

ON SOME IMPLICATIONS OF PUBLIC LIQUIDITY PROVISION FOR PRUDENTIAL REGULATION

Deutsche Bundesbank - Sveriges Riksbank - De Nederlandsche Bank

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INTRODUCTION (1) REFORMS AND REMAINING CONCERNS

Our financial system is still quite fragile

Despite substantial progress in the framework

1. Better supervisory infrastructures (Fed, ECB)
2. Higher capital adequacy requirements (CARs)
3. Countercyclical CARs
4. Increased emphasis on CCPs
5. Broader bailinability
6. Liquidity requirements

Framework is one thing...

- national implementation
- actual supervision

are another: the devil is in the details.

MANY POINTS OF CONCERN

1. Deregulation [e.g. US: putting into question Dodd-Frank and Basel 3]
2. Growth of shadow banking [risky leveraged/covenant-light loans by shadow banking]
3. Credit booms and asset bubbles [toward a sudden stop in emerging markets? Cryptocurrencies and now stable coins...]
4. International cooperation (resolution, ILOLR...)
5. Public debt
6. Doom loops
7. Exiting low interest rates
8. Politics [threats on Central Bank independence; SO banks in China and Russia]

INTRODUCTION (2) PUBLIC PRODUCTION OF LIQUIDITY

Many channels through which state provides liquidity to the private sector, often in a countercyclical pattern:

- *targeted liquidity*: Bailouts (capital injections, subordinated loans,...), discount window and (poorly) collateralized loans (unconventional monetary policy and various temporary credit facilities)...
- *non-targeted liquidity*: Monetary policy, support to asset prices.

To this must be added

- *countercyclical/insurance schemes*: Underpriced deposit insurance (stabilizes banks' funding), unemployment insurance, social benefits, export insurance, various guarantees to state firms...
- *creation of stores of value*: Treasury bonds...

Holmström-Tirole 1998, 2011.

- (1) Ubiquity of the state's provision of liquidation raises question: *What sets the government apart?*

Proposed answer: Exclusive right to tax future generations of citizens and firms.
Substituting for missing markets.

- (2) *Supply side*: Three sources of liquidity: Inside/private (claims on other private agents); government; international.

INTRODUCTION (3) THE TWO DEMANDS FOR LIQUIDITY

(a) *Private demand*

In a world *without* public intervention, demand for liquidity stems - like credit rationing (solvency) - from financial frictions:

$$\text{pledgeable income} < \text{total surplus}$$

⇒ search for ex-ante insurance (no financing as you go).

Funding and market liquidity

	A	L	
<i>market liquidity</i> [securitization, resale]	✓ T-bills, quasi-cash, credit lines	✓ retail deposits	} issuing new securities/ diluting existing claimholders = <i>funding liquidity</i>
	✓ other securities	✓ wholesale deposits	
	✓ “illiquid assets”	✓ MT/LT debt, hybrid securities	
		✓ equity	

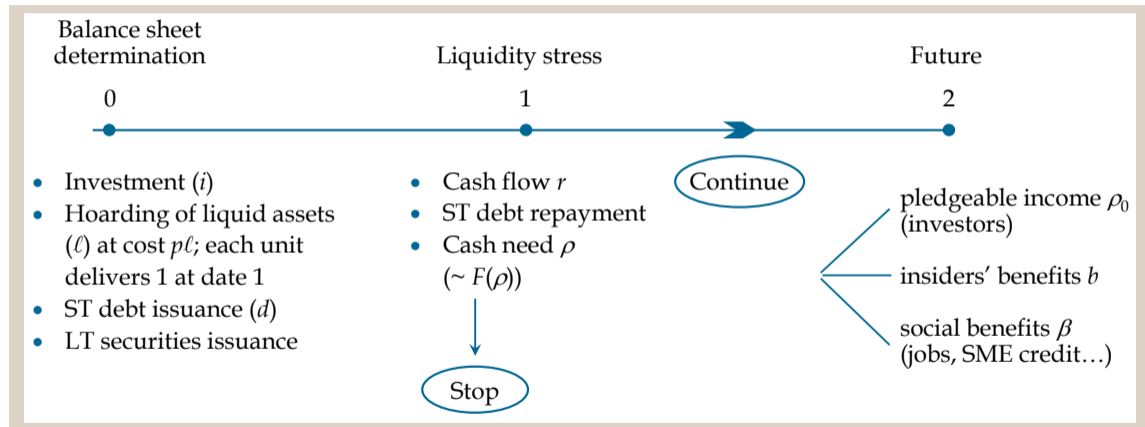
(b) *Regulatory demand*

Privately chosen liquidity may be socially insufficient for two reasons:

- (i) Bailout availability (soft budget constraint)
- (ii) Fire sales/externalities within banking sector.

Similar conclusions, will work with (i) to formalize rationale for liquidity regulation.

INTRODUCTION (4) A CANONICAL MODEL



What this model can and cannot do

What it does:

- focus on liquidity shocks that raise distrust & solvency concerns
- can formalize problems of rollovers with shortages of “special depositors”.

Not about risk-free public interventions à la DD 1983

- government too good at solving problems (“whatever it takes”)
- maybe hard or soft default (Calvo 88) and deadly embrace.

Assumption: Macroeconomic shock

Cash need ρ (or cash-flow shock r or roll-over shock if extends model to special depositors)

- If shocks were independent, then no shortage of liquidity and no liquidity premium ($p = 1$ if no time discounting), at least if net borrowing. Proof: (expected)

$$\begin{array}{rcc} \text{borrowing} & + & \text{net liquidity need} & = & \text{pledgeable income} \\ \text{(date 0)} & & \text{(date 1)} & & \text{(date 2)} \end{array}$$

at micro and macro levels (in expectation at micro level).

⇒ liquidity need \leq pledgeable income at aggregate level for sure
(different story if net lender)

⇒ if liquidity is not wasted (efficient markets), then

Securities on corporate sector (“inside liquidity”) suffice. No premium on outside liquidity.

Can there be a local shortage of liquidity in a financially integrated world?

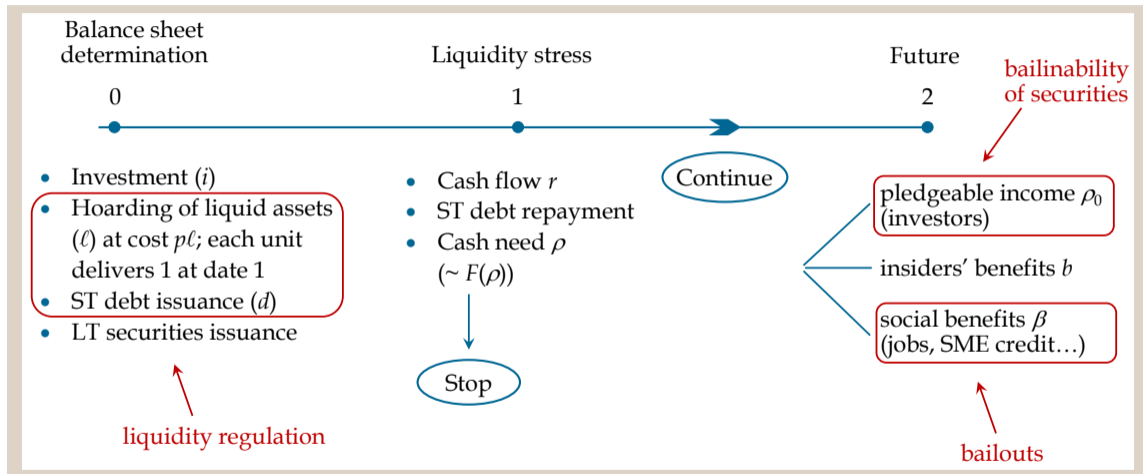
Why is liquidity expensive? Why can't domestic firms acquire liquidity abroad?

Answer: There is a limit to that:

- country may strategically default
- country may have limited amount of tradables

Countries themselves have limited pledgeable income

The 3 sources of liquidity in this model



Overview of sources of liquidity

How can banks meet a liquidity shock?

Source of liquidity	Limits
Hoard safe stores of value ahead of cash need	Limited supply/low yield
Issue bail-inable securities	<ul style="list-style-type: none">• Maximum = pledgeable income• Less if “risk-averse” depositors
Count on government assistance	Depends on fiscal/political cost, and on benefit of bailout

I. LIQUIDITY LEVEL: MONETARY AND FISCAL BAILOUTS

[Farhi-Tirole *AER* 2012]

(1) *Monetary policy*

- Private leverage/capital insurance choices depend on anticipated reaction to overall maturity mismatch.
- When policy instruments are imperfectly targeted to the institutions they try to rescue

balance-sheet-risk choices are strategic complements.

- When everybody engages in maturity transformation,
 - authorities have little choice but intervening
 - refusing to adopt a risky balance sheet lowers ROE.

Impact of monetary policy on date-1 liquidity constraint:

$$\rho \leq [r - d + \ell] + \underbrace{\frac{\rho_0}{R}}$$

The diagram illustrates the components of the date-1 liquidity constraint equation. Arrows point from labels to terms in the equation: 'Liquidity need' points to ρ , 'ST income' points to r , 'ST debt repayment' points to d , 'Liquidity assets' points to ℓ , 'Pledgeable income' points to ρ_0 , and 'Funding liquidity (full bailinability)' points to R .

- $R = 1 +$ interest rate, controlled by the central bank. Low interest rate \Rightarrow low cost of borrowing at date 1 (also higher value of long-term assets).
- Liquidity regulation ($\ell - d$) helps, provided it is not too expansive.

Deadweight loss of low-interest rates

- subsidy from savers to borrowers, transfer of wealth to asset owners
- induce search for yield
- sow the seeds of the next crisis.

CB lowers the interest rates only if big enough stake.

- ⇒
- (1) *strategic complementarities*: a bank is more inclined to take risk if others do (“collective moral hazard”).
 - (2) in contrast with CAPM, banks have an *incentive to correlate their positions* if they have a choice
 - (3) provides a *rationale for macroprudential supervision*.

Monetary policy and fiscal bailouts

Is countercyclical monetary policy still desirable in a world in which bailouts (recapitalizations, liquidity support, toxic asset repurchases) are feasible?

Such bailouts

- are better targeted at strategic actors (“those with high β ”)
- but, under asymmetric information, may refinance firms that do not need refinancing.

⇒ previous insights are still valid.

II. LIQUIDITY STRUCTURE

What kind of asset qualifies as a “liquid asset”?

- (a) Bubbly asset
- (b) Sovereign bond
- (c) Arbitrary asset portfolio.

(a) BUBBLES

Specific focus in [Farhi-Tirole *REStud* 2012]. Bubbles are an (imperfect) form of liquidity.

(i) Two effects of outside liquidity:

- crowding out (competes with productive investment for savings)
- liquidity effect: crowding in.

[Bubbles affect firms differently. Liquidity effect dominant for firms with low pledgeability/low recourse to leverage.]

(ii) Bubbles more likely to exist/larger when firms need liquidity:

- agency costs more severe (high demand for liquidity)
- outside liquidity is scarce and firms' net worth is high.

(iii) Crash of bubble \implies low interest rates, high leverage \implies bubble carries liquidity premium even in risk neutral environment.

(b) (OWN) SOVEREIGN BONDS

Should sovereign bonds count as admissible liquidity (current regulation: resounding yes)?

[Farhi-Tirole *REStud* 2018]

Debt re-nationalization in Europe (was major impetus for Single Supervisory Mechanism of Banking Union)

Framework: Fiscal and balance sheet shocks at date 1. Features a double-decker bailout:

- banks by their government (usual rationale)
- government by international community (motivated either by wrong side of Laffer curve or by the existence of spillovers)

- 1) *In the absence of international bailout*: re-nationalization when bad news: bad news (strong doom loop expectation) \Rightarrow incentive to take exposures to domestic bond.
- 2) *International bailouts*: New reason for re-nationalization: government becomes more lenient.

Bottom line:

- Risk weight for risky sovereign bonds
- Risk surcharge if own sovereign bonds

(c) HOW TO BUILD A LIQUIDITY COVERAGE RATIO?

[Dewatripont-Tirole 2019]

Example with two liquid assets and no discounting:

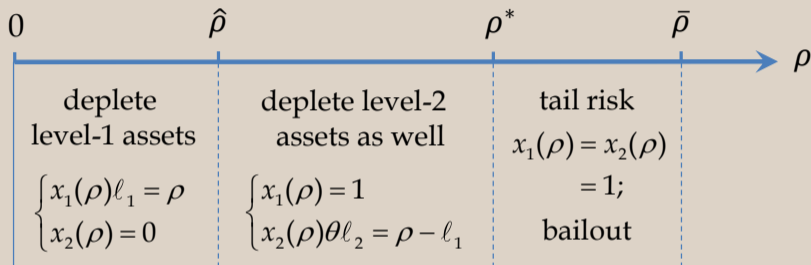
- 1 unit of asset i delivers 1 at date 2
- Level 1 asset delivers 1 if sold at date 1
Level 2 asset delivers $\theta < 1$ if sold at date 1
- Prices at date 0: p_i .

Rationale for liquidity regulation: reduce occurrence of bailouts.

- Hoarding of ℓ_i units at date 0
- Utilization rate $x_i(\rho)$ at date 1.

PEAK-LOAD AND BASE-LOAD LIQUIDITY

Proposition (Optimal policy)



Delegation

Can delegate choice of *structure* (but of course not level) to bank:

$$l_1 + \theta l_2 \geq \rho^*.$$

Delegation result no longer holds if fire sales on level 2 assets (then need to add $l_1 \geq \underline{l}_1$).

IMPACT OF SUPPLY OF SAFE ASSETS

Motivation:

- Level-1 liquidity mostly covered by Sovereign bonds or similar securities
- Segmented markets
- One-size-fits all? [$\frac{\text{debt}}{\text{GDP}} = 20\%$ in Australia, 250% in Japan].

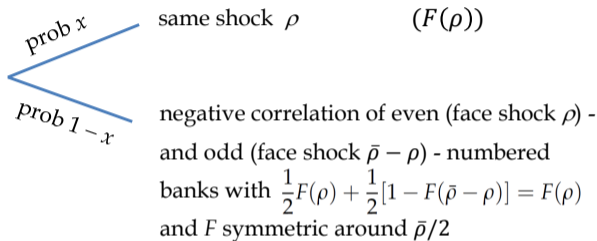
Suppose $p_1 = P_1(L_1 - \ell_1)$

Proposition (adapting to local conditions)

- $L_1 < \bar{L}_1$: $\begin{cases} \ell_1 + \theta \ell_2 \text{ invariant} \\ \frac{d\ell_1}{dL_1} = 1 \end{cases}$ (mere substitution)
- $L_1 \geq \bar{L}_1$: use only level-1 liquidity.

LIQUIDITY POOLING & CROSS EXPOSURES

Imperfect correlation:



Proposition (prudential treatment of interbank exposures)

Provided that liquidity pooling is used to provide hedges,

- (i) Liquidity requirements should be relaxed: $l_1^{**} + \theta l_2^{**} < l_1^* + \theta l_2^*$. The lower the correlation, the lower the liquidity requirement.
- (ii) The liquidity requirement can be decentralized through an LWA requirement.

Assumptions

- (i) No shadow banking: A bank's banking license can be withdrawn if it rejects the regulatory contract.
- (ii) Date-1 securities demand: Date-1 investors are ordinary risk-neutral investors, willing to pay 1 at date 1 for 1 unit of expected date-2 income (this assumption is relaxed in the paper).
- (iii) Equal treatment: All investors receive the same weight in the social welfare function.

Comment on (i) (relaxed in work with Emmanuel Farhi):

- shadow banks can use financial engineering to create quasi-deposits
- resulting put on taxpayer money makes asset valuations clientele-dependent.

Modeling

- Investor classes $j \in \mathcal{J}$; mass $\bar{\ell}^j$ of depositors of class j .
- Each depositor in class j is willing to pay $1/\theta^j$ at date 0 for right to 1 unit of expected income at date 1. Risk neutral over this range.

[A given investor may have several “incarnations”]

- Sources of liquidity:

$$\Theta \equiv \left\{ \underbrace{\theta_1, \dots, \theta_I}_{\text{assets}}, \underbrace{\theta^1, \dots, \theta^J}_{\text{liabilities}}, \underbrace{\frac{1}{1+\lambda}}_{\text{bailouts}} \right\}.$$

where $\lambda =$ shadow cost of public funds.

Proposition (optimal regulation)

- (i) Liabilities targeted to type- j investors are bail-inable if $j \in J^1$ and non-bail-inable (insured) if $j \in J^2$, where

$$J^1 \equiv \{j | \theta^j(1 + \lambda) > 1\} \text{ and } J^2 \equiv J \setminus J^1.$$

- (ii) Pecking order: Liquid assets are resold and liabilities bailed in according to their value of θ : The highest θ item in Θ (either a liquid asset or a liability) is used to cover small liquidity shocks, and so forth until some ρ^* beyond which all bail-inable liabilities are wiped out and all liquid assets are sold, and the shortfall in liquidity is made up through public funds.
- (iii) The optimum can be decentralized through a LWA requirement, in which bail-inable securities all receive weight 1:

$$\sum_{i \in \mathcal{I}} \theta_i \ell_i + \sum_{j \in J^1} \ell^j \geq \rho^*.$$

(a) *LCR design fits well with the theory on the asset side*

- HQLA are weighted by their liquidity discount;
- minimum percentage of higher quality assets is specified;
- substitution of level-2 assets for level-1 assets is allowed in case of shortage of the latter.

(b) *LCR does not relax liquidity requirements when banks grant each other insurance*

Prudent approach (theory above assumes that supervisor knows directionality of hedge).

(c) *Weaker fit on liability side* (asymmetric treatment of retail and wholesale deposits in LCR).

III. SHADOW BANKING

- In theory, unregulated financial institutions, which have no access to public liquidity (deposit insurance, liquidity backstops)... at least in theory:
 - “Transformation that takes place without direct and explicit access to public sources of liquidity or credit backstops.”

[Poszar et al 2013]

Migration waves

- Prior to 2008
- Current wave:
 - China (SME lending, wealth management funds and trusts).
 - US, UK, Europe: SMEs are increasingly turning to fund managers to borrow money. Private debt market has tripled between 2006 and 2014. US: 3/4 of business financing comes from alternative lenders.
 - India.

Traditional banking is built on *four pillars*

- Lending to SMEs
- Prudential supervision
- Access to public liquidity (LOLR)
- Retail deposits/access to deposit insurance (DI)

Divine coincidence?

- Why? State could price LOLR and DI to shadow banks!
- Besides, shadow banks may actually gain access to public liquidity
 - Indirectly through *syphoning*: backstops from retail banks (puts: contingent lines of credit, tail risk insurance, name on the door)
 - Directly through *liquidity assistance and bailouts*: unconventional policies in case of stress, for example
 - ▷ Commercial Paper Funding Facility (issuers of CP)
 - ▷ Primary Dealer Credit Facility (repo market)
 - ▷ Term Asset-Backed Securities Loan Facility (ABS).

THE CLIENT SIDE OF THE PUZZLE

“Core functions”: serving fragile & politically sensitive clients

- Retail depositors
- SMEs that borrow from bank and hoard liquidity there.

Again this should not be for granted:

- Why have they been in regulated sphere?
- Exceptions. E.g. China: Migration
 - Repressed savings: deposit rates regulated to low levels.
 - Government pressure to lend primarily to SOEs; little lending to SMEs (strict constraint on non-performing loans less adequate for SMEs).
 - Escape regulatory pressure (20% reserve ratio at PBOC; loans/deposits <75%).

RING FENCING AND STRUCTURAL REFORMS

Recent reforms include:

(1) *Structural reforms* (US: Volcker rule; Europe: Liikanen Commission)

UK's Vickers rule: creates a ring-fenced subsidiary (the retail bank)

- with a limited scope of activities (lend only to households and nonfinancial firms and trade high-quality securities. It can hedge the risk on corresponding exposures)
- prohibited from providing support to the investment bank.

▶ more on ring fencing

(2) *Moving contracts to CCPs*: creation of incentives to move contracts to platforms with central counterparty (central counterparty clearing houses)

- (1) Laissez-faire leads to excessive leveraging and bailouts \Rightarrow want to regulate liquidity
- (2) Conversely, may be worth contracting on (and charging for) LOLR

Distinction between bailouts and contracted-for insurance/liquidity provision

- Former are ex ante involuntary
 - Latter are part of a quid pro quo (would not be spontaneously granted ex post).
- (3) Toughening of regulation \Rightarrow threat of migration to SB sector.

Key = complementarity between supervision and insurance

Supervision reduces moral hazard \Rightarrow $\left\{ \begin{array}{l} \bullet \text{ LOLR cheaper to provide} \\ \bullet \text{ deposit insurance cheaper to provide} \end{array} \right.$

On deposit insurance, add class of investors:

- with risk aversion, or
- with projects to finance.

Imperfect correlation of shocks \Rightarrow within-banking-industry insurance opportunities (derivatives, swaps...)

Hazard for regulator: Are bilateral contracts insurance contracts or do they increase risk?

- (1) Counterparty risk hard to assess if counterparty is in SB sector \Rightarrow rationale for ring fencing.
Otherwise SB syphon liquidity and supply bogus liquidity.
- (2) Counterparty risk may be hard to assess even if counterparty is regulated. CCPs prevent risk selection.

PAPER'S TAKE-HOME POINTS

Model in which banks may be illiquid and receive support from the state.

(1) *Quadrilogy*. There are basic complementarities between regulation and the three other components of the quadrilogy.

Regulation, by limiting risk taking

- is particularly desirable if bank lends to SMEs, creating a put on taxpayer money: monitoring reduces frequency of bank bailouts
- reduces the cost of providing insurance (LOLR to banks, deposit insurance to depositors), as bank is less often in distress.

(2) *Ring fencing and CCPs (hexalogy)*

- Double hazard created by regulated banks' counterparty exposures
 - Syphoning of liquidity toward shadow banking sector (conduits)
 - Contagion from shadow sector to regulated sector: bogus liquidity (AIG).
- Benefits of ring fencing and of CCPs.

THANK YOU FOR YOUR ATTENTION

MORE ON RING FENCING

Idea: insulate “core services” (deposits, SMEs), and thereby the taxpayer, from other banking risks. Total separation sometimes criticized on the grounds that it precludes the investment bank’s support to a troubled retail bank.

Glass-Steagall (1933-1999) prohibited commercial banks from

- engaging in investment banking
- being affiliated with companies engaging in securities business.

Vickers (UK) allows within the retail bank: core services + mortgages and personal loans, loans to corporate, trade financing, hedging function.

Volcker (US) disallows prop trading, as well as substantial investments in hedge funds and private equity firms

Liikanen (Europe) disallows prop trading, as well as positions on assets and derivatives if systematically important.