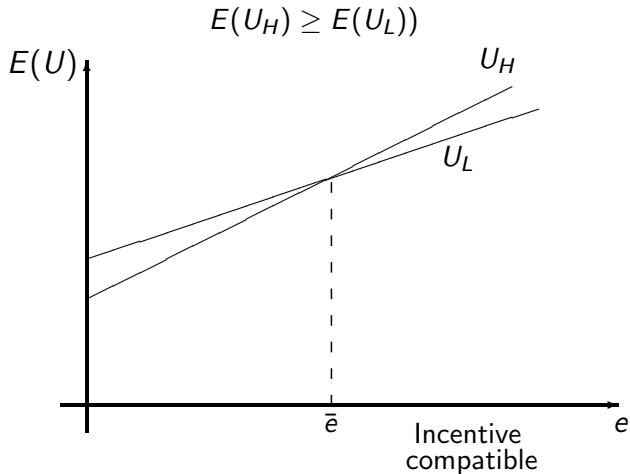
- $U_H \geq U_L$ needs $e \geq \bar{e}$ where

$$\bar{e} \equiv \frac{p - q + z}{q - p} \left[b - (q - 1) + \max(p - c - 1; 0)\right] + 1 - q + z$$

- IC curve: p positively affects $\bar{e}$.

The model

- Population of banks with different initial equity (distributed with $G(e)$ on the support $[e_m, e_M]$).
- Equilibrium asset price:

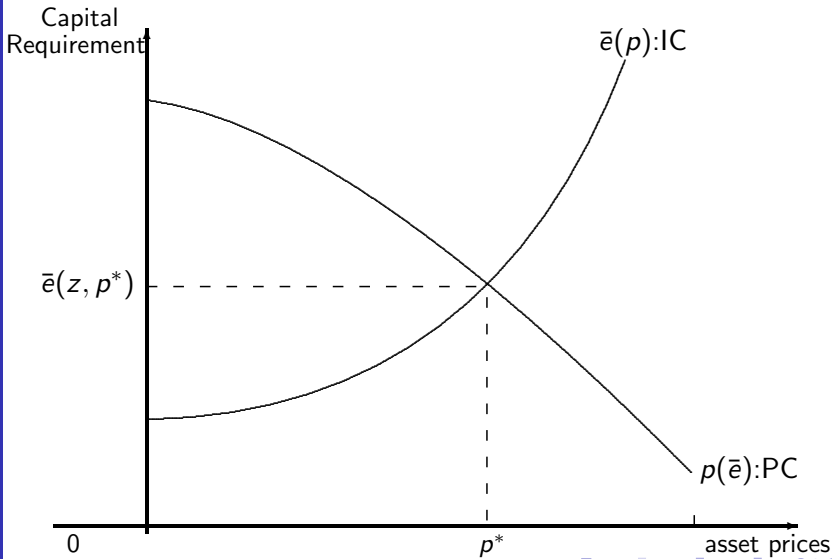$$\int\limits_{\bar{e}}^{e_M} \frac{e - 1 + q - z}{p - q + z} \mathrm{d}G(e) = S$$

  S: supply of assets.
- Only FIs with $e \geq \bar{e}$ (incentive compatible) can purchase assets.
- PC curve: the higher the capital requirement, the lower the equilibrium price.
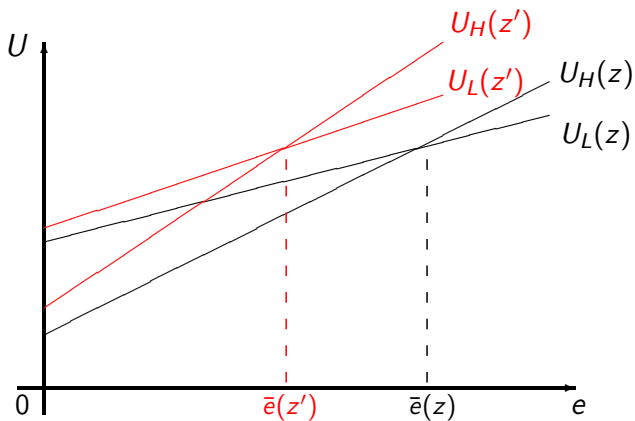
The model: equilibrium

The model: Incentive compatibility, decline in risk $z' < z$

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

Giovanni di
Iasio, Mario
Quagliariello

Incentives through the cycle and macroprudential regulation

Incentives
through the
cycle:
microfounded
macropruden-
tial
regulation

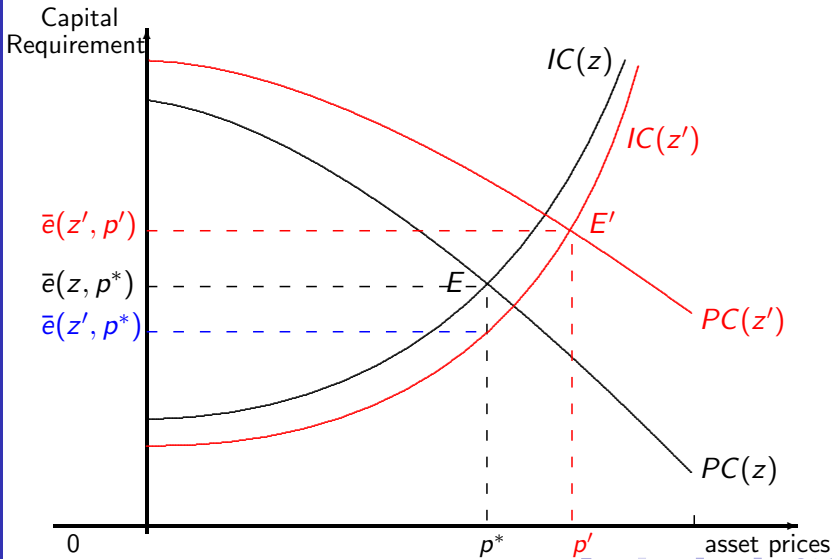Giovanni di
Iasio, Mario
Quagliariello

Positive shock to fundamentals:

- **Direct effect**: FIs' balance sheet can grow larger $\rightarrow$ higher continuation value (payoff in the good state) $\rightarrow$ higher optimal effort $\rightarrow$ lower capital requirement (risk-sensitive Basel II).

Incentives through the cycle and macroprudential regulation

Positive shock to fundamentals:

- **Direct effect**: FIs' balance sheet can grow larger $\rightarrow$ higher continuation value (payoff in the good state) $\rightarrow$ higher optimal effort $\rightarrow$ lower capital requirement (risk-sensitive Basel II).

- **Indirect effect**: aggregate pressure on asset demand and prices $\rightarrow$ expectations of higher liquidation price (payoff in the bad state) $\rightarrow$ lower optimal effort $\rightarrow$ strengthened capital requirement (countercyclical buffer Basel III).

Incentives through the cycle and macroprudential regulation

Conclusions

- When "fundamental" (exogenous) risk decreases, absent a proper regulation, the "deterioration" (endogenous) risk increases.

- Differently from standard model (Rochet et al. (1996), Allen and Gale (2004)), **positive** shocks may induce incentives distortion.

- Microprudential regulation (no attention to macro variables), disregarding the feedback effect of asset prices on FIs incentives, bad (dis)equilibria (e.g. fire sales and crisis).

- Macroprudential regulation: tighter regulatory constraints along the boom to eliminate incentives distortions.

THANKS FOR YOUR ATTENTION!