Liquidity Regulation and the Implementation of Monetary Policy

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Overview

- 2008 financial crisis Clear need for financial stability improvements
- Basel Committee on Banking Supervision (BCBS) implements new international regulations, known as **Basel III**
- New banking parameters supplement existing reserve requirements
- **Liquidity Coverage Ratio (LCR)** entails additional liquid assets in case of financial stress
- Potential **unintended effects** of LCR:
  - Deviation of untargeted interest rates
  - Interference of monetary policy

Agenda

- Outline Liquidity Coverage Ratio
- Present the model
- Introduce LCR into the model
- Effects on interest rates
- Effects on monetary policy

Liquidity Coverage Ratio

$$LCR = \frac{\textit{Stock of unencumbered high-quality liquid assets}}{\textit{Net cash outflows over the next 30 calendar days}} \geq 1.$$

- Banks must hold **sufficient quantity of High-Quality Liquid Assets (HQLA)** to survive a **30-day period of market stress**
- Two types of HQLA
  - Level 1: Cash, central bank reserve, certain marketable securities
  - Level 2: Government securities, corporate debt, residential MBS, certain equities
- Projected net cash outflows
  - **Multiply** size of **each type of liability** (or obligation) by its respective **runoff rate in a stress scenario**

The model

The model

- Single time period – divided into three stages (0, 1, 2)
- Three participants in this economy

1. Continuum of Banks, [0, 1]
2. Central bank
3. Representative investor
    - Aggregate financial position of households + non-financial firms

Balance Sheets

Bank i

Assets		Liabilities	
Loans	L^i	Deposits	D^i
Bonds	B^i		
Reserves	R^i	Equity	E^i

Central Bank

Assets		Liabilities	
Loans	L^{CB}	Reserves	R
Bonds	B^{CB}	Equity	E^{CB}

Investors

Assets		Liabilities	
Loans	L^H		
Bonds	B^H		
Deposits	D	Equity	E^H

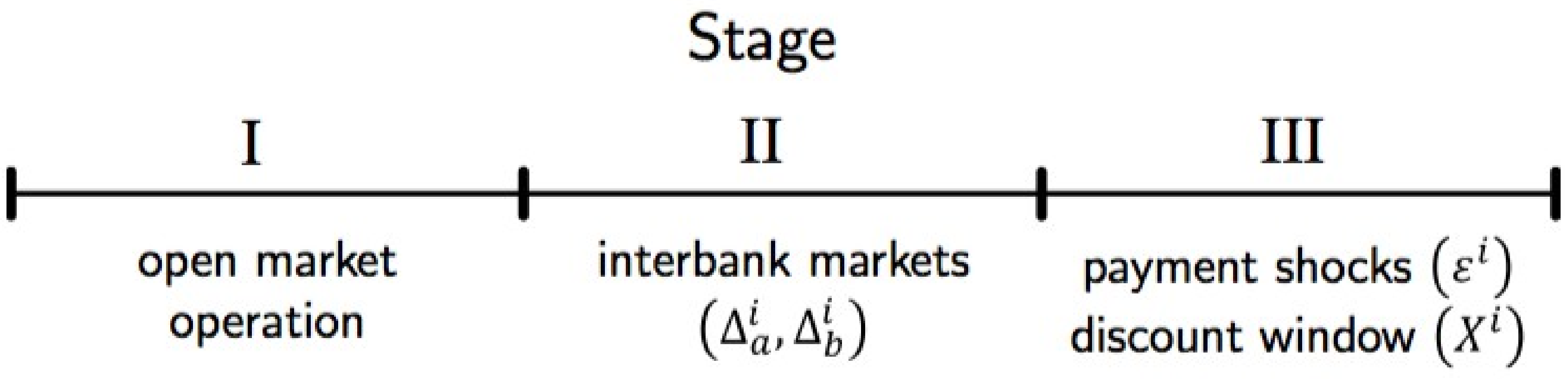
$$\int_0^1 L^i di + L^{CB} + L^H = \bar{L}$$

$$\int_0^1 B^i di + B^{CB} + B^H = \bar{B}.$$

$$\int_0^1 D^i di = D,$$

$$\int_0^1 R^i di = R.$$

Timeline - single period



- Two securities traded in the market
  - **a**: overnight loans
  - **b**: term loans
- Payment shock *after* markets close
- CB discount window remains open

End-of-Period Balance Sheet

Bank i

Assets		Liabilities	
Loans	L^i	Deposits	$D^i - \varepsilon^i$
Bonds	B^i	Net interbank borrowing	$\Delta_a^i + \Delta_b^i$
Reserves	$R^i + \Delta_a^i + \Delta_b^i - \varepsilon^i + X^i$	Borrowing from CB	X^i
		Equity	E^i

Balance Sheet + Requirements

Bank i

Assets		Liabilities	
Loans	L^i	Deposits	$D^i - \varepsilon^i$
Bonds	B^i	Net interbank borrowing	$\Delta_a^i + \Delta_b^i$
Reserves	$R^i + \Delta_a^i + \Delta_b^i - \varepsilon^i + X^i$	Borrowing from CB	X^i
		Equity	E^i

Reserve Requirement

$$R^i + \sum_{j=a,b} \Delta_j^i - \varepsilon^i + X^i \geq K^i.$$

K = RR for the period

LCR Requirement

$$LCR^i = \frac{B^i + R^i + \sum_j \Delta_j^i - \varepsilon^i + X^i}{\theta_D(D^i - \varepsilon^i) + \sum_j \theta_j \Delta_j^i + \theta_X X^i} \geq 1.$$

θ = runoff rate   j = a,b

Market interest rates

Bank profits

$$\pi^i(\varepsilon^i) = r_L L^i + r_B B^i - r_D\left(D^i - \varepsilon^i\right) - \sum_j r_j \Delta_j^i + r_K K^i$$
$$+ r_R \max\left\{R^i - K^i + \sum_j \Delta_j^i + X^i - \varepsilon^i, 0\right\} - r_X X^i.$$

$$X^i = \max\left\{X_K^i, X_C^i\right\}.$$

In aggregate,

Profits = (interest on assets) – (interest on liabilities)

Interest rates

- r_R = excess reserves
- r_X = Discount window
- $r_X > r_R$
  - rate corridor

Equilibrium rates under LCR

Borrowing to meet requirements

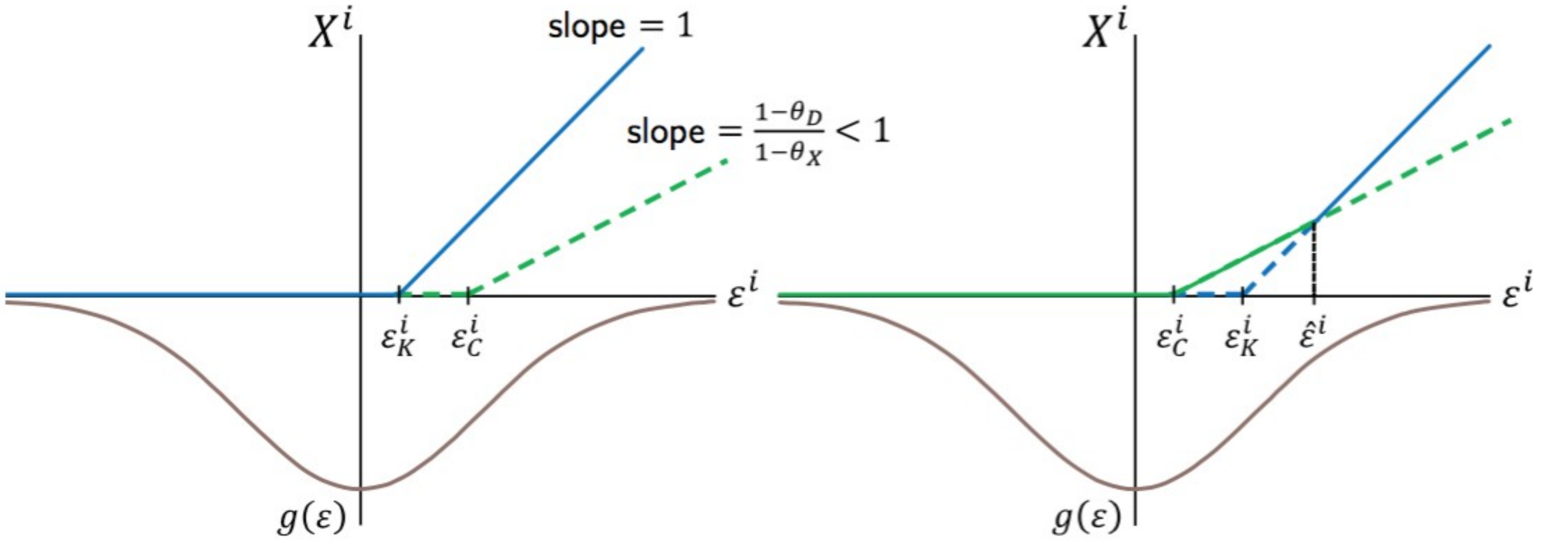
Reserve Requirement

$$R^i + \sum_{j=a,b} \Delta_j^i - \varepsilon^i + X^i \geq K^i. \quad \Rightarrow \quad \varepsilon_K^i \equiv R^i - K^i + \sum_{j=a,b} \Delta_j^i.$$

LCR Requirement

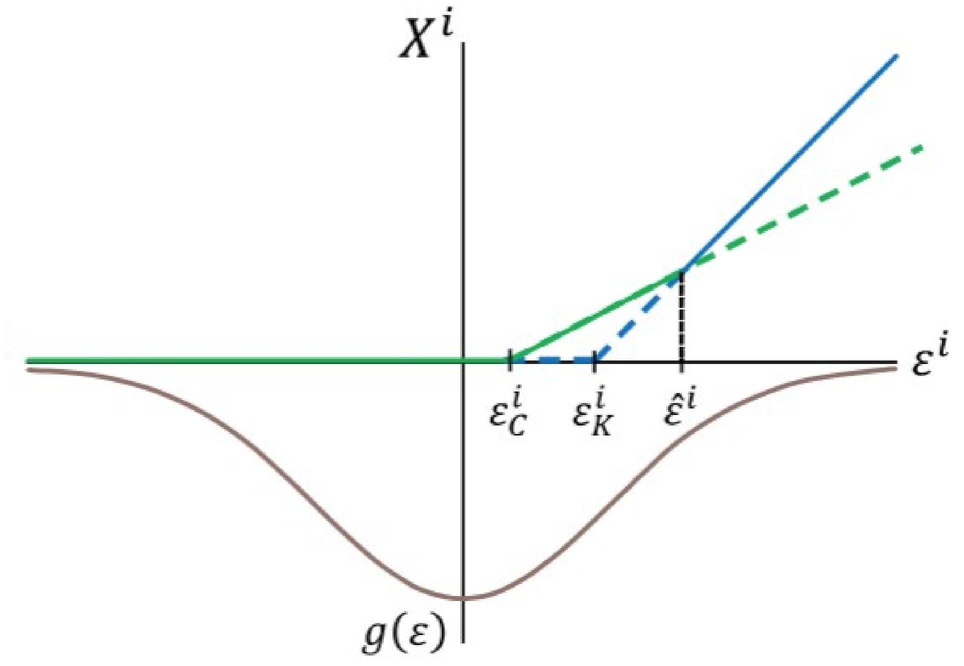
$$LCR^i = \frac{B^i + R^i + \sum_j \Delta_j^i - \varepsilon^i + X^i}{\theta_D(D^i - \varepsilon^i) + \sum_j \theta_j \Delta_j^i + \theta_X X^i} \geq 1. \quad \Rightarrow \quad \varepsilon_C^i \equiv S^i + \sum_{j=a,b} \frac{1-\theta_j}{1-\theta_X} \Delta_j^i.$$

$$S^i \equiv \frac{B^i + R^i - \theta_D D^i}{1 - \theta_D}.$$



$(i)\ \varepsilon_K^i < \varepsilon_c^i$ $(ii)\ \varepsilon_K^i > \varepsilon_c^i$

Borrowing to meet requirements



$(ii)\ \varepsilon_K^i > \varepsilon_c^i$

- When the LCR is the constraining requirement:
  - Overnight rate is lower (vs no LCR)
  - Term loan rate is higher
    - Term loans are advantageous because of their **lower runoff rate**
  - This represents a regulatory premium

$$r^* = r_R(prob[\varepsilon < \hat{\varepsilon}^*]) + r_X\, prob[\varepsilon > \hat{\varepsilon}^*]$$

$$r_T^* = r^* + (r_X - r_R)prob[\varepsilon_C^* < \varepsilon < \hat{\varepsilon}^*]$$

if time…

Open market Operations

Open market Operations

- Central Bank buys (or sells) assets from (to) banks
- Z = assets involved in OMO
- α = proportion of assets exchanged with banks, as opposed to the general investor

Central Bank

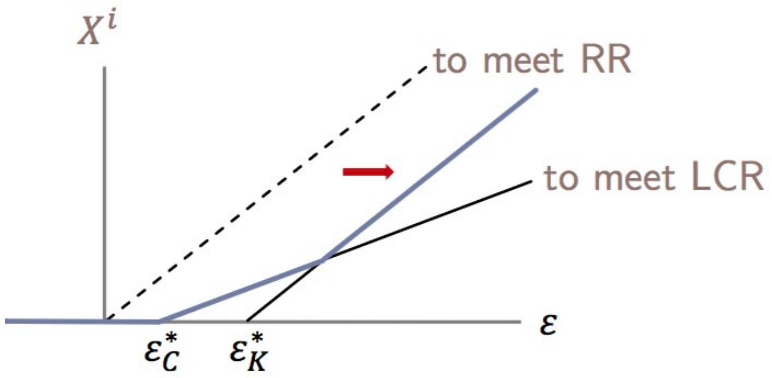
Assets		Liabilities	
Loans	$L_0^{CB} + z_L$	Reserves	$R_0 + z$
Bonds	$B_0^{CB} + z_B$	Equity	E^{CB}

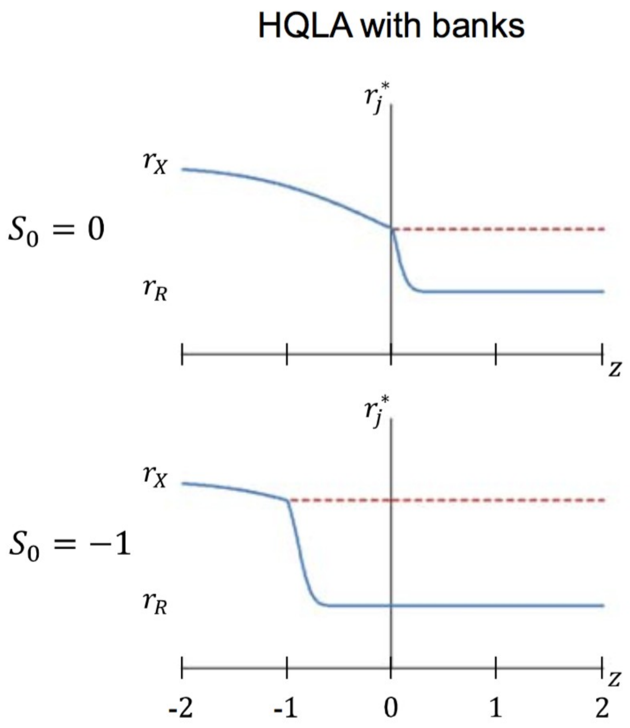
Banking System

Assets		Liabilities	
Loans	$L_0 - \alpha_L z_L$	Deposits	$D_0 + (1-\alpha_L)z_L + (1-\alpha_B)z_B$
Bonds	$B_0 - \alpha_B z_B$		
Reserves	$R_0 + z$	Equity	E

OMO

- Example: CB buys bonds from banks (α =1)





LCR risk remains unchanged

RR risk increases

Overnight rate falls

Another example of the **regulatory premium**

Red is term loan rate

Blue is overnight rate

Thank you

Sources

Keister, Todd, and Morton Bech. "Liquidity Regulation and the Implementation of Monetary Policy." *Journal of Economic Literature* (2015): n. pag. *Toddkeistcer.net*. Web. <http://www.toddkeister.net/pdf/BK_LCR.pdf>.

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