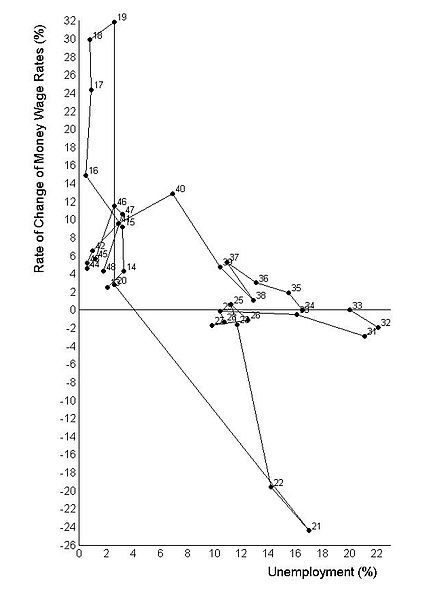
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**Lecture 09: How Banks Work & Monetary Policy**

1. Fractional reserve system
   1. Banks are *financial* *intermediaries*: they connect savers with borrowers. They make money by turning their liabilities (debts) into assets, such as lending out a deposit.
      1. *Reserve requirements* refer to a regulation requiring the bank to hold a certain percent of deposits (typically 10%).
      2. *Required reserves* are those deposits.
      3. *Excess reserves* are holdings beyond the required reserves and are often used for lending.
   2. The monetary multiplier
      1. The fiscal multiplier exists because the spending of one person becomes the income of another person.
      2. When banks lend money, something similar happens. Some (not all due to required reserves) of the money you save in Bank A goes to someone else as a loan. They put that loan in Bank B to use while they spend it.
      3. Bank B uses a portion of this money to lend out to someone else who puts it in Bank C, and so on and so on.
      4. Like the fiscal multiplier, the *monetary multiplier* describes the how much the money supply expands with each dollar increase in reserves. It equals 1 / reserve requirement.
      5. If the reserve requirement is 10% (0.10) and there’s an increase of $2,000 in reserves, the money supply increases by $20,000.
   3. A house of cards?
      1. So banks get money from depositors and then lend most of it out to others. But you can still stake a claim 100% of the money you deposited. How? It’s not there anymore!!!
      2. If you close your bank account, you’ll be taking other people’s deposits. This isn’t a big deal—these individuals still have a claim to their money. People only want a fraction of the money in their checking account at any one time.
      3. Every day, the bank brings in money from people paying back loans and from new deposits in accounts. Every day, money flows out in the form of loans and withdraws. On average, it balances out just fine.
      4. The problem occurs when people take more out than what is there. This is called a bank run and when it happens, it becomes a disaster very quickly.
   4. FDIC
      1. Stopping a bank run is very hard. The more people try to take money out, the more urgent it is to withdraw money. In emergencies, the government might declare a “holiday” and close the banks, but that doesn’t really solve the problem.
      2. The Federal Deposit Insurance Corporation insures all deposits under $250,000. If the bank fails, you’ll still get your money. Just make sure your bank is a member of FDIC (it’s a really shady bank if it’s not).
2. Asymmetric Information
   1. *Asymmetric information* is when two parties don’t have equal information concerning the other (e.g. lending, hiring, buying a used car, dating). Two problems appear:
   2. *Adverse Selection* is when a person makes a choice that was never the right one. In adverse selection, the problem occurs *before* the transaction was made. You can think of adverse selection as dealing with static troubles, the moment you encounter something or someone, there’s already some quality you won’t like.
      1. Ex: Most short-term relationships, used cars, hiring an established slacker, lending to a con artist
   3. *Moral Hazard* is when a person chooses someone who then becomes the bad choice after the decision is made. In moral hazard, the problem occurs *after* the transaction was made (hence the name, as there’s an implicit ethic dilemma). You can think of moral hazard as dealing with dynamic troubles, people respond to the incentives engendered from the deal.
      1. Ex: Most long-term relationships, national health care, hiring a potential slacker, lending to MC Hammer
   4. *Principal-Agent problem*—making sure one party (agent) acts according to the wishes of another party (principal), as entrusted. In other words, the P-A problem occurs because of asymmetric information (especially moral hazard).
   5. Banks care a lot about asymmetric information.
      1. They want to make sure they are lending to the right person.
      2. They want to make sure that person remains the right person after they get their money.
3. What is a central bank?
   1. A state-backed bank responsible for implementing monetary policy. (Engaging in actions that alter the interest rate, exchange rate, how private banks are run, etc.)
   2. “Bank” in this case is a little deceiving; a central bank isn’t trying to make loans or earn a profit. It is more of an authority than a bank. But the terminology “central bank” is the norm so we will use it here.
   3. Because most countries use a fiat currency, the bank must print new money—the government’s the only one that can supply it.
4. The Federal Reserve System (the “Fed”)
   1. This is a network of the U.S.’s central bank, managed by the Board of Governors.
      1. There are twelve Federal Reserve Banks in the U.S. spread throughout the country. Each Bank is in charge of a District.[[1]](#footnote-1)
      2. The Board makes policy decisions which determine the monetary control of the United States. When the government increases the money supply, the Board made the decision.
      3. Each board member is elected to a fourteen-year term. This lengthy term to help insulate the Board from political pressures.
      4. The chair of the Board of Governors is currently Janet Yellen.[[2]](#footnote-2)
   2. The Fed has a dual mandate: keep prices stable and keep unemployment low.
      1. Keeping prices stable typically means fighting inflation. The Fed is concerned about deflation as well, but historically the major concern in inflation.
      2. Over the years, the Fed has adopted a second mandate: low unemployment. Money is incredibly powerful in how it affects the performance of the economy, and, by extension, the level of employment.
      3. The problem is in the short-run, there is a trade-off between inflation and unemployment. High inflation means low unemployment and vice-versa. We call this the Phillips Curve, after the economist who first articulated this historic relationship, William Phillips.
      4. This graph, from Phillips (1958), illustrates the relationship between inflation and unemployment from 1913 to 1948 in the United Kingdom.
5. Lender of last resort
   1. In order to assuage the possibility of a systematic bank failure, the Fed is sometimes employed as a “lender of last resort.”
   2. When a bank is in danger of failing or is in desperate need of assistance, the Fed acts as a safety net and lends the needed amount to help keep it afloat.
   3. While this adds a great deal to stability and cultivates public confidence in the US banking system, it also creates a moral hazard problem.
      1. Suppose you go to a business conference in Las Vegas and your company agrees to reimburse you for any money you lose while gambling. Even if you’re hesitant about gambling, this safety net against losses completely changes the calculation. The smart thing to do is to gamble. A lot.
      2. This is the problem with the Fed’s role as a safety net for banks. Knowing the Fed will save them if they really screw up, banks have an incentive to take risks they wouldn’t otherwise take.
      3. For example, in the wake of the subprime mortgage crisis the U.S. government bailed out several “too-big-to-fail” banks that faced a crippling number of defaults.
6. Types of interest rates
   1. The Fed operates by altering the interest rate through the money supply. But there are multiple interest rates: rates banks borrow from the Fed, rates banks borrow from each other, rates banks grant savers, rates bank charge lenders, and so on.
   2. The *Federal funds rate*—the interest rate which banks lend from one another on overnight loans of reserves—is the key interest rate for monetary policy. It’s the interest rate which seeps into all sectors of economy and thus directly relates to economic growth.
      1. It’s called the Federal funds rate because it involves loans banks make to each other so they can meet the federally mandated reserve requirement.
      2. Think of the Fed trying to influence the market for wood products. The best way to do this would not be focusing on the prices of wooden chairs, sawhorses, and toys for that would only capture one aspect of the market. Instead, they would be best to focus on a price that affects each firm in the market they are trying to understand: the price of wood.
      3. Similarly, focusing on just a handful of interest rates of a handful of banks wouldn’t do much. But focusing on the price they all share—the price they charge each other—allows influence of the whole industry.
   3. In addition to the Federal funds rate, we should be made aware of the *discount rate*—the rate at which banks borrow from the Federal Reserve. Banks use this option when they have unexpected and immediate needs for funds.
7. Tools of the Fed
   1. The Fed has four basic tools in how it influences the economy. Each tool changes the Federal funds rate.
      1. If the Fed pulls any of these four levers, the basic sequence is:

Excess Reserves↑ → Federal Funds Rate↓ → Money Supply↑↑↑ → Interest rate↓↓↓ → I↑↑↑ → AD↑↑↑ → YR↑↑↑

* 1. **Like in fiscal policy, the greater the multiplier (this time the monetary multiplier), the greater the shift in AD.** 
     1. **This is why one upward arrow under Excess Reserves became three upward arrows under Money Supply.**
  2. Open-Market Operations
     1. The Fed’s most commonly used tool is directly changing the money supply through “open-market operations.”
     2. The Federal Reserve has the right to sell government bonds (to fund the government’s debt) and has the right to print money.
     3. If it sells government bonds, it collects dollars in return, lowering the money supply.
     4. If it buys government bonds, it gives up dollars in return, increasing the money supply.
     5. Since the Federal funds rate is the price of borrowing money, more dollars means the interest rate falls. A smaller money supply means it rises.
     6. As a general rule, the Fed keeps the discount rate (which they set) close to the Federal funds rate.
  3. Reserve Ratio (Reserve Requirement)
     1. Banks create money. When they loan out excess reserves (and charge interest), they are creating money.
     2. By changing the reserve ratio/requirement, the Fed alters how much money a bank can create because it changes how much money the bank must hold in its coffers. By raising the reserve ratio, it decreases the money supply and the monetary multiplier.
     3. This puts upward pressure on interest rates.
  4. The Discount Rate
     1. By changing the discount rate, the Fed changes how easy it is to borrow additional money from the Fed. Lowering the discount rate increases banks’ reserves.
     2. This is particularly effective because these loans are not subject to the reserve requirement. If a bank borrows $100 million, it can lend out all $100 million.
  5. Term Auction Facility
     1. The Fed auctions off a block of loanable funds twice a month. Each bidder submits an amount to borrow and an interest rate.
     2. The Fed then organizes the interest rates from highest to lowest. The Fed passes out money, starting with the bank which offered the highest interest rate.
     3. When the block is exhausted, all loans have the interest rate the last bank offered. Note how similar this is to a demand curve.
     4. The Fed can easily alter how much money is available for auction. By lowering (or raising) the amount available, the Fed injects more (or less) money into the economy, engaging in expansionary (or restrictive) monetary policy.

1. Challenges
   1. Lags: the delay between problem and solution still exist here, but they are less severe.
      1. Recognition lag—it takes time to identify the problem.
      2. Effectiveness lag—it takes time for investors to apply the new interest rates to investment and for that effect to be felt in real GDP.
   2. Demand for Cash: the actual monetary multiplier is lower than the theory
      1. The monetary multiplier assumes everyone puts 100% of their money in the bank.
      2. In fact many people, when they take a loan, get at least some of it in cash. Thus that portion never enters the banking system and is thus not multiplied.

Excess Reserves↑ → Federal Funds Rate↓ → Money Supply↑↑↑ → Interest rate↓↓↓ → I↑↑↑ → AD↑↑↑ → YR↑↑↑

* + 1. This challenge monetary policy faces interrupts the monetary multiplier. Exactly how much is not multiplied depends on the degree of the demand for cash.
  1. Liquidity Trap: when monetary policy doesn’t work anymore.
     1. The Fed’s expansionary monetary policy is based on lowering interest rates. But interest rates have a floor; you can’t have a negative interest rate.
     2. When there’s a recession and interest rates are already low, economists refer to this as a *liquidity trap*—when adding more liquidity has little-to-no positive effect on lending.
     3. The Fed can make more reserves available, but it can’t make banks lend the money. Banks might simply want liquidity in their coffers to assuage potential problems in the future.

Excess Reserves↑ → Federal Funds Rate↓ → Money Supply↑↑↑ → Interest rate↓↓↓ → I↑↑↑ → AD↑↑↑ → YR↑↑↑

* + 1. This challenge interrupts the connection between increasing the money supply and decreasing the interest rate. The interest rate can’t fall any more.

1. The banks are in Boston (1); New York (2); Philadelphia (3); Cleveland (4); Richmond (5); Atlanta (6); Chicago (7); St. Louis (8); Minneapolis (9); Dallas (10); Kansas City (11); and San Francisco (12). [↑](#footnote-ref-1)
2. As of April 2014; before Janet Yellen was Ben Bernanke; before Ben Bernanke was Alan Greenspan. [↑](#footnote-ref-2)