Lecture 3: LOLR, bailouts and crisis resolution

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Outline

• The classical LOLR doctrine and practice
• Coordination failure and the LOLR
• Endogenous liability structure, moral hazard, and crisis resolution
  – The commitment problem
• International LOLR, external discipline and emerging economies
The classical Lender of Last Resort doctrine and practice
The classical doctrine
Thornton (1802), Bagehot (1873)

a) lend only against good collateral (valued at pre-crisis levels) to solvent banks

b) lend at a penalty rate (to banks that are illiquid)

c) announce readiness to lend without limits (credible policy)
Evidence

• LOLR operations become standard practice after the panic that followed the Overend-Gurney failure (1866), first in the UK (Barings crisis, 1890) then in continental Europe.

• US private clearing houses played a LOLR role during the national banking era (1857-1907), before the creation of the Fed and the discount window (1913)
The doctrine and the Fed

• Federal Reserve System established in 1907 to deliver a credible emergency lending mechanism
• Fed introduced in the 1920s stigma for banks that used the discount window
• Failures of large banks in the 1930s made depositors realize that the discount window was not working and banks runs started
• Banking Acts of 1933 (Glass-Steagall) and 1935 establish FDIC and amend section 13 of Federal Reserve Act (13-3) to allow Fed to lend to banks in trouble under «unusual and exigent circumstances» as long as the loan is «secured to the satisfaction of the Fed»

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The Practice: Examples

• IT problems

• Closure of a large bank, followed by offer of Emergency Liquidity Assistance to other banks:
  – Herstatt bank, 1974 (German Bundesbank), Barings, 1995 (Bank Of England).

• Stem general illiquidity
  – Several instances by Fed, ECB, BOE, BOJ during the crisis.

• Fed extends LOLR umbrella in the crisis to broker dealers (BS, ML, GS, MS, ..) and the shadow banking system (Money Markets funds...)

• Intervention to prevent market crashes
  – Commercial paper run after Penn Central Bankruptcy in June 1970 (Calomiris 1994)
The Practice: Violations of the doctrine

• Violations of «lending only to solvents banks» (a):
  – Liquidity support to insolvent institutions during the subprime crisis (were Bearn Stearns in March 2008, Freddie Mae/Mac pre-LB and AIG, BoA, Citi, GS, MS post-LB solvent?).

• Insolvent banks that were bailed out
  – for political reasons: Crédit Lyonnais (1992-96, France), or

• Solvent bank not bail out?
  – Banco Popular (Spain, 2017)

• It is difficult to separate LOLR policy from closure/restructuring policy.
  – Is central bank help part of an “orderly failure resolution ” or is a “hidden bail out”?

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The Lehman moment (Sep. 2008)

- Was LB insolvent because of risky real state investments, as Bernanke, Paulson (Treasury Secretary) and Geithner (President of NY Fed) stated (and therefore no help was possible), or it was narrowly solvent and Paulson did not want to use public money to avoid being «Mr. Bailout»?
Criticisms to the classical doctrine

• Impossibility of clearly drawing a line between *illiquid* and *insolvent* banks.

• Central Bank is also responsible for stability of the financial system
  ⇒ sometimes rescue insolvent banks but moral hazard.
  – Goodhart-Huang (1999): Trade-off between contagion risk and banks’ moral hazard
    ⇒ Rescue insolvent banks above a certain size (TBTF) + random intervention (*Constructive ambiguity*).

• Public intervention is subject to political pressure and regulatory capture:
  – Discount window is a disguised way to bail out insolvent banks (Kaufman (1991)).
Criticisms to the classical doctrine

- Goodfriend and King (1988) argue that with modern inter-bank markets, banking policy has become redundant.
  
  “A solvent bank cannot be illiquid”: Well-informed participants in this interbank market will distinguish liquidity from solvency problems.
  
  – LOLR could be replaced by private Lines-of-Credit services (Goodfriend-Lacker, 1999)

- Similarly, an international LOLR is not needed because joint action by the Fed, the ECB and BOJ can take care of any international liquidity problem (Chari and Kehoe (1998)).
Back to the bank run model

The model

Dates: \( t = 0, 1, 2 \)

Bank's balance sheet at \( t = 0 \):

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- \( D_0 \): volume of uninsured wholesale deposits.
- Nominal value of deposits if withdrawn \((t = 1, 2)\): \( D \geq 1 \).
- \( E \): value of equity.
- \( I \): investment in risky assets, with random return \( \theta \sim N(\mu_\theta, (1/\tau_\theta)) \) at \( t = 2 \).
- \( M \): cash reserves held by bank.
The model

• At $t = 1$, fund manager $i$ observes private signal $s_i = \theta + \varepsilon_i$ ($\varepsilon_i$ are i.i.d. $N(0, (1/\tau_\theta))$).

• Proportion $y$ decides to withdraw (not renew CDs).

• If $yD > M$, bank forced to sell volume $y$ of assets.

• If bank does not fail at $t = 1$ it continues until date 2.
Early closure

• *Early closure* is possible:
  – Operation in interbank market does not involve physical liquidation of assets but when $\theta$ small or $\lambda$ large interbank markets do not suffice to prevent early closure of bank.

• Early closure ($t = 1$):
  – Involves physical liquidation of assets and is costly: (per unit) liquidation value of assets is $\nu \theta$, with $\nu \ll \left(\frac{1}{1+\lambda}\right)$.
  – It is never ex post efficient but may be ex ante efficient to discipline bank managers.
Regions (liquidation)

- \( yD \leq M \): no liquidation at \( t = 1 \) and failure at \( t = 2 \) iff
  \[
  \theta I + M < D \iff \theta < \theta_\sim = \left( \frac{D - M}{I} \right).
  \]
  \( (\theta: \text{solvency threshold of bank}) \)

- \( M < yD \leq M + (\theta I / (1 + \lambda)) \): partial liquidation at \( t = 1 \), and failure at \( t = 2 \) iff
  \[
  \theta I - (1 + \lambda)(yD - M) < (1 - y)D \iff \theta < \theta_\sim[1 + \lambda \frac{yD - M}{D - M})].
  \]
  (solvent banks can fail when \( y \) is too large but not when bank is supersolvent: \( \theta > (1 + \lambda)\theta_\sim \))

- When \( yD > M + (\theta I / (1 + \lambda)) \), bank is liquidated at \( t = 1 \)
  (early closure)
Complete liquidation at $t = 1$

Partial liquidation at $t = 1$

Failure at $t = 2$

No liquidation at $t = 1$

Failure at $t = 2$
Critical values

Early closure: $\theta_{ec}(y) = (1 + \lambda) \frac{(yD-M)_+}{I}$.

Failure: $\theta_f(y) = \theta + \lambda \frac{(yD-M)_+}{I}$.

• Equivalently:

  $\theta_{ec}(y) = \tilde{\theta}(1 + \lambda) \frac{(y-m)_+}{1-m}$

  $\theta_f(y) = \tilde{\theta} \left(1 + \lambda \frac{(y-m)_+}{1-m}\right)$ (inverse of $h(\theta)$)

• Note that

  $\theta_{ec}(y) < \theta_f(y)$
Failure and early closure thresholds given critical signal

\[ y(\theta, s^*) \]

\[ h(\theta) \]

Early closure

\[ \theta^* \]

\[ \theta \]

\[ \theta_{EC} \]

\[ (1 + \lambda) \theta \]

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Coordination failure and the LOLR
Coordination failure and LOLR Policy

Consider CB that tries to minimize involvement under constraint that coordination failure/illiquidity region disappears

- A high enough liquidity requirement eliminates coordination failure but this typically limits too much bank lending capacity (i.e., credit crunch, $I + M = D_0 + E$).

Bagehot's LOLR policy that eliminates coordination failure:

- Suppose the CB is not allowed to subsidize banks and observes $\theta$ at $t = 1$ (supervisory knowledge or observing withdrawals of bank).
- CB announces it will lend without limits at rate $r \in (0, \lambda)$, but only to solvent banks.
- Optimal strategy of (solvent) bank is to borrow the liquidity it needs $D[y - m]_+$. 
Coordination failure and LLR Policy

When $\gamma - m > 0$, failure will occur at $t = 2$ iff:

$$\frac{\theta_I}{D} < (1 - \gamma) + (1 + r)(\gamma - m)$$

or iff:

$$\theta < \theta \left(1 + r \frac{[\gamma - m]_+}{1 - m}\right)$$

(as before with $r$ replacing premium $\lambda$).

- LOLR policy fully effective (yielding $\theta^* = \theta$) when $r$ close to zero.
- Note that LOLR induces $\theta^* = \theta$ even if there are multiple equilibria to start with (credibility of CB policy).
Coordination failure and LOLR Policy

• CB intervention:
  – Open market operation (high $\lambda$ due to temporary spike of market rate as in Sep 11, 2001)
  – Discount window (high $\lambda$ due to adverse selection)
  (Rationalizes low rate lending by Fed?)

• Whenever CB helps with a very low rate collateral of bank is evaluated under "normal circumstances" (that is, when there is no coordination failure)

• Potential superiority of LOLR over market investors:
  – Better information
  – Large investor can eliminate adverse selection by pooling
  – Better means to secure repayment of debt
  – Long horizon and no financing constraint
Example equilibrium (with no LOLR)

Case $\tau_\varepsilon \to \infty$ (unique equilibrium with closed-form solution):

$$s^* = \theta^* = \theta \left( 1 + \frac{\lambda}{1 - m} \left( \max\{1 - \gamma - m, 0\} \right) \right)$$

and

$$\bar{m} = 1 - \gamma$$

- Private information is arbitrarily more accurate than public information:
  - There is little aggregate uncertainty in the interim period, while there is maximal strategic uncertainty among agents.
  - Guarantees a unique equilibrium.
How does the figure change when $\tau_{\varepsilon} \to \infty$?
Example (continued)

Case ($\tau_\varepsilon \to \infty$).

- Let $1 - \gamma > m$ so that $\theta^* > \theta$. Then
  - $y = 0$ for $\theta > \theta^*$,
  - $y = 1 - \gamma$ for $\theta = \theta^*$, and
  - $y = 1$ for $\theta < \theta^*$

- Note that $\theta^* = \theta_{EC}$ (no heterogeneity: all agents take the same action in eq., and there is no partial liquidation).

- Whenever $\theta > \theta^*$, CB will help avoiding failure and evaluating collateral as if $y = 0$. This effectively changes failure point to $\theta^* = \theta$.
Alternative LOLR (avoid early closure)

- Announce commitment to provide liquidity assistance at a (close to) zero rate but only for liquidity needs that exceed amount that can be lent by the market in the range \((\theta, \theta_{EC}(s^*))\).

- Avoids inefficient liquidation (early closure) at \(t = 1\) by lending \(D \cdot y(s^*, \theta) - \left( M + \frac{I\theta}{1+\lambda} \right) > 0\) (but in this case equilibrium among fund managers is not modified and bank will fail at \(t = 2\)).

- LOLR help (bail-out) complements money raised in the interbank market \(\frac{I\theta}{1+\lambda}\) (bail-in) in orderly resolution of failure.
Endogenous liability structure, moral hazard, and crisis resolution
Moral hazard and short-term debt

• Puzzle: Why the bulk of interbank lending is short-term?
  
  Short term debt to discipline bank manager subject to moral hazard problem:

• Investment in risky assets requires supervision of bank manager.

• Manager can exert (unobservable) effort \( e \in \{0, 1\} \) at \( t = 0^+ \) and distribution of returns is \( G(\theta|e): \theta \sim N(\mu^0, \tau_{\theta}^{-1}) \) when \( e = 0 \), and \( \theta \sim N(\mu^1, \tau_{\theta}^{-1}) \) when \( e = 1 \) with \( \mu^1 > \mu^0 \).

• To choose \( e = 1 \) has cost \( A \) and manager has benefit \( B \) from continuing project until \( t = 2 \) (but does not care about monetary incentives).

• Use threat of early closure to induce effort
  
  – Assume it is worthwhile to induce \( e = 1 \) (\( \mu^1 - \mu^0 \) large enough and (physical) cost of asset liquidation \( v \) not too large).
Moral hazard

- $t = 0^+$: Bank manager chooses effort
- $t = 0$: Balance sheet in place
- $t = 1/2$: Public signal $P$ released
- $t = 1$: Fund managers receive private signal and decide on CD renewal; Risky project continues with probability $q$
- $t = 2$: $\theta$ realized; Payoffs of fund and bank managers collected

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Incentive efficient solution

\[ \max_{I,M,q} \mathbb{E}[\text{Surplus}] \text{ s.t.} \]

- resource constraint
- ICC of bank manager
- \( q(\theta) \): prob. of continuation at \( t = 1 \) is a function of \( \theta \) since pooled signals of fund managers reveal \( \theta \)
  - Payoff of bank manager is: \( q \mathcal{B} - A e \)
  - Given that MLRP holds and early closure costly, optimal region of continuation is of cutoff form: close/restructure bank if \( \theta < \theta^o \): smallest \( \theta \) that fulfills ICC:
    \[ G(\theta|e = 1) - G(\theta|e = 0) \geq \frac{A}{\mathcal{B}} \]
  - \( \theta^o \) (weakly) increasing with extent of moral hazard problem of bank managers \( \frac{A}{\mathcal{B}} \)
    - Note that as \( \frac{A}{\mathcal{B}} \to 0 \), we have that \( \theta^o \to -\infty \)

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Incentive efficient solution (program)

\[ \max_M \left\{ (1 + E - M) \left( \mu^1 - (1 - \nu) \int_{-\infty}^{\theta^o} \theta g(\theta|e = 1) d\theta \right) + M \right\} \]

where \( \theta^o \) is the minimal return cutoff that motivates the bank manager.

If

\[ \mu^1 - (1 - \nu) \int_{-\infty}^{\theta^o} \theta g(\theta|e = 1) d\theta > 1 \]

then \( M^o = 0 \).
Implementation of incentive-efficient solution

• Withdrawals at market solution with dispersed short term debt may enforce early closure of bank and provide incentives to manager:
  – Single lender or long term debt will not work.
  – But market solution may be inefficient (not enough degrees of freedom).

• Problem: typically market solution has too many early closures of banks.
Banking contract with short-term debt

\[ \max_{(I,M,D)} \mathbb{E}[Surplus] \quad \text{s. t.} \]

- resource constraint
- IRC of investors (zero expected return; determines \( D \))
- ICC of bank manager, and
- closure rule associated with (unique) eq. of fund managers’ game \((s^*, \theta^*)\): \( y(\theta, s^*) D > M + \frac{I \theta}{1+\lambda} \) or \( \theta < \theta_{EC}(s^*) \) \((\leq \theta^*)\).
Banking program

\[ \text{Max}_m \phi(m) \]

where \( \phi(m) = \]

\[
(1 + E - Dm) \left( \mu^1 - (1 - v) \int_{-\infty}^{\theta_{EC}(s^*(m))} \theta g(\theta | e = 1) d\theta \right) + Dm
\]

subject to:

1. \( s^*(m) \) is the unique equilibrium of the fund managers’ game; and
2. \( \theta_{EC}(s^*(m)) \geq \theta^o \)
3. \( D(1 - p) = 1 \) where \( p = Pr[\theta < \theta^*] \)
Solution to banking program

If the net return on banks’ assets is always smaller than the opportunity cost of liquidity (when the banks keep no liquidity)

\[
\mu^1 - (1 - v) \int_{-\infty}^{\theta_{EC}(s^*(0))} \theta g(\theta | e = 1) d\theta < 1,
\]

then \( m^* > 0 \).

- \( \theta_{EC}(s^*) \geq \theta^0 \); typically \( \theta_{EC}(s^*) > \theta^0 \) and market solution with too many early closures of banks and too little investment.
Can the LOLR implement the incentive-efficient solution?
Lender of Last Resort and moral hazard

• Central bank helps banks in distress with a line of credit or open market operation.

• Bailouts avoid costly liquidation of projects but induce a moral hazard problem: banker will not monitor projects if he knows it will be bailed out when in trouble (e.g. bailouts in Argentina, Mexico, Thailand).

• Need threat of closure/restructuring to discipline bank managers.
The commitment problem

• Central bank policy is time-inconsistent:
  – Ex ante the central bank would like to commit to close the bank (not to help) if returns are low.
  – Ex post (once the crisis is ongoing) it is always optimal to forebear/help (because to liquidate projects is costly and bank manager welcomes help).

• Acharya and Yorulmazer (2007):
  – Too-many-to-fail: Regulator has incentives to bail out ex-post failed banks when many institutions have problems.

• Farhi and Tirole (2012):
  – Correlated risks: private leverage choices of financial intermediaries are correlated through the response of monetary policy.

• Gale-Vives (2002):
  – A time-inconsistent policy will lead to excessive bailouts (and no effort by bank managers).
  – Solution: build a reputation for CB toughness to implement incentive-efficient solution (e.g. Federal Reserve, Bundesbank).
A modified Bagehotian LOLR

• Implement incentive-efficient solution by announcing commitment to provide liquidity assistance (discount window) at a zero rate whenever $\theta > \theta^o$.
• Bank will borrow liquidity it needs $D(y - m)_+$. 
• Inefficient liquidation at $t = 1$ in the range $(\theta^o, \theta_{EC}(s^*))$ is avoided.
• When $\theta^o > \theta$, no money is lost by CB since bank is helped while being solvent; commitment problem for the CB needs prompt corrective action policy.
• When $\theta^o < \theta$, CB money is lost in the range $(\theta^o, \theta)$, outside funding is needed: orderly resolution of failures regime.
Modified Bagehotian LOLR

Severe Moral Hazard
(Market may get it right: $\theta_{EC} \geq \theta^o$)

Moderate Moral Hazard
(excessive liquidation always: $\theta_{EC} \geq \sim > \theta^o$)
A modified Bagehotian LOLR: some issues

- Solvency threshold $\theta$ has no special meaning:

  $$\theta^o > \sim \theta \sim \theta^o < \theta$$

  for severe (moderate) moral hazard problem for bank managers.

- If LOLR has *imperfect signal* then there is cost of liquidity provision by CB and there is a role for the liquidity ratio. Prudential regulation and LOLR policy will be complementary.

  - E.g., Santos and Suarez (2013): liquidity requirements make banks better able to withstand the initial phases of a crisis, and allow the LOLR to be better informed when making his decision.
A modified Bagehotian LOLR: summary

• With neither a LOLR nor an interbank market, liquidation takes place whenever $y > m$, which limits inefficiently investment $I$.

• With an interbank market but no LOLR (as advocated by Goodfriend and King) closure threshold is $\theta_{EC}(s^*)$ and there is typically excessive failure $\theta_{EC}(s^*) > \theta^o$. 
A modified Bagehotian LOLR: summary

• With LOLR facility and interbank market:
  – When \( \theta^o > \theta \) (severe moral hazard problem for banker), incentive-efficient solution can be implemented complementing LOLR with policy of *prompt corrective action* in range \( (\theta, \theta^o) \).
  – When \( \theta^o < \theta \) (moderate moral hazard problem for banker), a different institution (financed by taxation/insurance premiums) is needed to complement CB and implement incentive-efficient solution.
    • CB helps whenever bank is solvent and other institution finances "orderly resolution of failure" otherwise.
A variation

- Implement incentive-efficient solution by announcing commitment to provide liquidity assistance at a zero rate but only for liquidity needs that exceed amount that can be lent by the market in the range \((\theta^o, \theta_{EC}(s^*))\).
- Avoids inefficient liquidation at \(t = 1\) by lending
  \[D \cdot y(s^*, \theta) - \left( M + \frac{I\theta}{1+\lambda} \right) > 0\] (and bank will fail at \(t = 2\)).
- LOLR help (bail-out) complements money raised in the interbank market \(\frac{I\theta}{1+\lambda}\) in orderly resolution of failure.
Conclusion

• Rationale for Bagehot's doctrine of helping illiquid but solvent banks in context of modern interbank markets:
  – Act when bank is close to insolvency ($\theta$ low) or when there is a temporary liquidity shortage ($\lambda$ high) in interbank markets.

• When the liability structure of banks is endogenized (with banker’s moral hazard problem) then we need a modified Bagehotian LOLR with an intervention threshold which differs from the solvency threshold leading to two types of crisis resolution regimes:
  – *Prompt corrective action (PCA)* regime where the commitment problem of the LOLR is resolved (prevented from intervening too often).
  – *Orderly failure resolution (OFR)* regime where non-central banks funds are needed to cover the expected costs of banks’ assistance.
Public intervention: theory

• Ex ante: Prudential regulation
• Interim: LOLR
• Resolution: Closure/restructuring rules; PCA and OFR regimes

• Complementarity between policies:
  – prudential (including liquidity requirements when the information of the CB is imperfect),
  – LOLR,
  – resolution
Public intervention: practice

• Tensions: Dodd-Frank (2010) aims to end public bailouts and conflicts with LOLR:
  – extends ability of Fed (and Treasury) to act ex ante (pre-emptively before a crisis) and as supervisor but reduces flexibility to act quickly during the crisis:
    • Section 13-3 (Federal Reserve Act) powers of Fed restricted by requiring more cooperation with Treasury and more disclosure to Congress.

• Challenges of LOLR:
  – Scope: coverage of non-bank institutions?
  – How to avoid stigma of discount window?
  – Combine supervision and LOLR?
  – Conflict with monetary policy?
The LOLR post Dodd-Frank

• No loans can be made to single institutions.
• All nonbank loans must be approved by the secretary of the treasury.
• Loans can only be made to solvent institutions.
• Banks are severely limited in using discount window loans to channel funds to nonbank affiliates, like broker-dealers.
• Heightened collateral requirements are imposed, preventing inter alia the purchase of unsecured commercial paper, as done in the crisis.
• All loans must be publicly disclosed within one year and disclosed to congressional leaders within seven days.
International LOLR

ILOLR can inject liquidity in international financial markets or can act to help particular banking systems in trouble. Size of intervention different in each case.
Stylized facts

• During the decade running up to the financial crisis, there have been financial and banking crises usually coupled with currency and debt crises (e.g. Mexico, Thailand, Indonesia, Korea, Russia, Brazil, Ecuador, Turkey, Argentina and Uruguay).

• The crises involve:
  – Massive reversal of capital flows.
  – Large drop in economic activity.
  – Unwillingness of investors to rollover short-term claims on the country.
Two views on international crises:
View I (Sachs (1995), Fischer (1999))

- Driven by liquidity runs and panics.
- Can be avoided via the provision of sufficient international liquidity to threatened countries.
- The creation of an international lender of last resort (ILOLR) would:
  - increase ex post efficiency by eliminating liquidation costs and default in the event of a run.
  - would prevent crises from occurring in the first place by breaking off the link between illiquidity and insolvency.
Two views on international crises.

View II (Meltzer report (2000))

• Crises are driven by:
  – Fundamental shocks
  – Policy mismanagement

• International illiquidity is *not* the main factor driving crises.

• Liquidity support may turn into a subsidy to insolvent countries
  – Thus generating debtor and creditor moral hazard.

• IMF intervention should be limited in frequency and size so as to reduce moral hazard distortions, even if limited support would not prevent liquidity runs.
Reinterpretation of the model

as banking system/private sector of a small open economy:

– $D_0$: foreign denominated short-term debt/sovereign
– $M$: amount of foreign reserves
– $I$: investment in risky local entrepreneurial projects
– $E$: equity and long-term debt
– $D$: face value of foreign denominated short-term debt
– $\lambda$: fire sales premium of early sales of domestic bank assets in the secondary market.
Run on sovereign debt

- The public signal may be a credit rating
Ratios

• The balance constraint at $t = 0$ is

\[ E + D_0 = I + M \]

and the solvency threshold

\[ \theta \equiv (D - M)/I = (1 - m)/(\ell^{-1} + d^{-1} - m) \]

where

\[ \ell = D/E \] is the short-term external leverage ratio
\[ d = D/D_0 \] is the risk premium
\[ m = M/D \] is the ratio of foreign reserves to foreign short-term debt (crucial empirically in determining probability of country crisis (Radelet and Sachs (1998), Rodrik and Velasco (1999))).
Equilibrium results (I)

• For $\theta < \theta_{EC}$ foreign lenders cannot be repaid at $t = 1$, costly liquidation of projects and banking sector/private sector/government "restructured".

• For $\theta < \theta^*$ banking sector/country is bankrupt/country will default.

• Coordination failure of international investors may occur: a solvent banking sector/country may fail/default.

• For a high enough $m$ there is no coordination failure.
Equilibrium results (II)

• The probability of default of the banking sector/country is:
  – decreasing in $m$ and $\mu_\theta$
  – increasing in $\lambda, d, \ell, \gamma^{-1}$ (market conservatism)
  – increasing in $\tau_\theta$ when public news are bad

• Disclosure of public signal/credit rating about country return prospects may introduce multiple equilibria and expectations rally in run equilibrium.

• A Bagehotian ILOLR can minimize incidence of coordination failure among international fund managers provided that is well informed about $\theta$. 
Moral hazard

- $e$: effort exerted by country bank managers/entrepreneurs/government to improve distribution of returns (default at $t = 1$ deprives those actors of continuation benefits).

- Foreign short-term debt disciplines bank managers/entrepreneurs/government (assume it is worth to induce effort).
Moral hazard and sovereign debt

Country manager chooses effort
\( t = 0^+ \)

\( t = 0 \)
- Balance sheet in place: Invest \( I \)
- \( D_0: \) ST external debt
- \( M: \) safe reserves

\( t = 1/2 \)
- Credit rating \( P \) released

\( t = 1 \)
- Fund managers receive private signal and decide on CD renewal
- Risky project continues with probability \( q \)

\( t = 2 \)
- \( \theta \) realized
- Payoffs of fund and country managers collected
Policy commitment problem

• Developing economy: Aggravated commitment problem of Central Bank because of weak regulatory structure and short horizons
  – Tendency to bailouts and blanket insurance.

• Government of an emergent country may devalue the claims of foreigners in domestic currency in order to protect the domestic private sector
  – Inter-temporal inconsistency, capture, “crony capitalism”.

• Central problem in external borrowing is lack of commitment/contracting capacity between the government of the emerging country and foreign investors.
External discipline
(Gale and Vives (2002))

• “Dollarization” (adopting a stable currency) represents a commitment to a limited use of the LOLR facilities:
  – "We would never put ourselves in a position where we envisioned actions that we would take would be of assistance to the rest of the world but to the detriment of the United States”.
    Alan Greenspan to a congressional panel in 1999 (IHT, Jan. 19, 2000)
  – Help must be arranged in advance (stabilization funds and/or tax schemes, or pre-contracted in the international market) like in Argentina when currency board was in place.
  – It is costly to reverse (although a currency board is less credible...).

• Short-term debt denominated in foreign currency (cannot be “inflated away” by Central Bank like domestic debt).
Argentinia

• 1991 Convertibility Law
  – LOLR activity of CB severely restricted.
  – CB could raise additional liquidity equivalent to 30% of the monetary base (not enough for large crisis).

• Banking system well regulated and supervised:
  – Following developed country strategy anchored in the currency board.
  – Importing external discipline.

• Indications that market discipline had improved:
  – "Tequila" crisis of 1995: 51 institutions closed and depositors lost approx. 50%.
  – Risk perceptions of banks were taken into account by the market in 1993-99 (Calomiris and Powell (2000)).
Trade-offs of external discipline

• Benefit:
  – Solves the time-inconsistency problem of CB policy/opportunistic behavior of government.
  – Imposes discipline to banking/private sector by avoiding excessive help.

• Cost:
  – Excessive liquidation of entrepreneurial projects (e.g., help is not available even when it is ex ante good).
Foreign-denominated short-term debt (I)

• Emergent economy has acquired foreign-denominated short-term debt to alleviate the moral hazard/commitment problem in order to access the international capital market – disciplining the private sector to exert effort and preventing the government from devaluing the claims of foreign investors.

• This allows access to the international capital market beyond the reserves of the country.
Foreign-denominated short-term debt (II)

• Two-edged sword:
  – disciplining device but
  – leaves door open to systemic risk, speculative attack, and sudden reversal of capital flows.

• Optimal amount of foreign short-term debt is not zero but danger of overexposure.

• Empirical results on impact of short-term debt on probability of crisis are mixed.
International LOLR: scenarios

• With no ILOLR and no access to international interbank market: country projects liquidated when withdrawals by foreign fund managers are larger than reserves \((y > m)\).

• With no ILLR but access to international market: some costly project liquidation avoided with asset fire sales; excessive liquidation of entrepreneurial projects.
International LOLR: scenarios

• With ILOLR and access to international market:
  – For $\theta < \theta^o$ there is "restructuring".
  – For severe moral hazard problem $(\theta^o > \bar{\theta})$, PCA in range $\left(\bar{\theta}, \theta^o\right)$ needed to complement ILOLR facility. A solvent country may need to restructure when returns close to solvency threshold.
  – For moderate moral hazard problem $(\theta^o < \bar{\theta})$, on top of ILOLR help for solvent country, an OFR process needed.
Role of ILOLR

• ILOLR can
  1. inject liquidity in international markets or
  2. help countries in trouble.
• In (2) tension between crisis prevention and moral hazard.
• ILOLR à la Bagehot, modified with a policy of prompt corrective action and with facilities for orderly failure resolution, can implement incentive-efficient solution.
What if LOLR has imperfect information?
What size of intervention is needed?
Can partial bailouts work?
IMF position on ILOLR: An intermediate view

• If a crisis can be grounded in illiquidity rather than insolvency:
  – A partial bailout conditional on policy adjustment by the debtor country can restore investors’ confidence and stop destructive runs.
  – Can have a catalytic effect.

• As a result, resources do not need to be unlimited, since official liquidity provision and policy adjustment will convince private investors to rollover their positions while restoring market access by the debtor country.
Effect of ‘catalytic interventions’ on economies experiencing a crisis

• In the decade up to the crisis, the IMF systematically adopted a catalytic approach of large financial loans to support main emerging market economies that experienced a crisis
  – Success in Mexico 1995; Brazil in 1999 and 2002.

• Empirical studies have difficulties in understanding why and to what extent catalytic finance may work.
Research Question
Corsetti et al. (2006)

• Can partial ‘catalytic’ bailouts ever be successful or only corner solutions of full bail-outs or full bail-ins (i.e. debt suspension or standstill) can be effective in preventing destructive runs?

• Claim: IMF bailouts will only work when there are enough resources to fill financing gaps of any possible size (e.g. Zettelmeyer (2000) and Jeanne and Wyplosz (2001))
  – These authors use models with multiple equilibria in which partial bailouts cannot rule out the possibility of self-fulfilling runs.

Corsetti et al. (2006): Theoretical model of financial crises and the main policy trade-offs in the design of liquidity provision by an international financial institution.
Modeling features

• Crisis is generated by both fundamental shocks and self-fulfilling panics.
• Liquidity provision affects the optimal behavior of the government of the debtor country (may generate moral hazard distortions).
• Official creditor (IMF or ILOLR) is modeled as a large player in the world economy with a well defined objective function, private noisy information, and financial resources.
• Strategies of the official creditor, international speculators and domestic governments are endogenously determined in equilibrium (unique since private precisions set to infinity).
• Domestic GNP is a measure of national welfare
  – It is different from the objective function of the domestic government because of the political costs of implementing reforms and adjustment policies.
Results (I)

• A catalytic liquidity provision by an official institution can work to prevent a destructive run.
  – But if fundamentals are weak, partial bailouts may not be successful.

• Contingent liquidity support, even relatively small, lowers the likelihood of a crisis by enlarging the range of economic fundamentals at which international investors find it optimal to rollover their credit to the country. This effect is larger with
  – increased size of IMF funds;
  – more accurate IMF’s information.
Results (II)

• Liquidity support can either induce or prevent moral hazard.
• With relatively weak fundamentals liquidity assistance increases incentives for a government to implement efficiency-enhancing but costly reforms.
  – It is plausible that some governments may be discouraged from implementing good but costly policies because speculative runs jeopardize the chances of their success.
  – Liquidity support reduces liquidation costs in the event of a run since it can make socially desirable policies more attractive to the government.
• The level of support preferred by the IMF need not coincide with either the level preferred by national governments, or the level preferred by the country’s citizens.
COMPETITION AND STABILITY IN BANKING

THE ROLE OF REGULATION AND COMPETITION POLICY

XAVIER VIVES
References


