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107 Park Street—Saugatuck, MI--49453—312-565-0112 –Email: rgenetski@classicalprinciples.com

A Q&A About Excess Bank Reserves and Monetary Policy

Mitt: Bob, having thought again about the concept of bank "excess reserves" at the Fed, I have the following question. When the Fed adds liquidity to the economy by purchasing securities it pays for those securities by making a deposit a bank's (the selling bank) "account" at the Fed. This causes an increase in reserves. When that bank makes a loan, it in effect transfers some of its reserves at the Fed to another bank's reserves at the Fed. (It writes a check to a borrower; that borrower deposits the check in another bank; the check is paid by the lending bank; all checks clear through the Fed.) In the process, reserves neither go up nor down. They necessarily stay the same. Therefore, shouldn't "excess" reserves at the Fed be only dependent on how much the Fed has invested in securities? (I'm not considering cash in this analysis.) Where have I gone wrong?

Genetski: Let's take it one step at a time.
1: "When the Fed adds liquidity to the economy by purchasing securities it pays for those securities by making a deposit to a bank's (the selling bank) "account" at the Fed. This causes an increase in reserves."
A: Yes. That's the usual way the Fed increases reserves.
2: "When that bank makes a loan, it in effect transfers some of its reserves at the Fed to another bank's reserves at the Fed. (It writes a check to a borrower; that borrower deposits the check in another bank; the check is paid by the lending bank; all checks clear through the Fed.) In the process, reserves neither go up nor down. They necessarily stay the same."
A: Yes again. The behavior of the banks has not changed the amount of total reserves.
3: "Therefore, shouldn't "excess" reserves at the Fed be only dependent on how much the Fed has invested in securities? (I'm not considering cash in this analysis.) Where have I gone wrong?"
A: Total reserves are dependent on how much the Fed has invested in securities. Excess reserves depend on how the banks respond to the Fed's creation of total reserves. You are correct that reserves remain the same. And so long as the banks decide to keep all their excess reserves on deposit with the Fed there is also no further increase in loans, investments or bank deposits beyond those created by the Fed's purchases.
Your question may relate to the notion of an expansion of credit and bank deposits above and beyond the amount of reserves created by the Fed. The multiple expansion of credit is a difficult concept to grasp. As explained in "The Theory of Multiple Expansion of Deposits: What is it and whence it came" by Thomas M. Humphrey, it took six economists roughly a century to figure it out. The short answer is when banks loan or invest excess reserves the original deposits *as well as* the additional deposits generated by the loans or investments stay in the banking system. (The article does a much better job at explaining this than my short answer.)
Hope this helps.

Mitt: Bob, thanks for the article. I think I understand how the multiplier (r in the article) works. But I still don't understand why reserves could ever be "excess" and controlled by banks. Assuming the Fed has no other liabilities and assuming the Fed's net worth is relatively unchanged (it remits profits to the U.S. treasury), and assuming assets remain the same (FED doesn't unwind QE), don't reserves need to remain constant and equal to the difference between deposits and loans? This seems to be the way the article describes deposit creation. Furthermore, it seems to match the data. D=C/r, where C and r are determined by the Fed.
Genetski: It's true that bank reserves are a liability of the Federal Reserve. It's also true that without the Fed purchasing securities (or loaning funds to banks) bank reserves remain constant. As for the relationship between reserves, deposits, and loans, it will change depending upon the amount of excess reserves.
There may be some confusion over the term "excess reserves". In the article it states, "In short, multiple expansion occurs in the multibank case because the excess reserves that *form the basis for loans*, though lost to the individual bank, are not lost to the system as a whole." I've highlighted "*form the basis for loans*" because they may or may not increase loans.
Excess reserves are the amount of reserves banks keep on deposit with the Fed over and above what the Fed requires. In the analysis in the article it assumes banks want to be "fully loaned up." By this it means that by definition banks will have no excess reserves, i.e. no reserves above those required by the Fed. So long as banks keep these funds on deposit with the Fed, the funds cannot be used for loans in the economy. Hence, the multiple expansion of loans and deposits will not occur.
To illustrate, let's take two extreme examples both with a reserve requirement of 10%. In both cases the Fed purchases $10 billion in securities and creates $10 billion in bank reserves (all other things are held constant).
In the first case the banks keep the entire $10 billion of total reserves on deposit with the Fed. Total reserves are $10 billion consisting of $1 billion in required reserves and $9 billion in excess reserves.
In this case the $10 billion the banks have on deposit with the Fed represents a loan to the Fed ($9 billion of the loan is voluntary the other $1 billion is mandatory). Having loaned the money to the Fed, banks are not able to loan the same funds to anyone else. In this example, bank deposits still increase by $10 billion (reflecting the increase in total reserves), but there is no increase in loans to the rest of the economy. Without an increase in loans to the economy, there is no multiple expansion in loans and deposits. In this extreme example the $10 billion increase in bank reserves results in a $10 billion increase in bank deposits. Total reserves are still $10 billion consisting of $1 billion in required reserves and $9 billion in excess reserves.
In the other extreme case let's assume banks keep the minimum amount of its reserves ($1 billion) on deposit with the Fed. Banks use the entire $9 billion to fund loans. The loans generate new deposits via the multiple expansion of credit so that 90% of the $9 billion generates new loans and so on as explained in the article referred to above. When the process ends the economy will have $100 billion in new bank deposits. Total reserves are still the original $10 billion but now consist of $10 billion in required reserves and zero of excess reserves. In this extreme example the multiple expansion process leads to a total increase in bank deposits of $100 billion and an increase in loans of $90 billion.

This is why, when banks reduce the amount of reserves they keep at the Fed (over and above their requirement), it can have a major impact on the amount of money or liquidity in the system. Let me know if this explanation clears anything up (or if I've simply added to the confusion).
Bob