

The Central Bank's Role as a Provider of Liquidity

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1. Introduction

- One of the reasons the 2007-2009 financial crisis was so severe was massive illiquidity in interbank and other markets
- These liquidity problems resulted in the Basel III accord introducing global liquidity standards for banks
 - The Liquidity Coverage Ratio is designed to ensure banks can withstand a stressed funding scenario for at least 30 days
 - The Net Stable Funding Ratio is designed to reveal risks that arise from significant maturity mismatches between assets and liabilities

These policy measures raise a number of questions:

- Why is the provision of liquidity that the market provides insufficient?
- What is (are) the market failures these regulations are designed to correct?
- Are the regulations proposed the best way of correcting the market failures?

As with much banking regulation, the answers to these questions are not entirely clear

- Willem Buiter (2007) made the following observation

“Liquidity is a public good. It can be managed privately (by hoarding inherently liquid assets), but it would be socially inefficient for private banks and other financial institutions to hold liquid assets on their balance sheets in amounts sufficient to tide them over when markets become disorderly. They are meant to intermediate short maturity liabilities into long maturity assets and (normally) liquid liabilities into illiquid assets. Since central banks can create unquestioned liquidity at the drop of a hat, in any amount and at zero cost, they should be the liquidity providers of last resort both as lender of last resort and as market maker of last resort...”

- In order to understand what the market failures might be, we need to have benchmark models where Adam Smith's invisible hand of the market works
- The Arrow-Debreu model does not contain a financial system with financial institutions and so cannot be the benchmark for studying bank liquidity while standard banking models are usually very special and do not have financial markets
- We therefore start with a model due to Allen and Gale (2004) that has both banks and financial markets where the efficiency of the market economy can be analyzed

2. Liquidity Provision in the Financial System

- The framework distinguishes between two types of risk
 - *Idiosyncratic* shocks to individual preferences (e.g. liquidity preferences) that are non-contractible - institutions deal with these
 - *Aggregate* shocks (e.g. asset returns or aggregate liquidity needs) that are contractible - markets deal with these
- Two cases are considered: (i) *intermediaries* that use general contracts contingent on aggregate states and (ii) *banks* that use non-contingent deposit contracts
- The focus is on liquidity provision and the key role this plays

Benchmark case with complete contracts and complete markets

- Individuals invest in intermediaries
- There is a complete set of markets for aggregate risks
- Only intermediaries can trade in these markets
- There is one intermediary for each ex ante type
- Intermediaries offer incentive compatible risk sharing contracts to individuals that are contingent on aggregate risks but not on individual risks

Result 1: The equilibrium is incentive efficient.

Case where the intermediaries are banks

- A bank is a special kind of intermediary where instead of being able to condition payments to investors on aggregate risks a *deposit contract* where the payments promised are fixed for the period ahead is chosen - it is too costly for (small) depositors to enforce contracts where returns are explicitly contingent.

Result 2: The equilibrium is constrained efficient.

Comment 1: With general intermediaries there are no runs or crises but with banks runs and crises do occur.

Comment 2: There is no role for regulation in either case.

What are the market failures?

- While in practice there are markets for hedging uncertainty about asset returns, there are not for hedging liquidity shocks – in this case there is a role for liquidity regulation but it is not to prevent crises but rather to improve risk sharing
- There is a large literature on reasons for failures in interbank markets such as moral hazard, asymmetric information, and monopoly power but this literature by and large does not consider liquidity regulation as a solution (see, e.g., Acharya, Gromb and Yorulmazer (2012), Heider, Hoerova and Holthausen (2009), Freixas and Jorge (2008), Diamond and Rajan (2011), and Acharya, Gale and Yorulmazer (2011))

3. The Role of Central Banks in Providing Liquidity

Real models

- Bagehot (1873) laid out his famous principles for how a central bank should lend to banks during a crisis:
 - Lend freely at a high rate of interest relative to the pre-crisis period but only to solvent but illiquid borrowers with good collateral (i.e. any assets normally accepted by the central bank).
 - The assets should be valued at between panic and pre-panic prices.
 - Institutions without collateral should be allowed to fail.
- Despite being written over 140 years ago, these principles are still widely quoted and used as the foundation for many central bank policies

- Goodfriend and King (1988) dismissed this view as obsolete on the grounds that in modern interbank markets it cannot be the case that a solvent bank is illiquid but of course the crisis casts serious doubts about the validity of this argument
- Rochet and Vives (2004) develop a global games model with a unique Bayesian equilibrium that is characterised by a positive probability that a solvent bank cannot get enough liquidity assistance in the market and this provides a justification for intervention of the Bagehot type
- Repullo (2005) considers the moral hazard problem caused by Bagehot's proposed interventions and identifies circumstances when it is not a problem and when it is

Monetary models

- In most models of banking crises banks contract with depositors in real terms, and government-injected liquidity is done using appropriate financial and fiscal instruments that have effects in real terms but this ignores the point made by Buiter (2007)
- Again a benchmark model is needed – Allen, Carletti and Gale (2014) provides a model with money, a central bank, commercial banks, consumers and firms

The model has the following features:

- A standard three-date banking model with aggregate liquidity and return risk but with nominal contracts
- The central bank passively supplies money in response to demand from the commercial banks
- Commercial banks take in deposits from consumers and make loans to firms to maximize profits
- Firms invest in a safe short asset and a risky long asset to maximize profits

The main results:

- A competitive equilibrium implements the same fully state-contingent efficient allocation as the planner's problem, not merely the non-state contingent constrained-efficient allocation, even though deposit contracts are non-contingent and involve a fixed claim (in terms of money) on the banks
- A central bank policy of passively accommodating the demands of the commercial banks for money is sufficient to eliminate financial crises and achieve the first best
- The quantity theory of money holds in equilibrium: the price level at each date is proportional to the supply of money extended to the commercial banks by the central bank and risk sharing is achieved through variations in the price level

- The central bank can control the nominal interest rate and the expected inflation rate, but it has no effect on the equilibrium allocation of goods
- First best efficiency can be achieved by monetary policy alone when the model is extended to allow for idiosyncratic (bank-specific) liquidity risk and multiple periods
- Accommodative monetary policy alone is not always sufficient to achieve efficiency – it does not allow the sharing of idiosyncratic (bank-specific) asset return risk and here direct intervention to allow risk sharing may be needed – liquidity regulation doesn't achieve this

4. Policy Discussion of Liquidity Regulation

While there has been a great deal of academic and policy literature on capital regulation there has been little on liquidity regulation, particularly before the crisis, but there are exceptions

- Rochet (2004, 2008) argues that market failures that can justify liquidity regulation include
 - potential problems in payment systems,
 - moral hazard problems at the individual bank level due to opaqueness of assets, and
 - moral hazard at the aggregate level due to expectations of a generalized bailout if there are macro shocks
- He argues that while simple liquidity ratios can potentially deal with the first two, more complex regulation based on a banks' exposure to macros shocks may be necessary for the third problem

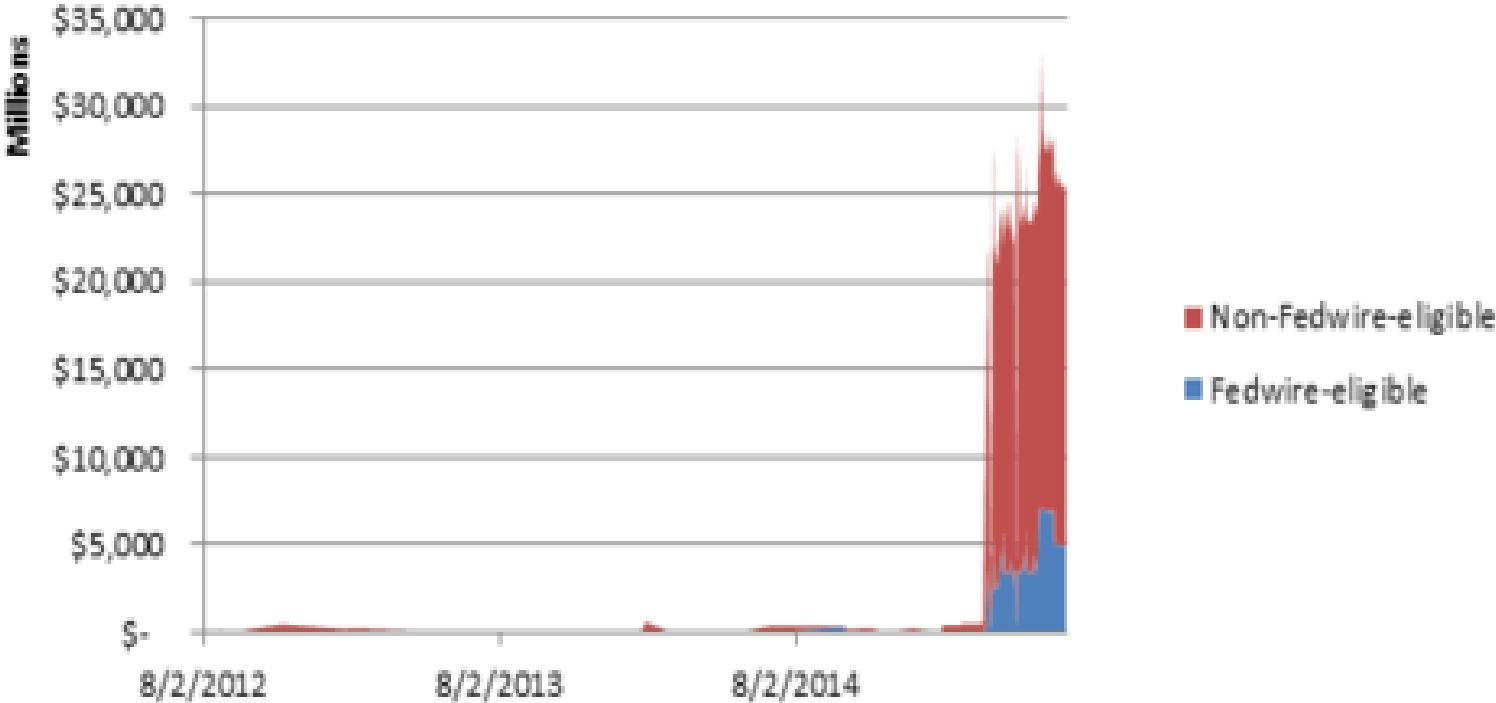
- In Perotti and Suarez (2011) the market failure is that even though each individual bank takes into account its own exposure to refinancing risk, it does not internalize the system-wide effect of its decision
 - When banks differ in credit opportunities, Pigovian taxes are best
 - When they differ in their risk taking incentives, net funding liquidity ratios are best but if capital controls can be used as well as liquidity ratios, then taxes can again be optimal
- Other contributions
 - Stein (2013)
 - Bech and Keister (2013)
 - Bouwman (2014)

5. Practical Aspects

Innovating around the regulations

- Extendable or Evergreen repos
 - These help to satisfy the Liquidity Coverage Ratio by making the maturity period greater than 30 days
 - Their use has exploded with the new regulation
 - The following shows Bank of New York Mellon's extendable repos representing more than 50 percent of the market

U.S. Tri-party Repo Evergreen Loan Values



International issues

- So far we have considered a one country-one currency world but in practice there are many currencies
 - As Bertsch and Molin (2016) point out, for a country like Sweden where banks fund in multiple currencies, particularly the US dollar, it is important for central banks to have access to dollar funding
 - Swap networks between central banks should be extended

6. Concluding Remarks

- The literature on liquidity regulation is still at an early stage
- There is no clear analysis of whether liquidity should be thought of as corresponding to short term real assets or to monetary instruments
- With capital regulation there is a huge literature but little agreement on the optimal level of requirements, but with liquidity regulation we do not even know what to argue about

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