

Principles of Macroeconomics

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In the following cases, will real growth rise, fall, or remain unchanged according to the New Keynesian model?

1. Expected inflation 5%, Actual inflation 7%
2. Expected inflation 3%, Actual inflation 1%
3. Expected inflation 6%, Actual inflation 6%
4. Expected inflation 7%, Actual inflation -10%
5. Expected inflation -1%, Actual inflation 0%

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- a If newspapers and magazines report a lot of good news about the economy, what is likely to happen to velocity?
- b If the Federal Reserve wants to keep aggregate demand (i.e., spending growth) stable, what will it do to the growth rate of the money supply when a lot of good news comes out about the economy: increase it, decrease it, or leave it unchanged?

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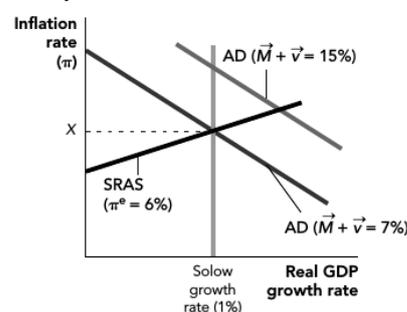
Sort the following shocks into real shocks or aggregate demand shocks. Remember that shocks include both good and bad events.

- ▶ A fall in the price of oil
- ▶ A rise in consumer optimism
- ▶ A hurricane that destroys factories in Florida
- ▶ Good weather that creates a bumper crop of California oranges
- ▶ A rise in sales taxes
- ▶ Foreigners watch fewer U.S.-made movies
- ▶ Fear
- ▶ New inventions occur at a faster pace than usual
- ▶ A faster money growth rate

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Consider the figure below. In this relatively unsuccessful economy, the Solow growth rate is 1% per year.

- a Calculate the value of X in this economy. (Hint: Use the quantity theory.)
- b If spending growth were 15% in this economy, what would the inflation rate be in the long run, assuming the Solow growth rate stays fixed?

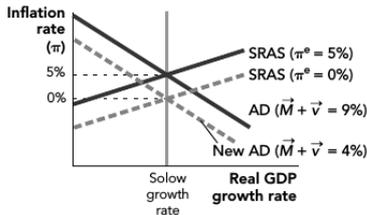
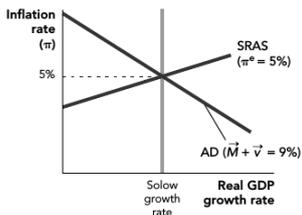


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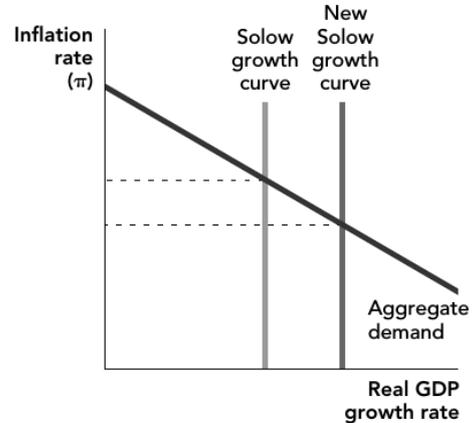
What happens when bad aggregate demand shocks hit the economy?

- a Before we get to the bad aggregate demand shock, let's find out what the Solow growth rate is in this economy. Use the quantity theory to find your answer.
- b Because of a fall in the growth of the money supply, spending growth falls to 4% per year. Draw the immediate result on aggregate demand in the graph above.
- c This fall in money growth lasts for many years. Eventually, in the long run, workers, business owners, and consumers all adjust their inflation expectations enough so that the economy returns to the Solow growth rate. Draw this new SRAS curve in the figure above.
- d In the long run, after spending growth falls to 4% per year, what will the Solow growth rate be? What will inflation be?

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If the Solow growth curve increased because of a sudden fall in the price of oil, what would happen to inflation? Assume that spending growth (aggregate demand) does not change – only the growth curve shifts. Draw the shift in the following figure.



Which will have the effect of amplifying a negative real shock and which are intended to offset a shock?

- a Several large financial institutions become insolvent as a housing bubble bursts & subprime mortgages begin to default in large numbers
- b Many financial institutions begin issuing fewer loans and increasing their excess reserve holdings in anticipation of higher default rates on existing loans.
- c The Federal Reserve expands the money supply and lowers interest rates.
- d Instead of building for future demand, home builders delay their usual building so they can await and see whether demand increases.
- e As unemployment rises, consumers begin cutting back on their expenditures and paying down personal debt.
- f The government passes a stimulus package increasing spending on roads and other infrastructure.
- g Firms accumulate cash reserves and delay expansions projects pending the outcome of potential government actions influencing business conditions.
- h Students decide to stay in college for longer periods of time due to the poor job market, and older workers retire early.

As noted in the chapter 31, an oil price shock will probably increase the size of an oil-centered city like Houston, Texas. During the time that people are moving to Houston, looking for jobs, and switching jobs to find the best job possible, do you think GDP will be lower than usual or higher than usual? (Try focusing on the production part of GDP in answering this question.)

The Definition and Functions of Money

- ▶ Money is a highly liquid financial asset that serves as a:
 - ▶ Medium of exchange
 - ▶ Unit of account
 - ▶ Store of wealth & Standard of deferred payment
- ▶ Liquid means to be easily changeable into another asset or good

Money is anything that is widely accepted as means of payment. The most important assets that serve as money today are:

1. Currency – Paper bills and coins.
2. Total reserves held by banks at the central bank.
3. Checkable deposits – your checking or debit account.
4. Savings deposits, money market mutual funds, and small-time deposits.

(Alternative) Measures of Money

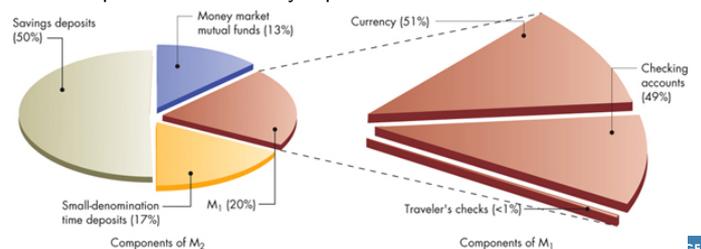
Economists have developed different measures of money

MB Monetary Base: currency outstanding and total reserves at the central bank.

- ▶ The central bank has only direct control over the monetary base.

M1 currency in the hands of the public plus checking accounts and traveler's checks

M2 M1 plus other relatively liquid assets



Fractional Reserve Banking and the Creation of Money

Can commercial banks create money?

The first step in the creation of money

- ▶ The Central bank creates money by simply printing currency
- ▶ Currency is a financial asset to the bearer and a liability to the central bank
- ▶ The bearer deposits the currency in a checking account at the bank
- ▶ The form of money has changed from currency to a bank deposit

The second step in the creation of money

- ▶ The bank lends a fraction of the deposit
- ▶ The amount of money has expanded:
- ▶ Initial deposit + new loan
- ▶ The amount of money is multiplied

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An Example of the Creation of Money

Round	Bank Gets	Bank Keeps (reserve ratio: 20%)	Bank Loans (80%) Person borrows
1	\$10,000	\$2,000	\$8,000
2	\$8,000	\$1,600	\$6,400
3	\$6,400	\$1,280	\$5,120
4	\$5,120	\$1,024	\$4,096
5	\$4,096	\$819	\$3,277
	\$33,616	= \$6,723	+ \$26,893
	Total money after 5 rounds		
Infinite	\$50,000	= \$10,000	+ \$40,000
	Eventual money creation		

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All else remaining constant, what happens to the money supply if the reserve ratio decreases?

The Money Multiplier

- ▶ Reserves are currency and deposits a bank keeps on hand or at the central bank, to manage the normal cash inflows and outflows
- ▶ The reserve ratio is the ratio of reserves to deposits a bank keeps as a reserve against cash withdrawals
- ▶ Banks can keep more reserves: excess reserve ratio
- ▶ Reserve ratio = required reserve ratio + excess reserve ratio

Calculating the Money Multiplier

- ▶ We will call the ratio $1/r$ the simple money multiplier
 - ▶ The simple money multiplier is the measure of the amount of money ultimately created per dollar deposited in the banking system, when people hold no currency
 - ▶ It tells us how much money will ultimately be created by the banking system from an initial inflow of money
- ▶ The higher the reserve ratio, the smaller the money multiplier, and the less money will be created

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Determining How Many Demand Deposits Will Be Created

- ▶ To find the total amount of deposits that will be created, multiply the original deposit by $1/r$, where r is the reserve ratio
- ▶ If the original deposit is \$100 and the reserve ratio is 10 percent (0.1), the amount of money ultimately created is:

$$\$100 \times 1/0.1 = \$1000$$

$$\text{New money created} = \$1000 - \$100 = \$900$$

- ▶ The simple money multiplier reflects the assumption that only banks hold currency
- ▶ When firms and individuals hold currency, the money multiplier in the economy is:

$$\frac{1 + c}{r + c}$$

- ▶ Where r is the percentage of deposits banks hold in reserve and c is the ratio of money people hold in currency to the money they hold as deposits

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Monetary Policy

- ▶ Monetary policy is a policy of influencing the economy through changes in the banking system's reserves that influence the money supply and credit availability in the economy
 - ▶ Fiscal policy is controlled by the government directly
 - ▶ Monetary policy is controlled by the central bank
 - ▶ Monetary policy works through its influence on credit conditions and the interest rate in the economy
- ▶ **Expansionary monetary policy** is a policy that increases the money supply and decreases the interest rate and it tends to increase both investment and output



- ▶ **Contractionary monetary policy** is a policy that decreases the money supply and increases the interest rate, and it tends to decrease both investment and output



The Conduct of Monetary Policy

- ▶ The Central Bank influences the amount of money in the economy by controlling the monetary base
 - ▶ Monetary base is vault cash, deposits of the Central Bank, and currency in circulation
- ▶ Monetary policy affects the amount of reserves in the banking system
 - ▶ Reserves are vault cash or deposits at the Central Bank
 - ▶ Reserves and interest rates are inversely related

Monetary Policy and the Central Bank

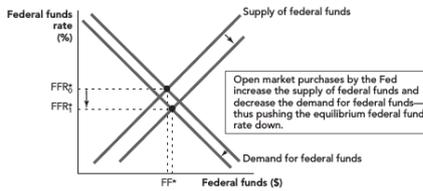
- ▶ A central bank is a type of banker's bank whose financial obligations underlie an economy's money supply
 - ▶ If commercial banks need to borrow money, they go to the central bank
 - ▶ If there's a financial panic and a run on banks, the central bank is there to make loans
- ▶ It...
 - ▶ conducts monetary policy (influencing the supply of money and credit in the economy)
 - ▶ (often) supervises and regulates financial institutions
 - ▶ is lender of last resort to financial institutions
 - ▶ provides banking services to the government
 - ▶ issues coin and currency
 - ▶ provides financial services to commercial banks, savings and loan associations, savings banks, and credit unions
- ▶ The ability to create money gives the central bank the power to control monetary policy

Open Market Operations

- ▶ Open market operations are the primary way in which the Central Bank changes the amount of reserves in the system
 - ▶ Open market operations are the Central Bank's buying and selling of government securities
 - ▶ To expand the money supply, the Central Bank buys bonds
 - ▶ To decrease the money supply, the Central Bank sells bonds
- ▶ When banks are eager to lend, they keep reserves low, and the Money Multiplier will be high.
 - ▶ Changes in MB will have a larger effect on the money supply.
- ▶ When banks are reluctant to lend, they hold reserves high, and Money Multiplier will be low.
 - ▶ Changes in MB will have a smaller effect.

Open Market Operations

- ▶ An open market *purchase* is expansionary monetary policy that tends to reduce interest rates and increase income



▶ When the Central Bank buys bonds, it deposits money in banks' account with the Central Bank

▶ Bank reserves are increased, and when banks loan out the excess reserves, the money supply increases

- ▶ Increased supply of money leads to increase in supply of loans
- ▶ Decreased interest rate leads to increase in demand for loans
- ▶ An open market *sale* is a contractionary monetary policy that tends to raise interest rates and lower income
 - ▶ When the Central Bank sells bonds, it receives checks drawn against banks
 - ▶ The bank's reserves are reduced and the money supply decreases

Overnight lending rate

- ▶ The Central Bank controls a real rate of interest only in the **short-run.**
 - ▶ Lending and borrowing decisions depend on the real interest rate.
- ▶ The Central Bank has greatest influence over the overnight lending rate that banks charge each other.
- ▶ Monetary policy is usually conducted around the the overnight lending rate.
 - ▶ It is a convenient signal of monetary policy.
 - ▶ It responds quickly to actions by the Central Bank.
 - ▶ It can be monitored on a day-to-day basis.
 - ▶ M1 and M2 are more difficult to measure and monitor.

Reserves

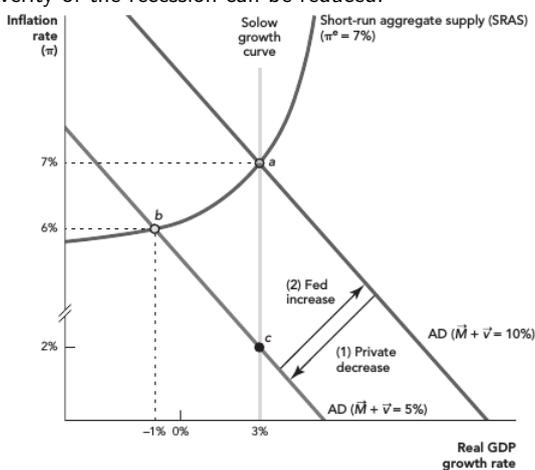
- ▶ Reserves are currency and deposits a bank keeps on hand or at the central bank, to manage the normal cash inflows and outflows
- ▶ The reserve ratio is the ratio of reserves to deposits a bank keeps as a reserve against cash withdrawals
- ▶ The reserve requirement is the percentage the Central Bank sets as the minimum amount of reserves a bank must have
- ▶ Banks can keep more reserves: excess reserve ratio
- ▶ Reserve ratio = required reserve ratio + excess reserve ratio

Where you get your loans is a signal about what kind of bank (or person) you are.

Which of the following would seem like bad signs? If you think one or more of the cases are ambiguous, explain.

1. Your friend borrows money from a federal student loan program.
2. Your friend borrows money from a payday loan store.
3. Your friend pays for ordinary living expenses by borrowing with her credit card.
4. Your friend borrows money from her parents.
5. Your friend borrows money from an illegal loan shark.

If the Central Bank increases the growth rate of the money supply, and the AD curve shifts back by just the right amount, the length and severity of the recession can be reduced.



Borrowing from the Central Bank and the Discount Rate

- ▶ In case of a shortage of reserves, a bank can borrow reserves directly from the Central Bank
- ▶ Because the Central Bank can create money at will, it is lender of last resort.
- ▶ These loans increase the Monetary Base, when the banks repay the loans the monetary base shrinks back.
- ▶ The discount rate is the interest rate the Central Bank charges for those loans it makes to banks
 - ▶ An increase in the discount rate makes it more expensive to borrow from the Central Bank and may decrease the money supply
 - ▶ A decrease in the discount rate makes it less expensive to borrow from the Central Bank and may increase the money supply
- ▶ Banks in good health usually borrow from other banks.
 - ▶ There is a stigma to borrowing from the Central Bank.

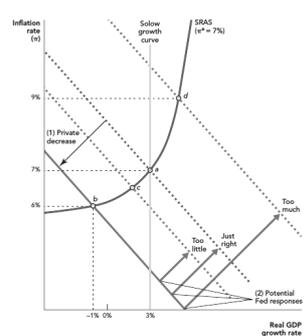
Suppose that entrepreneurs are suddenly more pessimistic.

- ▶ This results in less borrowing and lending and the growth rates of M1 and M2 fall.
- ▶ AD falls and the rate of growth of real GDP falls.
- ▶ Eventually the economy will recover at the original growth rate of real GDP and a lower rate of inflation.
- ▶ If wages are sticky, this process takes longer and higher unemployment will last longer.

What would be the Central Banks best response to the result of the entrepreneurs pessimism?

Monetary policy looks easy, but...

- ▶ The Central Bank must operate in real time – when much of the data about the state of the economy are unknown.
 - ▶ Data... Are often released on a quarterly or monthly basis
 - ▶ Are often amended after the fact
 - ▶ Take time to analyze and interpret.

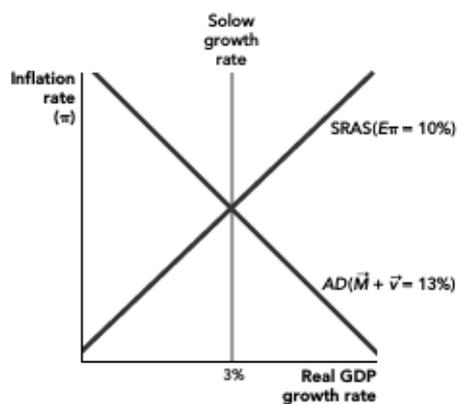


- ▶ The Central Bank's control of the money supply is incomplete and subject to uncertain lags.
 - ▶ An increase in the money supply typically affects the economy with a lag of 6 to 18 months.
 - ▶ If banks aren't willing to lend – AD will be affected very little ...the Central Bank will undershoot.
 - ▶ If the economy recovers before the monetary policy has an effect – the Central Bank can easily produce a higher than desired rate of inflation ...overshoot.

Rules vs. Discretion

1. Monetary policy should be governed by rules.
 - ▶ The Central Bank should not try to respond to every shock. Some suggestions...
 - ▶ Set target ranges for M1 and M2.
 - ▶ Set target ranges for inflation.
 - ▶ Milton Friedman: Strict rule in which money supply would grow by 3% a year.
 - ▶ Allow some adjustments, stated in advance.
2. The Central Bank should have the discretion (and flexibility) to do what it thinks best.
 - ▶ Discretionary policy has resulted in less volatility.

- ▶ Suppose that inflation is running at 10%. Velocity shocks are 0 and that the Solow growth rate is 3%.
- ▶ The central banker would like to lower inflation to 2% without reducing real growth.
 - ▶ What should the central banker tell the public?
 - ▶ And at what level should the central banker set money growth?



Market Confidence

One of the Monetary Policy Maker's / Central bank's most powerful tools is Market Confidence

- ▶ Expectations (perhaps more important than money supply and interest rates!)
- ▶ Uncertainty – the opposite of confidence...
 - ▶ Drives people to hold more cash
 - ▶ Lending falls
 - ▶ Example: 9/11 – uncertainty goes up after the terrorist attacks.
 - ▶ A bandwagon effect could have caused a severe recession.
 - ▶ US Fed sent a strong signal by increasing lending to banks by over \$45 billion.
 - ▶ A severe recession did not develop.

Central Banks in different countries may have different objectives

While the Fed focuses on the Central Bank funds rate as its operating target, it also has its eye on its ultimate targets:

- ▶ stable prices,
- ▶ acceptable employment,
- ▶ sustainable growth, and
- ▶ moderate long-term interest rates
- ▶ preventing the spread of systemic risk

The European Central Bank's sole objective is price stability.

Central Banks may be more or less independent of the government.

Credibility: When people expect the central bank to stick with its policy

- ▶ Policy makers are very concerned about establishing policy credibility because they believe that it is necessary to prevent inflationary expectations from becoming built into the system
- ▶ If expansionary policy leads to expectations of increased inflation, nominal rates will increase and leave real rates unchanged
- ▶ Most economists believe that a monetary regime, not a monetary policy, is the best approach to policy
 - ▶ A *monetary regime* is a predetermined statement of the policy that will be followed in various situations
 - ▶ A monetary policy is a response to events chosen without a predetermined framework
- ▶ Monetary regimes are now favored because rules can help generate market expectations
- ▶ An explicit monetary policy regime has problems because special circumstances arise where it makes sense to deviate from the regime

We often want higher real growth and lower inflation.

What kind of shock makes that happen?

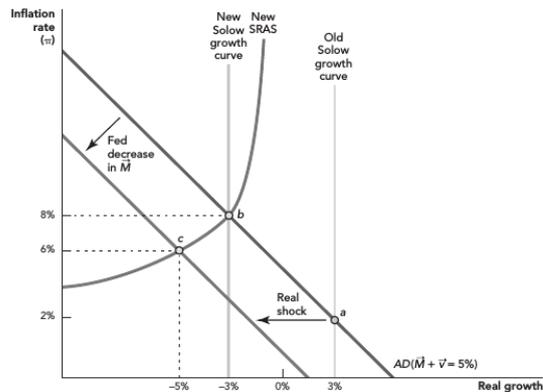
The Negative Real Shock Dilemma

Monetary policy is less effective at dealing with a real shock than an AD shock.

- Example** The shock: a sudden and large increase in the price of oil.
- ▶ This negative shock shifts the Solow growth curve to the left.
 - ▶ Sticky wages and prices amplify the shock by shifting SRAS even more to the left.
 - ▶ Lower growth and higher inflation.

Contracting the money supply to deal with the higher inflation rate

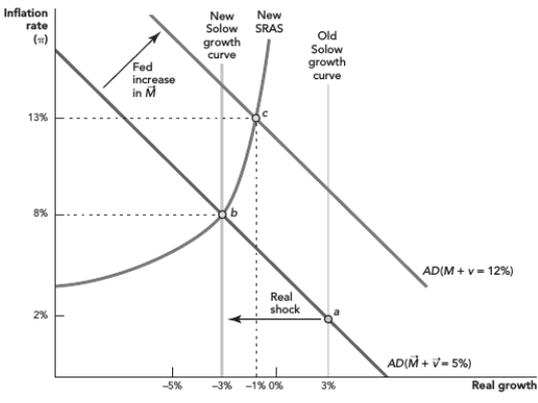
The Negative Real Shock Dilemma



Real growth will slow even more, and unemployment will rise.

Expanding the money supply to deal with the decrease in the real growth rate

The Negative Real Shock Dilemma



Inflation will rise even higher.

...Monetary Policy is difficult

Expansionary	Contractionary
Advantages <ol style="list-style-type: none"> 1. Interest rates may fall. 2. Economy may grow. 3. Decreases unemployment. 	Advantages <ol style="list-style-type: none"> 1. Helps fight inflation. 2. Trade deficit may decrease. 3. Capital inflow.
Disadvantages <ol style="list-style-type: none"> 1. Inflation may worsen. 2. Capital outflow. 3. Trade deficit may increase. 	Disadvantages <ol style="list-style-type: none"> 1. Risks recession. 2. Increases unemployment. 3. Slows growth. 4. May help cause short-run political problems. 5. Interest rates may rise.

- ▶ Central Bank actions to increase the monetary base are not guaranteed to work.
 - ▶ We don't know exactly how much M1 and M2 will change.
 - ▶ We don't know exactly by how much lower interest rates will stimulate investment spending.
- ▶ The Central Bank has most influence over short-term rates while investment is most affected by long-term rates.
- ▶ Monetary policy takes time to work and the response lags vary.
- ▶ Analysis of the economy is difficult.

Essay 2

Discuss the potential effects of different cultures and religious beliefs on GDP growth? (Hint: Think about the labor force participation rate)

Your audience will not include economists (so you will have to explain all economic concepts that you use) but will consists of people who expect the standard scientific structure, approach, and style.

Further instructions will be posted on the web page.
Deadline: May 28th