Central Banks as Lenders of Last Resort and Bank Regulators[1]

We have already discussed how Central Banks conduct monetary policy in order to affect macroeconomic variables such as interest rates, exchange rates, money, etc. These notes focus on two important, but less prominent, roles of Central Banks: acting as a lender of last resort and acting as a financial and banking regulator. As the financial sector has grown, it is now about 8% of U.S. GDP, the regulatory role has grown in importance.

Lender of Last Resort

The idea that a Central Bank should act as a lender of last resort dates to Walter Bagehot, the Editor of *The Economist* in 1873.[2] Paul Tucker summarizes Bagehot's position as follows[3]

> To avert panic, central banks should lend early and freely (*i.e.* without limit), to solvent firms, against good collateral, and at high rates.

Each of these conditions merits some discussion:

i. "To avert panic, central banks should lend early and freely (*i.e.* without limit)." Economic crises (also known as panics, a somewhat archaic term) are among the biggest concerns of economic policymakers. As we have discussed, credit crises are often a major component of the worst economic crises. They cause firms to fail, credit to disappear, and are associated with higher unemployment and reduced production. A Central Bank should thus act as a creditor when private lenders are unable or unwilling to do so. If a Central bank can do so early enough, and freely enough, then they might prevent or at least mitigate the worst effects of a credit crisis.

ii. "to solvent firms." This illustrates an important difference between *insolvency* and *illiquidity*. Insolvency means that, in the long run, a firm's liabilities exceed its assets. It thus can only continue in operation with a subsidy (as opposed to a loan) that is borne ultimately by taxpayers. Most economists believe that Central Banks should not sustain insolvent firms because it

[1]These are undergraduate lecture notes. They do not represent academic work. Expect typos, sloppy formatting, and occasional (possibly stupefying) errors.

[2]Walter Bagehot ([1873] 1897), Lombard Street: A Description of the Money Market (New York: Charles Scribner's Sons).

[3]Paul Tucker. 2009. "The Repertoire of Official Sector Interventions in the Financial System: Last Resort Lending, Market-Making, and Capital" Leaving the Board remarks at the Bank of Japan 2009 International Conference on the Financial System and Monetary Policy Implementation, Bank of Japan, Tokyo, May 27-28, p. 5

creates too much inefficiency.[4] An illiquid firm may or may not be solvent. Illiquid means that the firm lacks enough cash or easily convertible assets to meet its short run liabilities. This may happen when it cannot find buyers for its short term debt. Illiquidity can also force a firm to fail. Bagehot argued that solvent but illiquid firms should receive credit from the Central Bank because they are likely to be able to pay the loan back once the crisis has passed.

A 1991 amendment to the Federal Reserve Act limits the Fed's ability to make emergency loans to solvent firms. This has proven significant. In September 2008, the Fed did not bail out Lehman Brothers, an investment bank whose failure acted as a catalyst for the ensuing financial crisis. In the ensuing debate about whether the Fed erred, it has defended itself by claiming that because Lehman was insolvent, it had no legal authority to bail them out.

iii. "against good collateral." The motivation here is similar to ii. The Central Bank should only make secured loans to help ensure that taxpayers do not sustain a loss. Note that the definition of "good" is somewhat vague. Is a mortgage backed security good collateral?

iv. "at high rates." Emergency loans should come at a premium. This serves two purposes. First, it further protects the taxpayer. Second, it attempts to mitigate "moral hazard," the concern that by rescuing troubled firms, emergency lending might encourage more bad behavior in the future. Moral hazard is a legitimate concern that must be factored into any cost-benefit analysis for emergency loans. By charging high rates, perhaps the Central bank can create enough of a penalty to minimize moral hazard.

The first Central Bank to embrace this concept of lender of last resort was the Bank of England in the late nineteenth century. Its performance, which was judged successful, was a motivation for the later creation of other Central Banks, including the Federal Reserve.

When the Federal Reserve was created in 1913, its role as lender of last resort was formalized in Section 13, which has subsequently been amended several times. In 1932, the Fed's role was expanded:[5]

> The Emergency Relief and Construction Act adds Section 13(3) to the Federal Reserve Act permitting the Reserve Banks to lend in unusual and exigent circumstances and with the authority of the Federal Reserve Board, to any individual,

[4]The Bank of Japan has been heavily criticized for loans to insolvent or "zombie firms." These firms are dependent on continued aid and may have contributed to Japan;s decades long stagnation.

[5]Bordo, M. and D. Wheelock. 2011. "The Promise and Performance of the Federal Reserve as Lender of Last Resort 1914-1933. *Federal Reserve Bank of St. Louis Working Paper 2010-036B.*

> partnership, or corporation unable to secure adequate credit accommodations from other banking institutions. Section 13(3) loans must be secured by paper f the kinds and maturities eligible for discount for member banks under other provisions of the Federal Reserve Act and carry the endorsement of the borrower or a third-party surety

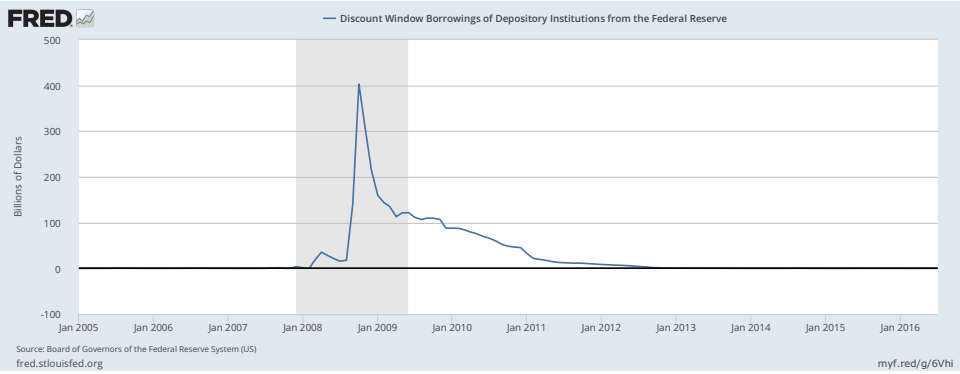
The Fed's role as lender of last resort was last modified in July 2010, when Congress required that it to reveal the recipients of emergency credit within two years. The Fed had been criticized for secrecy in its lending operations. Critics found such secrecy undemocratic.

Section 13(3) of the current Federal Reserve Act currently states that "The Board shall establish procedures to prohibit borrowing from programs and facilities by borrowers that are insolvent."

We can crudely divide emergency lending into the short-run and the long-run:

i. For the Federal Reserve, most of its short term lending comes via the discount window.[6] Commercial banks occasionally wish to borrow extra reserves, possibly because they have fallen below the required reserve ratio. They may attempt to do so from other banks at the Federal Funds Rate. Alternatively, they may borrow from the Fed itself at the discount rate. To do so, the bank must be deemed financially stable and it must offer collateral. The Fed also charges them a premium (consistent with Bagehot's principles), with the discount rate typically being set 0.25%-0.5% above the Federal Funds rate target.

Figure 1: Discount Window Lending



Note that discount lending increased greatly during the Financial Crisis in 2008.

[6]Once upon a time, it really was a window. Sadly, I cannot find a picture.

ii. For longer term emergency lending, the Fed may negotiate loans with troubled firms. Most of the time, this sort of emergency lending is minimal. During crises, however, it can be an important part of a Central Bank's policy kit. In the recent financial crisis, the Federal Reserve made emergency loans to firms such as the American Insurance group (AIG) and the investment bank Bear Stearns. In both of these examples, the Fed had to determine that these companies were facing an illiquidity crises and that they were solvent in the long run. They determined that AIG was solvent without any further action. To ensure the solvency of Bear Stearns, the Fed had to arrange the purchase of the firm to JP Morgan Chase.

In September 2008, another investment bank, Lehman Brothers, was also on the brink of failure. The Federal Reserve did not bail Lehman out, it failed, and that failure is often cited as a catalyst for the ensuing crisis. Whether the Fed could have, or should have saved Lehman, continues to be a subject of debate. Among the defenses raised for not doing so is that Lehman was both insolvent and illiquid, that no buyer could be found to make Lehman solvent, and that bailing Lehman out would thus have been illegal under the Federal Reserve Act. This argument remains controversial.

Acting as a lender of last resort is not limited to the Federal Reserve. The Bank of England, which acted in this role long before the Fed existed, made almost $100 billion in emergency lending during the financial crisis to troubled institutions including the Royal Bank of Scotland.[7] The European Central Bank has engaged in significant emergency loans. Unlike the Federal Reserve, much of its emergency lending is to the Central Banks within the Eurozone (*e.g* Greece). The motivation is the same. Emergency lending is intended to head off financial failures that may propagate through the rest of the economy.

Central Banks emergency lending is often linked to concept of "too big to fail." This term is often misunderstood. It does not mean that Central Banks rescue firms that should not be rescued. Instead, it means that a firm has become so large that its failure threatens a broader financial crises. In this case, most economists would argue that, in the short run, a Central Bank has no choice but to rescue such a firm. The optimal policy is then to consider policy changes that prevent firms from becoming too big to fail in the future.

Central Banks as Regulators

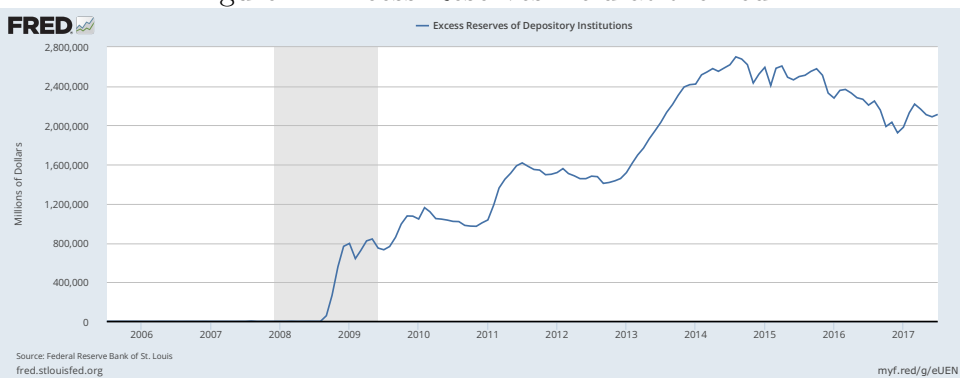
The exact nature of Central Banks regulatory powers varies across economies. There are, however, some common types of regulatory powers that they utilize. One is the setting of

[7]See: Plenderleith, Ian. October 2012. "Review of the Bank of England's Provisions of Emergency Liquidity Assistance in 2008-09." *Presented to the Court of the Bank of England*

required reserve ratios for commercial banks. This is the fraction of deposits that banks must hold as reserves (usually electronically at the Central Bank). For decades, Introductory Macroeconomics courses have taught that lowering the required reserve ratio is a tool by which the Central Bank can increase the money supply. We should stop teaching this. In practice, the required reserve ratio is set to ensure that banks have enough liquidity to meet demand for withdraws. It is rarely changed and is even less often used as a tool by which Central Banks manipulate the money supply.

Notably, the Federal Reserve did not lower its required reserve ratio after the financial crisis in 2008. This is despite that, in some cases, a lower ratio is expansionary and that the Fed typically responds to crises by engaging in expansionary monetary policy. There are a few important reasons why the Fed did not change this ratio. First, lowering bank reserves might made banking failures more widespread. Second, such a change is unlikely to have had a significant effect on the money supply. In Principles of Macroeconomics, we often teach that commercial banks choose to hold the minimum amount of deposits as reserves and that they then lend the rest out. This process duels money creation and yields the erroneous multiplier $\frac{1}{RR}$. This process, however, broke down during the financial crisis. Faced with a shortage of credit worthy borrowers, and looking to shed risk, banks chose to hold much more than the required level of reserves as excess reserves. The required reserve ratio was thus not generally a binding constraint and changing it wouldn't have much of an effect.

Figure 2: Excess Reserves Held at the Fed



Most Central Banks engage in significant banking supervision. The process varies across specific Central Banks, but the Federal Reserve's role is illustrative. Each of the regional Fed banks have a banking supervision division. Banking supervision generally refers to the enforcement of regulations, imposed either by the Fed itself or some other regulator, on commercial banks. Some examples include:

i. The CAMELs system provides a summary measure of a bank's overall health. The Fed visits each bank periodically to collect data to construct this measure. The six criteria used are:

Capital adequacy. Does the bank have enough capital to withstand a reduction in loan performance?

Asset quality. Are the loans that the banks holds made to credit worthy borrowers who are likely to repay? Alternatively, are the associated risk premia reasonable?

Management. Are the banks decision makers competent?

Earnings. How profitable has the bank been?

Liquidity. Does the bank possess enough convertible assets to withstand a short term inability to borrow itself?

Sensitivity. Suppose that each bank's loans have a 5% of defaulting. How sensitive is the bank to a general macroeconomic downturn? The answer depends on whether these loans are independent of each other or not. If a recession means that that there is a 5 chance that all will default and a 95% chance that none will, then the bank is sensitive to market risk. But suppose that the loans are independent of each other so that the failure of one loan implies nothing about the others, In this case, the bank can aggregate away risk and is likely insensitive to market risk. This is one of the things that banking supervisors must access.

Each banks receives a rating from 1 through 5, with 5 being horrid. This rating is shared with other regulators. The most severe consequence of a poor CAMELs rating is that the FDIC might take control of the bank and seek to sell it or its assets.

ii. Bank holding companies are large firms that may own many individual banks. Under the Dodd-Frank act, the Fed conducts *stress testing* for each bank holding company with at least $50 billion in assets. This entails estimating how that bank holding company would withstand a hypothetical financial crisis. The Fed then reports the results. For example, for 2016:[8]

> The nation's largest bank holding companies continue to build their capital levels and improve their credit quality, strengthening their ability to lend to households and businesses during a severe recession, according to the results of supervisory stress tests announced by the Federal Reserve Board on Thursday.

[8]Source: Board of Governors Press Release, June 23, 2016.

> The most severe hypothetical scenario projects that loan losses at the 33 participating bank holding companies would total $385 billion during the nine quarters tested. The "severely adverse" scenario features a severe global recession with the domestic unemployment rate rising five percentage points, accompanied by a heightened period of financial stress, and negative yields for short-term U.S. Treasury securities.
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> The firms' aggregate common equity tier 1 capital ratio, which compares high-quality capital to risk-weighted assets, would fall from an actual 12.3 percent in the fourth quarter of 2015 to a minimum level of 8.4 percent in the hypothetical stress scenario. Since 2009, these firms have added more than $700 billion in common equity capital.

In 2017, the Fed again announced that all banks had passed their stress tests. But the results also allow anyone to see how much margin for error each bank has. Ally Financial, and Sun Trust passed, but with the smallest margins of error. If the stress tests are well done, they provide confidence that banks will be able to service even significant downturns.

The purpose of stress testing is to try to mitigate or prevent future credit crises by ensuring that the largest banks are adequately capitalized, which many weren't in 2008. Hopefully, banks wish to receive good results so that they can then better access credit markets (here, the stress tests act somewhat like a credit rating). But poor performance can potentially result in a bank being broken up by the Financial Services Oversight Committee, a group that includes the Federal Reserve.

iii. The Consumer Financial Protection Bureau (CFPB) is, for some reason nobody understands, housed in the Fed. This organization fields, investigates, and resolves consumers' complaints about financial misconduct from lenders such as credit card companies, mortgage brokers, etc.

Finally, it is important to note that the Federal Reserve is charged only with regulating banks. This definition includes bank holding companies, credit unions, and commercial banks. It does not include brokerages or investment banks, these are regulated by the Securities and Exchange Commission. Prior to the 2008 financial crisis, the five American independent investment banks were not regulated by the Fed. Following the crisis, the two surviving independent investment banks reorganized as bank holding companies. This subjected them to Fed regulation, although their business model did not change too much.