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Federal Reserve policy actions in August 2007: frequently asked questions (updated)

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A revised and updated version of the 13 August column on the basic how's and why's of what the Fed has been doing to calm financial markets.

Editors' note: This column updates the 13 August 2007 column on the same topic and includes a slightly revised version of the content of the earlier column.

Let's start with the facts: On Thursday 9 August 2007 the Federal Reserve's Open Market Trading Desk (the "Desk") injected \$24 billion into the U.S. banking system. This was done in two equal size operations, one at 8:25am and a second 70 minutes later at 9:35am.¹ On Friday 10 August 2007, the Desk was in the market three times (8:25am, 10:55am, and 1:50pm) putting in a total of \$38 billion dollars. By early this week, things seemed to have returned to normal with injections of \$2 billion on Monday and no action at all on Tuesday.

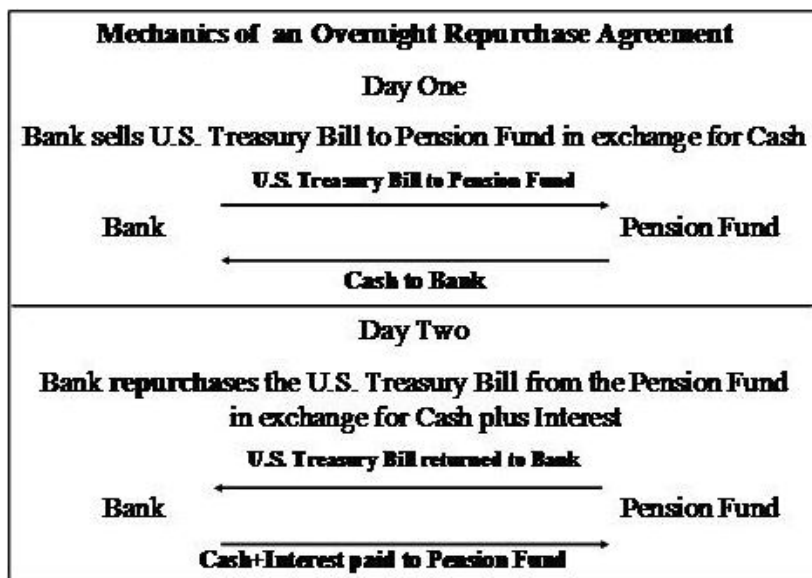
The Fed's operations came on the heels of two even larger injections by the European Central Bank (ECB) in Frankfurt. On Thursday morning the ECB in Frankfurt Germany had put nearly €95 billion (\$130 billion) into European financial institutions, followed by a somewhat smaller operation of €61 billion (\$83.6 billion) on Friday. Things continued to seem unsettled in Europe after the weekend, as the ECB added €47.7 billion (\$65.3 billion) on Monday (13 August), and then in two separate operations put €25 billion (\$34.2 billion) into the European banking system on Tuesday.²

How is this actually done? What are the mechanics of the transactions?

In all of these cases, the funds were put into the banking system using what are called "repurchase agreements" or "repos" for short. Here's a dictionary-style description: A repurchase agreement is a short-term collateralized loan in which a security is exchanged for cash, with the agreement that the parties will reverse the transaction on a specific future date at an agreed upon price, as soon as the next day. For example, a

bank that has a U.S. Treasury bill might need cash, while a pension fund might have cash that it doesn't need overnight. Through a repurchase agreement, the bank would give the T-bill to the pension fund in exchange for cash, agreeing to buy it back at the original price – repurchase it – with interest the next day. In short, the bank gets an overnight loan and the pension fund gets some extra interest. The details are shown in the figure below.

The easiest way to think about a repo is as an overnight mortgage. In the same way that you pledge your house to the bank in exchange for a loan, a financial institution pledges a bond to the Fed in exchange for funds.



The Federal Reserve Bank of New York's Open Market Desk engages in repurchase agreements every morning (the exact time varies). The quantities normally range from \$2 billion to \$20 billion dollars.³ Most of them are overnight; but it is standard to engage in repos that are as long as 14 days. The \$35 billion on Friday 10 August 2007 was the largest since those in the aftermath of the 9/11 terrorist attacks. The record is \$81.25 billion on 14 September 2001.

How does the Fed pay for the repo? Where does it get the money?

There is an important difference between what happens when two private financial institutions would engage in a repo with each other and how it works when the Fed is involved. When pension fund engages in a repo with a bank, the pension fund transfers cash to the bank. Looking at the cash accounts of the two institutions, we see the level of one went down (the pension fund) and the other one (the bank) went up, for a total of zero. When the Fed engages in a repo, it simply credits a bank's reserve account

creating money (albeit for a very short time). Put another way, when the Fed wants to engage in a repo, or buy anything else for that matter, it can simply create liabilities to do it. It's a bit like having a credit card with no limit where the bill never comes.

What happens if the bonds used in the repo fall in value overnight?

When the Fed engages in a repo the bank (or securities dealer) on the other side – what is called the “counterparty” – agrees to repurchase the security at a fixed price regardless of what happens in the markets.⁴ It is these banks who reap the gains or suffer the losses from prices moving up or down. The only risk the Fed faces is that the counterparty in a repo goes bankrupt and can't make good on the promise. Given that these are very large banks, and that the repos are very short term, this is an incredibly unlikely event.

Does this have any impact on the government's budget deficit?

No. Central bank operations have nothing to do with fiscal policy – federal government tax, expenditure and debt management policies – they are all about the interest rate and the quantity of reserves in the banking system. The Federal Reserve is the Federal Government's banker – accepting and making payments, issuing debt when they want, etc. – but they are not connected in any material way. (I'm simplifying slightly here, as there is an esoteric connection that creates a quantitatively negligible impact.)

If the Fed has \$35 billion to help the financial system, why can't they use some of their money to help the poor?

The Fed isn't spending the money on bailing out banks, hedge funds, or helping rich people. It is making fully-collateralized loans that will be repaid the next day (or week). So, while it's putting the funds in today, it's taking them out almost immediately. If, instead, the Fed were to take \$35 billion in \$20 dollar bills and go hand them out to the needy, this would be a permanent increase in the quantity of money in circulation. More money in the long run means higher prices – and that's inflation.

What is liquidity and why is it so important?

The publicly stated rationale for these large interventions is that liquidity dried up. Unfortunately, liquidity is one of those terms that means different things to different people. In the glossary to my Money and Banking textbook, I define liquidity as “the ease with which an asset can be turned into a means of payment such as money.” That is, when an asset is liquid it is easy to sell large quantities with out moving market prices. When something is illiquid, it is hard to sell.

People don't want to buy things that they can't easily sell. If they are worried that a bond they are considering buying may be difficult or expensive to sell they will lower the price they are willing to pay, assuming anyone are still willing to buy it at all. For financial markets to function well, it must be cheap and easy to both buy and sell securities. When market liquidity dries up, the financial markets stop functioning.

This form of liquidity might be better labeled "market liquidity" as distinct from what I would call "lending liquidity." Lending liquidity is the term I attach to the concept that was in the news until recently. You may recall reading or hearing about "enormous amounts of liquidity sloshing around the system." When people said this what they meant (I think) is that loan supply is plentiful so it is easy to borrow at favorable rates. Put differently (and using some technical jargon) it meant risk spreads were low and insensitive to a borrower's balance sheet position. That is, the risk premium a borrower paid was small and did not increase with additional borrowing, which should be riskier.

Fall 1998 was the last time market liquidity dried up to a greater extent than we observe today. Then it was difficult to even trade U.S. Treasury securities – usually the most liquid financial market there is.⁵ So far, things are no where near that bad. In fact, with few exceptions markets still seem to be operating normally.

\$35 billion seems like quite a bit of money. Is it?

To put the number into perspective we have to understand what these funds are used for. When the Fed injects "money" into the financial system what it does is create balances in something called "reserve accounts". That's where the money goes. Commercial banks have deposit accounts at the Fed (you and I can't have one). Those are the bank's checking accounts, with the exception that they don't pay interest. Because there is no interest paid on reserve balances, banks try to economize on the quantities.

Banks hold reserves at the Fed for three primary reasons: (1) They are required to hold them. (2) They need it to do business, so that meet customer demands for withdrawals and they can make payments to other banks. And (3), it is prudent to do so; reserves act as the bank's emergency fund – they are always ready just in case disaster strikes.

So, is \$35 billion a big number or not? Here are three numbers we could use to get some sense:

(1) Total reserves in the U.S. banking system for the two weeks ending 1 August 2007 averaged \$45 billion, of which roughly \$12 billion was held as deposits in reserve

accounts at the Federal Reserve. The remainder is held in cash in banks' vaults – that counts, too.

(2) Excess reserves, those above what the Fed requires banks to hold, usually total less than \$2 billion.

(3) On an average day, the gross quantity of interbank transfers is \$4 trillion (that's with a "t"). This includes \$1.6 trillion in funds that are transferred for the purpose of settling purchases and sales of various bonds (primarily U.S. Treasury securities).⁶

Looking at these numbers, first we see that the Fed's action on Friday increased banking system reserves by more than 75 percent. More importantly, the addition of \$35 billion increased the size of reserve accounts by a factor of 4. Second, the increase was more than 10 times the normal level of excess reserves (although for complex reasons it is hard to know today exactly how much it will add to average excess reserves).

Finally, note the rather amazing fact that during normal times the banking system uses \$12 billion to engage in \$4 trillion in daily transactions. That is, on average a dollar in a reserve account is used more than 300 times PER DAY. Because reserves do not pay interest, banks have a big incentive to economize on their use – this is pretty efficient. (This is also the reason that excess reserves are so low.) That banks do this every day suggests that they know how to do it; but the fact that they use the funds so many times means that if anyone starts hoarding reserves, there is the potential to disrupt the system.

The conclusion is that the \$35 billion is a very big number – it is three times the normal level of reserves that banks hold. Why did the banks need it?

Why did the banks need this money?

It is easy to explain why the Fed used open market operations to add \$81.25 billion on 14 September 2001 in the aftermath of the 9/11 terrorist attacks. People's inability to reach their offices in downtown New York had closed some very large banks. Though those banks could still receive payments from other banks, they couldn't make any payments to anyone else. Funds were flowing into a few huge reserve accounts, but nothing was coming out. A few large banks were sucking up the lifeblood of the financial system.

Last week the trigger seems to have been the continued fall in the value of certain mortgage-backed securities. Mortgage-backed securities bundle a large number of mortgages together into a pool in which shares are then sold. The owners of these

securities receive a share of the payments made by the homeowners who borrowed the funds. The pools create a form of insurance. In the same way that automobile insurance companies know what fraction of the insured will have collisions (but not exactly which individuals), pools of mortgages mean investors can predict the quantity of defaults and the repayment rates.

There are numerous types of mortgage-backed securities, but the ones that have run into difficulty are in what is called the “subprime” segment of the market. Subprime borrowers are basically people with poor credit who cannot qualify for a standard mortgage. Making loans to these people is known to be risky. And when things are risky, sometimes they don't work out. That's what happened.

But up to now, the problems in the subprime mortgage market are relatively small. Currently, losses are estimated to be at most \$35 billion – equivalent to a stock market decline of about 0.2 percent. (Last week the value of stocks traded in U.S. markets were down a not terribly unusual 1.5 percent, or 7 times the total expected decline in the value of these mortgages).

What's happened is that problems in this one relatively small part of the financial system been seeping into the rest of the market. When people see that they have underestimated the risks in one place, they start to question their ability to accurately evaluate risks everywhere else.

Then two things happen. First, the prices of risky financial assets fall. Risk requires compensation, and the more risk there is the more compensation. Second, people flee risky stuff that they find hard to evaluate and put their money in safe assets – what's called a “flight to quality.” The flight to quality is reflected in a increase in prices of U.S. Treasury securities and an influx of funds into the banking system.

So, the first reasons the banks need the reserves is to serve the customers that have brought money into their deposit accounts.

But individuals are not the only ones who have reduced their tolerance for risk. Bankers have, too. Bankers' reduced risk tolerance shows up in two important ways, both of which result in higher demand for reserve balances. The first is that they simply want a bigger cushion against the possibility of losses. That's pretty simple.

The second reason bankers need more reserves is that they became less willing to lend their reserves to other banks. There is a huge daily interbank market for overnight loans. It's called the “federal funds market” and the interest rate charged on those overnight loans is the “federal funds rate.” The federal funds rate is the rate targeted by

the Federal Reserve.⁷ On a normal day (which Thursday and Friday of last week were not) banks are willing to make loans early in the day even if it means temporarily overdrawing their accounts. (Yes, they are allowed to do that.) Banks that are overdrawn in the morning figure that if they don't receive payments to bring their reserve accounts back into positive territory by the end of the day, they can always go out and borrow it back. Well, it appears that last week banks were not willing to behave this way and the result was that it was very difficult to borrow late in the day.

The bottom line of this very long-winded explanation is that the banks wanted to hold substantially higher level of reserves. Keeping the federal funds rate at its target level of 5¼ percent – that's what the Open Market Desk at the Federal Reserve Bank of New York is supposed to do every day – meant engaging in huge operations.

I've heard that the Fed's operation had something to do with mortgages. Did it?

Yes it did. On Friday 10 August the Fed accepted mortgage-backed securities as collateral for the entirety of the \$35 billion in repos it engaged in that day. Importantly, though, they did not accept just any mortgage-backed securities. They only allowed dealers to pledge mortgage-backed securities issued or fully guaranteed by federal agencies.

Two comments are important here. First, this is not new. The willingness to accept mortgage-backed securities as collateral in repo goes back to changes made in advance of Y2K. At the time there were concerns about being able to get funds into the financial system quickly, and this is one of the changes made to ensure the Desk could do that. Since then, the Fed has taken mortgage-backed securities as collateral in repo at nearly the same rate they have taken agency securities.

Nevertheless, the way in which the Fed chose to do this on Friday 10 August is notable. Normally, when the Fed sends out a message they tell dealers exactly what they want in collateral. Each of the three categories is treated separately. So, it is common for the Desk to send out a message that they are willing to accept only Treasury securities. Alternatively they might send out a message that they will accept all three types – Treasury, agency and mortgage-backed – in three separate operations. What the Desk did on Friday is send out a message that said they would take whatever the dealers wanted to deliver. Since mortgage-backed securities are the cheapest to deliver (they have the lowest price in the market), that's what came in.

My speculation is that the Fed did this to demonstrate to the markets that they believe

mortgage-backed securities are good as collateral. They were trying get financial market participants to value mortgage pools sensibly.

Who decides to do this?

A number of people are involved in deciding the quantity of a daily open market operation. On a normal day there isn't much to decide. The Desk staff makes a recommendation in a conference call and the participants agree. (Having listened in on these calls, I can attest to the fact that they are normally not very interesting.) Last week was obviously not normal. While I doubt that the entire Federal Open Market Committee decided on the action, they may have been consulted through a conference call. My guess is that Chairman Bernanke and New York Fed President Geithner had a say. What I can be sure of is that the decision was made by the Federal Reserve, not by the Secretary of the Treasury or the President of the United States.

Why did this happen when it did?

It is natural to ask whether there is some specific reason for these events to occur when they did. Can we identify a specific trigger? While we can see something that has happened, as I suggested earlier there has been no fundamental deterioration in economic conditions. In fact, in the United States there was no economic data released on Thursday 9 August 2007. So, it isn't that people suddenly changed their view of the future.

Instead, what happened was analogous to a bank run. Bank runs can be the result of either real or imagined problems. Here's what how it works. Most people, even fairly sophisticated investors, are not in a position to assess the quality of the assets on a financial institution's balance sheet. In fact, most people don't even know what those assets are. So when we learn that one bank is in trouble, investors begin to worry about all financial institutions and investors start to flee. The inability to accurately value assets leads to a strong shift toward high-quality securities like Treasury bonds.

Thinking about it this way, there are two events that may have precipitated this. The first was the announcement on 2 August that the German bank, IKB Deutsche Industriebank AG, was in trouble because of investment in U.S. subprime loans. And then, on Wednesday that one of Europe's largest banks, BNP Paribas had three funds with similar problems. Financial market participants' response was to reduce their exposure to risky investments under the assumption that they could not properly assess the risks. That's exactly analogous to a bank run. It is impossible to predict the exact timing of something like that.

Does this have anything to do with discount lending?

For those of you who have seen (and heard) Jim Cramer's diatribe on CNBC on Monday 3 August,⁸ you may be wondering about discount lending. Here's the deal. The Fed has a standing offer to lend to banks (so long as they have collateral to pledge for the loan) at a rate that is 1 percentage point above the federal funds rate target of 5¼ percent. So, today a bank can borrow from the Fed at 6¼ percent. Banks, not the Fed, decide when to request a discount loan. The borrowed funds are deposited into the bank's reserve account and can be loaned out to other banks.

While we do not know for sure, it seems unlikely that discount lending increased much last week. The reason is that banks always have the option of borrowing from other banks at the federal funds rate, and the Federal Reserve Bank of New York reports that the highest rate charged for an overnight interbank loan late last week was 6 percent.⁹ I seriously doubt that a bank would borrow from the Fed at 6¼ percent when they can borrow more cheaply from another bank.

I would guess that Cramer was really arguing for an interest rate cut. It's hard to see why that's necessary at the moment. If you can't buy and sell the securities you own, you probably don't care if the cost of funds is 5¼ percent or 4 percent, or whatever.

The European Central Bank's operation was much larger than the Fed's. Is there a reason?

The details of the European Central Bank's (ECB) operating procedures are very different from those of the Fed, and I won't go into the details here. Nevertheless, I can provide the simplest explanation for the size the ECB's operation. When the ECB announced its intention to provide funds on Thursday 9 August 2007 (a day they would not normally operate at all) they said that they would accept all bids at or above the their 4 percent target. The result was that banks asked for and received €95 billion (\$130 billion) on Thursday, €61 billion (\$83.6 billion) on Friday, and €47.7 billion (\$65.3 billion) the following Monday.¹⁰

To explain this, we need to understand two things about how bank reserves work in Europe. As it turns out, 9 August is the first day of a 35 day reserve maintenance period in the Eurosystem. As I mentioned earlier, banks hold reserves because they are required. The amount they need to hold depends (in a complicated way) on the size of deposits the bank held in the past. Because there can be day-to-day fluctuations in accounts, the requirement is enforced as an average over a longer period, called the maintenance period. In the United States, the maintenance period is 2 weeks. In Europe

it varies from 28 days to 35 days.

That's the first thing. The second point is that in Europe banks receive interest on the reserves that they are holding. The interest rate paid on required reserves is equal to the average of the overnight lending rate over the maintenance period – a rate that is almost always slightly above the ECB's target rate. (This is very different from what goes on in the United States where no interest is paid.)

Okay, so now imagine that you are a bank and you hear the ECB announce that they will lend you as much as you want at the 4 percent target. Maybe you know something about what's going on, maybe you don't. In either case, when the ECB says that they are going to give you as much as you want on a day when they normally do nothing, you have to wonder what they know that you don't.

You also know that since the reserve requirement is an average over the next 35 days, if you hold a high level of reserves today, you can always make up for it with a very low level before the end of the maintenance period. And, again unlike in the U.S. if you are stuck with excess reserves holdings, in you can redeposit it at the ECB at a 3 percent interest rate. All of this makes it much cheaper for European banks to take the reserves from the ECB and helps explain why they took so much.

Editor's note: A French translation of this can be found at ddata.over-blog.com/xxxyyy/0/24/69/70/cecchetti.pdf. This site is unrelated to Vox, but our thanks! I found it on <http://obouba.over-blog.com/>

¹You can find all of the details by looking at the historical data on the Federal Reserve Bank of New York's website starting at <http://www.newyorkfed.org/markets/omo/dmm/temp.cfm>. Every transaction is posted shortly after it is completed.

² On Tuesday, the ECB provided €17.5 billion through it's regular weekly auction plus €7.5 billion through fine-tuning operations.

³ The Desk puts out a call for bids, usually stating the term of the repo and the type of collateral that they will accept. Banks and securities dealers submit their offers – quantities and prices – and then the Manager at the New York Fed decides how much to accept. There are three types of collateral: U.S. Treasury Securities, U.S. Agency Securities (issued by people like Fannie Mae and the Small Business Administration),

and Mortgage-backed Securities. Offers average roughly 5 times what's accepted for Treasury securities, 10 times for Agency securities, and 15 times for Mortgage-backed.

4 The Fed only engages in transactions with 21 "primary dealers." Primary dealers agree to make bids or offers when the Fed conducts open market operations, provide information to the Fed's open market trading desk, and to actively participate in U.S. Treasury securities auctions when the bonds, notes, and bills are initially sold.

5 We can get some sense of the operation of a market by looking at the behavior of securities dealers who both buy and sell. When a market operates normally, the difference between the price they bidding to buy and the one they asking to sell – the bid/ask spread – is very small and they are willing to quote a single price for a large quantity. In the fall of 1998 there was a brief period when the bid/ask spread for U.S. Treasury bonds was 10 times normal and the quantity for which dealers were willing to hold the price was one-tenth normal.

6 If you want to know more, start at www.federalreserve.gov/paymentsystems/fedwire/default.htm.

7 When the Federal Open Market Committee "sets the interest rate" they are really instructing the Open Market Desk to try and keep the federal funds rate determined by banks in the market for overnight loans near a specific target. The Desk does this by supplying the quantity of reserves they believe the banking system will want at that target rate. For somewhat complex reasons, the Fed does not actually determine the rate. I describe the details in Chapter 18 of my textbook *Money, Banking, and Financial Markets* (page 462 ff. in the first edition, page 430 ff. in the second edition).

8 You can watch Jim Cramer screaming on UTUBE at <http://www.youtube.com/watch?v=SWksEJQEYVU> – it's very entertaining and will take you only 3:13 minutes to watch.

9 On the day of Cramer's diatribe, there was a federal funds loan reported at 6½ percent, above the level at which the Fed was willing to lend. But because both the effective federal funds rate was close to the target and the (weighted) standard deviation was low, my strong suspicion is that the quantity of lending at 6½ percent was very low.

10 It is possible that the ECB did this to rescue a single institution that was unable to obtain credit elsewhere. I hope that's not the case.

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Comments

F One question: In a world

On August 18th, 2007 F says:

F

One question: In a world of currency substitution, should the ECB's and the Fed's operations be considered as a single one?

Or rather two: If so, after allowing for the operational differences, would an intervention by the Fed of the size of the ECB's result in a different appreciation by market participants?

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