

Tuesday, March 3 & Wednesday, March 4

Warm up--copy in notes + answer Qs:

Assets		Liabilities & Equity	
Req. Reserves	\$2,000	Demand Deposits	\$20,000
Excess Reserves	\$3,000	Owner's Equity	\$5,000
Treasury Bonds	\$5,000		
Loans	\$15,000		

If the Fed sells \$2000 bonds to the bank:

1. Is this expansionary or contractionary?
2. How much do demand deposits change?
3. How much do required reserves change?
4. How much do excess reserves change?
5. How much more can the bank initially lend out?
6. Maximum change in the money supply?

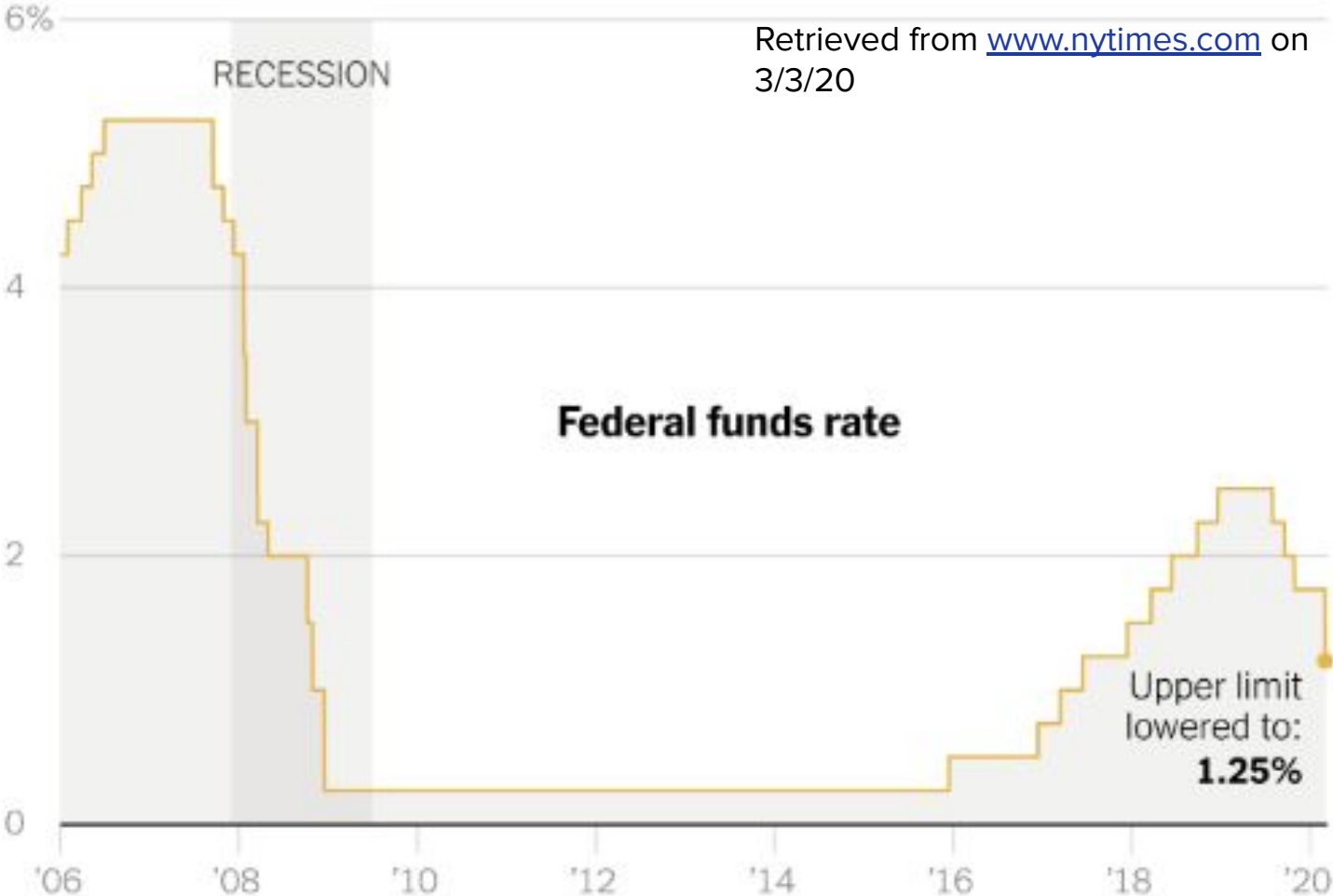
Tuesday, March 3 and Wednesday, March 4

- *Learning target: I can use bank balance sheets to show the effects of deposits, OMO, and the money multiplier working through the magic of fractional reserve banking.*
- **Agenda: Warm up with practice balance sheets (10 min); Work period: trade/grade/review Fun Set 4.2; review practice balance sheets (60 min); closing: what questions do you have at this point? (5 min)**



**Have you paid
for the AP
exam? Do it!!**

**B Day: Questions
re. Discount rate
and IoR?**

Retrieved from www.nytimes.com on 3/3/20



Tool: Interest on Reserves in Practice

- **Expansionary monetary policy:** Lower the interest rate paid on reserves to give banks an incentive to loan more \$\$ out so the bank can make a profit--increased loans leads to increased spending; AD 
- **Contractionary monetary policy:** Raise the interest rate paid on reserves to give banks an incentive to keep more money in reserve so the bank has less \$\$ to lend--decreased loans leads to decreased spending; AD 

Monetary Policy and Economic Activity

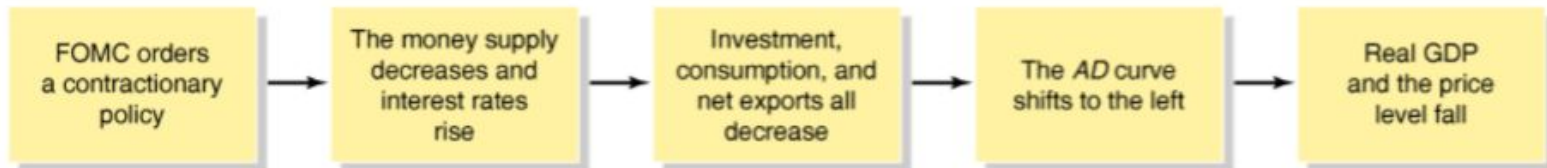
A Summary of How Monetary Policy Works

Table 26-1

Expansionary and Contractionary Monetary Policies



(a) An expansionary policy



(b) A contractionary policy

Assets		Liabilities & Equity	
Req. Reserves	\$2,500	Demand Deposits	\$25,000
Excess Reserves	\$4,500	Owner's Equity	\$5,000
Treasury Bonds	\$5,000		
Loans	\$18,000		
Total Assets	\$30,000	Total Liabilities & Equity	\$30,000

If Bob deposits \$2,000 into this bank:

1. How much do demand deposits change?
2. What is the required reserve ratio?
3. Will M1 money supply initially \uparrow , \downarrow , stay same?
4. How much is the required reserves?
5. How much is the excess reserves?
6. How much more can the bank initially lend out?
7. Maximum change in money supply from deposit?

Assets		Liabilities & Equity	
Req. Reserves	\$2,500	Demand Deposits	\$25,000
Excess Reserves	\$4,500	Owner's Equity	\$5,000
Treasury Bonds	\$5,000		
Loans	\$18,000		
Total Assets	\$30,000	Total Liabilities & Equity	\$30,000
If the Fed buys \$2,000 of bonds:			

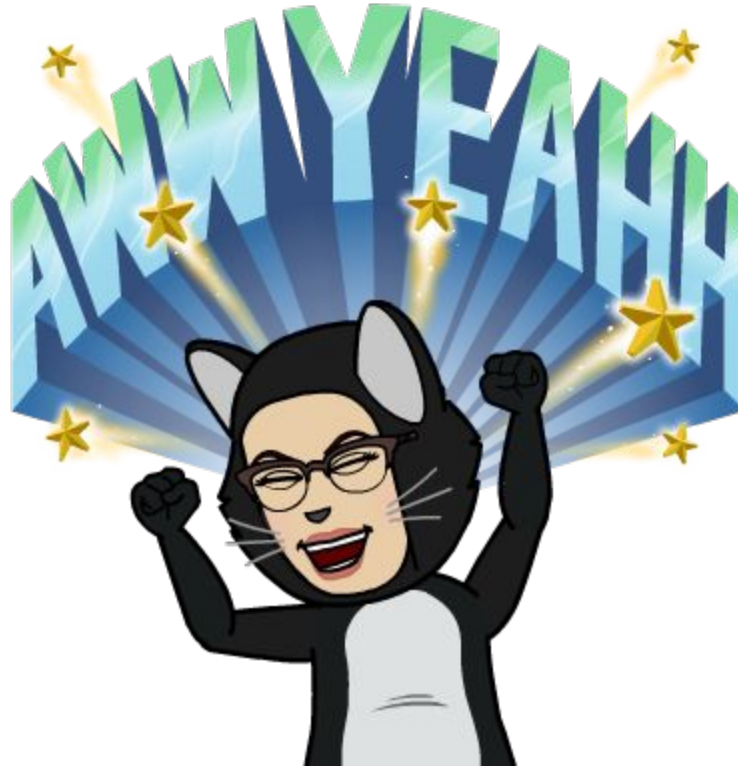
1. How much do demand deposits change?
2. How much is the required reserves?
3. How much is the excess reserves?
4. How much more can the bank initially lend out?
5. Maximum change in the money supply?
6. Maximum change in demand deposits (all banks)?
7. Maximum change in req. reserves (all banks)?

Assets		Liabilities & Equity	
Req. Reserves	\$2,500	Demand Deposits	\$25,000
Excess Reserves	\$7,500	Owner's Equity	\$5,000
Treasury Bonds	\$5,000		
Loans	\$15,000		
Total Assets	\$30,000	Total Liabilities & Equity	\$30,000

If Bob withdraws \$3000 from this bank:

1. Will M1 money supply initially \uparrow , \downarrow , stay same?
2. How much is the required reserves?
3. How much is the excess reserves?
4. Assume Bob burned the money, what is the maximum change in money supply?

Practice FUN!!



12. Which of the following is most likely to occur if the Federal Reserve engages in open market operations to reduce inflation?
- (A) A decrease in interest rates
 - (B) A decrease in reserves in the banking system
 - (C) A decrease in the government deficit
 - (D) An increase in the money supply
 - (E) An increase in exports

13. Which Federal Reserve action can shift the aggregate demand curve to the left?
- (A) Lowering the federal funds rate
 - (B) Lowering income taxes
 - (C) Lowering reserve requirements
 - (D) Raising the discount rate
 - (E) Raising government spending on national defense

18. Which of the following sequences of events would occur if the Federal Reserve implemented contractionary monetary policy?

- (A) Interest rates increase, investment and consumption spending decrease, aggregate demand decreases, and output and prices decrease.
- (B) Interest rates increase, investment and consumption spending decrease, aggregate demand increases, and output and prices decrease.
- (C) Interest rates increase, investment and consumption spending increase, aggregate demand decreases, and output and prices decrease.
- (D) Interest rates decrease, investment and consumption spending decrease, aggregate demand decreases, and output and prices decrease.
- (E) Interest rates decrease, investment and consumption spending decrease, aggregate demand decreases, and output and prices increase.

39. When an economy is operating below the full-employment level of output, an appropriate monetary policy would be to increase which of the following?
- (A) The discount rate
 - (B) The required reserve ratio
 - (C) The international value of the dollar
 - (D) Open market purchases of government bonds**
 - (E) Government expenditure on goods and services

45. The Federal Reserve decreases the federal funds rate by
- (A) decreasing the reserve requirement
 - (B) decreasing the discount rate
 - (C) increasing the discount rate
 - (D) selling government bonds on the open market
 - (E) buying government bonds on the open market

54. Suppose that all banks keep only the minimum reserves required by law and that there are no currency drains. The legal reserve requirement is 10 percent. If Maggie deposits the \$100 bill she received as a graduation gift from her grandmother into her checking account, the maximum increase in the total money supply will be

- (A) \$10
- (B) \$100
- (C) \$900
- (D) \$1,000
- (E) \$1,100

16. Which of the following will lead to a decrease in a nation's money supply?
- (A) A decrease in income tax rates
 - (B) A decrease in the discount rate
 - (C) An open market purchase of government securities by the central bank
 - (D) An increase in reserve requirements
 - (E) An increase in government expenditures on goods and services

23. In the short run, an expansionary monetary policy would most likely result in which of the following changes in the price level and real gross domestic product (GDP) ?

Price Level

Real GDP

(A) Decrease

Increase

(B) No change

Decrease

(C) Increase

No change

(D) Increase

Decrease

(E) Increase

Increase

29. If a country's economy is operating below the full-employment level of output at a very low inflation rate, the central bank of the country is most likely to
- (A) pursue an expansionary monetary policy because it is required to do so by law whenever output is below the full-employment level
 - (B) pursue an expansionary fiscal policy because it is required to do so by law whenever output is below the full-employment level
 - (C) lower the discount rate and buy bonds on the open market to generate an increase in output**
 - (D) lower the required reserve ratio and sell bonds on the open market to generate an increase in output
 - (E) raise the discount rate and lower the required reserve ratio to generate an increase in output

43. In the short run, which of the following would occur to bond prices and interest rates if a central bank bought bonds through open-market operations?

Bond Prices

Interest Rates

- | | | |
|------------|-----------|----------|
| (A) | No change | Increase |
| (B) | Increase | Increase |
| (C) | Increase | Decrease |
| (D) | Decrease | Increase |
| (E) | Decrease | Decrease |

46. Assume that the required reserve ratio is 10 percent, banks keep no excess reserves, and borrowers deposit all loans made by banks. Suppose you have saved \$100 in cash at home and decide to deposit it in your checking account. As a result of your deposit, the money supply can increase by a maximum of

- (A) \$800
- (B) \$900
- (C) \$1,000
- (D) \$1,100
- (E) \$1,200

57. For which of the following sets of unemployment and inflation rates will a central bank be most reluctant to increase the rate of growth in the money supply?

Unemployment Rate

Inflation Rate

- | | | |
|------------|-----|-----|
| (A) | 10% | 2% |
| (B) | 10% | 5% |
| (C) | 10% | 10% |
| (D) | 5% | 5% |
| (E) | 5% | 10% |

If the reserve requirement is 25 percent and banks hold no excess reserves, an open market sale of \$400,000 of government securities by the Federal Reserve will

- (A) increase the money supply by up to \$1.6 million
- (B) decrease the money supply by up to \$1.6 million
- (C) increase the money supply by up to \$300,000
- (D) increase the money supply by up to \$100,000
- (E) decrease the money supply by up to \$100,000

To counteract a recession, the Federal Reserve should

- (A) raise the reserve requirement and the discount rate
- (B) sell securities on the open market and raise the discount rate
- (C) sell securities on the open market and lower the discount rate
- (D) buy securities on the open market and raise the discount rate
- (E) buy securities on the open market and lower the discount rate

The purchase of bonds by the Federal Reserve will have the greatest effect on real gross domestic product if which of the following situations exists in the economy?

- (A) The required reserve ratio is high, and the interest rate has a large effect on investment spending.
- (B) The required reserve ratio is high, and the interest rate has a small effect on investment spending.
- (C) The required reserve ratio is low, and the interest rate has a large effect on investment spending.
- (D) The required reserve ratio is low, and the marginal propensity to consume is low.
- (E) The marginal propensity to consume is high, and the interest rate has a small effect on investment spending.

2009 Practice FRQ

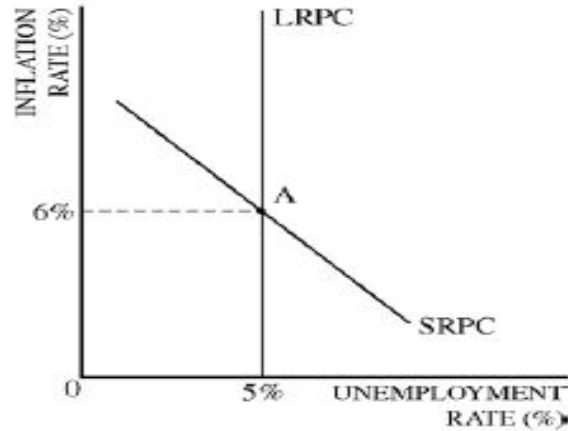
1. Assume that the United States economy is in long-run equilibrium with an expected inflation rate of 6 percent and an unemployment rate of 5 percent. The nominal interest rate is 8 percent.
 - (a) Using a correctly labeled graph with both the short-run and long-run Phillips curves and the relevant numbers from above, show the current long-run equilibrium as point A.
 - (b) Calculate the real interest rate in the long-run equilibrium.
 - (c) Assume now that the Federal Reserve decides to target an inflation rate of 3 percent. What open-market operation should the Federal Reserve undertake?
 - (d) Using a correctly labeled graph of the money market, show how the Federal Reserve's action you identified in part (c) will affect the nominal interest rate.
 - (e) How will the interest rate change you identified in part (d) affect aggregate demand in the short run? Explain.
 - (f) Assume that the Federal Reserve action is successful. What will happen to each of the following as the economy approaches a new long-run equilibrium?
 - (i) The short-run Phillips curve. Explain.
 - (ii) The natural rate of unemployment



2009 Practice FRQ

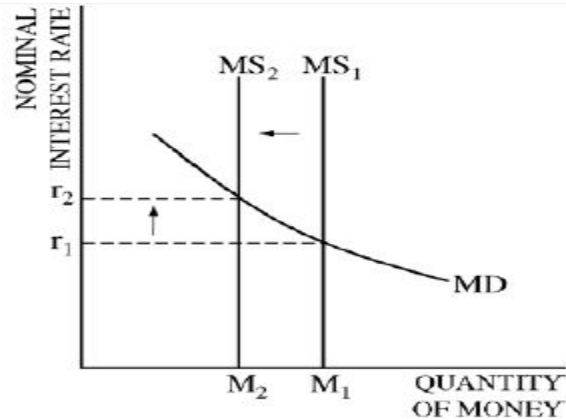
Question 1

11 Points (2 + 1 + 1 + 2 + 2 + 3)



- (a) 2 points:
- One point is earned for a correctly labeled graph of the short-run Phillips curve.
 - One point is earned for showing position "A" on the LRPC at the correct coordinates where the SRPC crosses the LRPC curve.
- (b) 1 point:
- One point is earned for the correct calculation of the real interest rate: $8\% - 6\% = 2\%$.
- (c) 1 point:
- One point is earned for stating that the Federal Reserve should sell bonds.

2009 Practice FRQ



(d) 2 points:

- One point is earned for a correctly labeled graph of the money market.
- One point is earned for showing a leftward shift of the money supply curve resulting in a higher interest rate.

(e) 2 points:

- One point is earned for stating that aggregate demand decreases.
- One point is earned for explaining that the higher interest rate decreases investment and interest-sensitive consumption spending, and that both consumption and investment are components of aggregate demand.

(f) 3 points:

- One point is earned for stating that the short-run Phillips curve will shift to the left.
- One point is earned for explaining that Federal Reserve policy will lower inflationary expectations.
- One point is earned for stating that the natural rate of unemployment will remain unchanged.

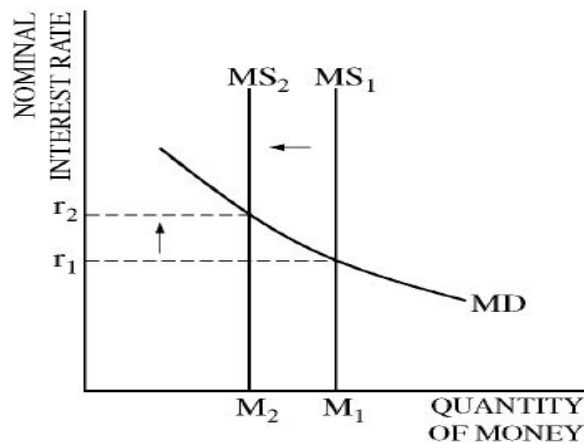
2009B Practice FRQ

In Country Z, the required reserve ratio is 10 percent. Assume that the central bank sells \$50 million in government securities on the open market.

- (a) Calculate each of the following.
 - (i) The total change in reserves in the banking system
 - (ii) The maximum possible change in the money supply
- (b) Using a correctly labeled graph of the money market, show the impact of the central bank's bond sale on the nominal interest rate.
- (c) What is the impact of the central bank's bond sale on the equilibrium price level in the short run?
- (d) As a result of the price level change in part (c), are people with fixed incomes better off, worse off, or unaffected? Explain.

(a) 2 points:

- One point is earned for determining the total change in reserves: \$50 million.
- One point is earned for calculating the maximum possible change in the money supply: $10 \times \$50 = \500 million.



(b) 2 points:

- One point is earned for a correctly labeled graph of the money market.
- One point is earned for showing a leftward shift of the money supply curve and an increase in the nominal interest rate.

(c) 1 point:

- One point is earned for concluding that the equilibrium price level will fall.

(d) 2 points:

- One point is earned for concluding that people with a fixed income would be better off.
- One point is earned for explaining that the lower price level raises real income or increases the purchasing power of the fixed income.

2009 AP[®] MACROECONOMICS FREE-RESPONSE QUESTIONS

3. Assume that the reserve requirement is 20 percent and banks hold no excess reserves.
- (a) Assume that Kim deposits \$100 of cash from her pocket into her checking account. Calculate each of the following.
 - (i) The maximum dollar amount the commercial bank can initially lend
 - (ii) The maximum total change in demand deposits in the banking system
 - (iii) The maximum change in the money supply
 - (b) Assume that the Federal Reserve buys \$5 million in government bonds on the open market. As a result of the open market purchase, calculate the maximum increase in the money supply in the banking system.
 - (c) Given the increase in the money supply in part (b), what happens to real wages in the short run? Explain.

6 points (3 + 1 + 2)

(a) 3 points:

- One point is earned for stating that the maximum dollar amount the bank can initially lend is \$80.
- One point is earned for stating that the maximum change in demand deposits is \$500.
- One point is earned for stating that the maximum change in the money supply is \$400.

(b) 1 point:

- One point is earned for stating that the Federal Reserve's action will increase the money supply by at most \$25 million.

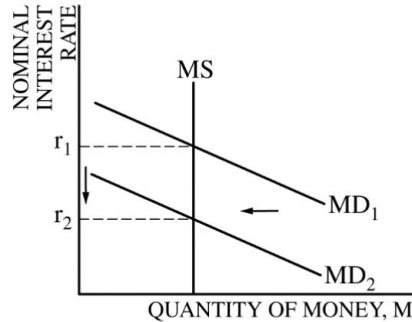
(c) 2 points:

- One point is earned for stating that the real wages will fall.
- One point is earned for explaining that real wages fall because the Federal Reserve's action causes inflation.

2017 AP[®] MACROECONOMICS FREE-RESPONSE QUESTIONS

2. Assume that an economy is in long-run equilibrium. Assume that consumers wish to hold less money because they use credit cards more frequently to purchase goods and services than cash.
- (a) Draw a correctly labeled graph of the money market and show the effect of the reduced holdings of money on the equilibrium nominal interest rate in the short run.
 - (b) Based on the change in the interest rate in part (a), what will happen to each of the following in the short run?
 - (i) Prices of previously issued bonds
 - (ii) The price level and real income. Explain.
 - (c) With a constant money supply, based on your answer to part b(ii), will the velocity of money increase, decrease, or remain the same, or is the change indeterminate?
 - (d) If the central bank wishes to reverse the change in the interest rate identified in part (a), what open market operation would it use?

6 points (2 + 2 + 1 + 1)



(a) 2 points:

- One point is earned for drawing a correctly labeled graph of the money market.
- One point is earned for showing a leftward shift in the money demand curve, resulting in a lower nominal interest rate.

(b) 2 points:

- One point is earned for stating that the price of previously issued bonds will increase.
- One point is earned for stating that both the price level and real income will increase and for explaining that the lower interest rate will increase consumption, investment, and/or net exports (interest-sensitive spending), which increases aggregate demand.

(c) 1 point:

- One point is earned for stating that the velocity of money will increase.

(d) 1 point:

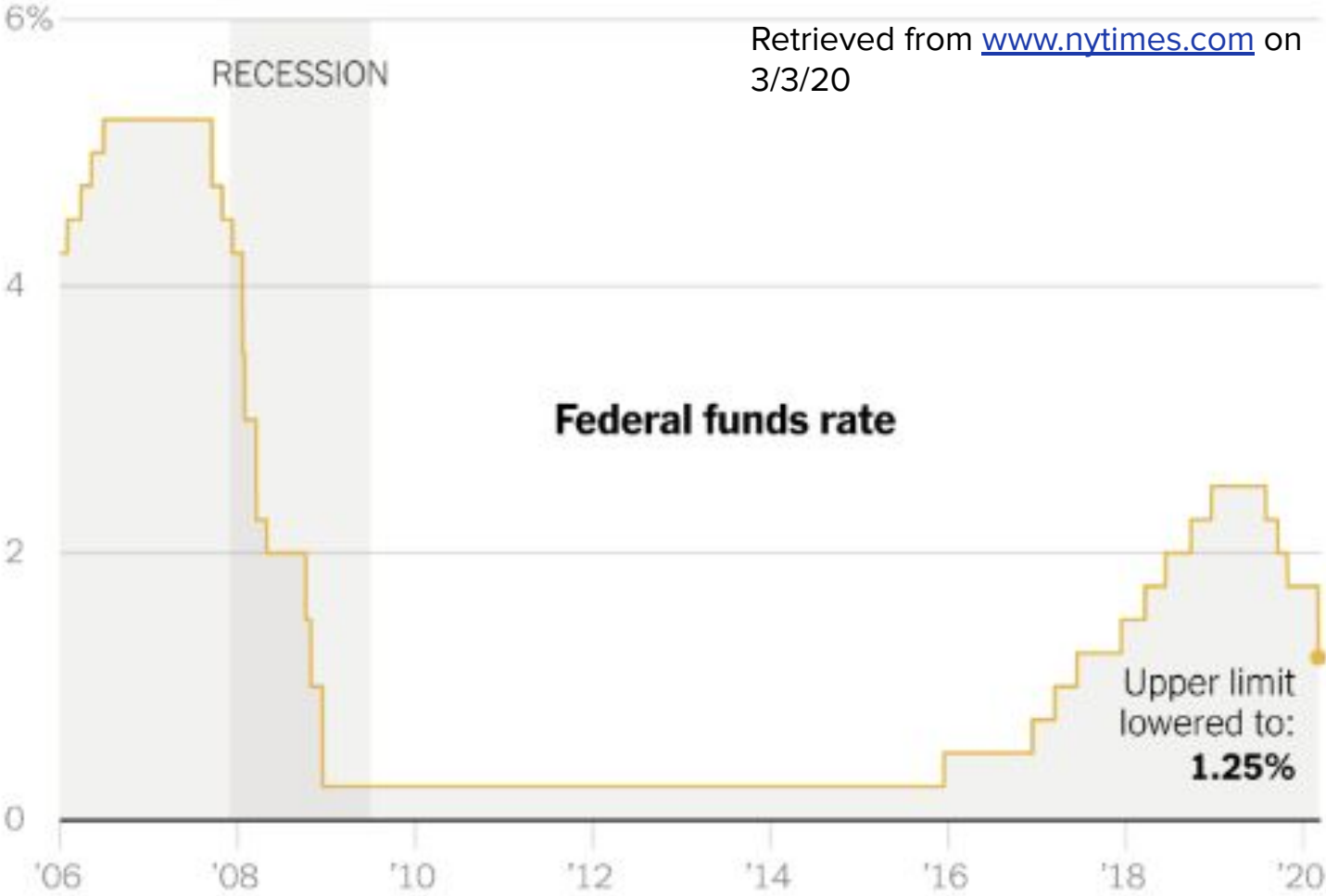
- One point is earned for stating that the central bank would sell bonds.



Thursday, March 5 and Friday, March 6

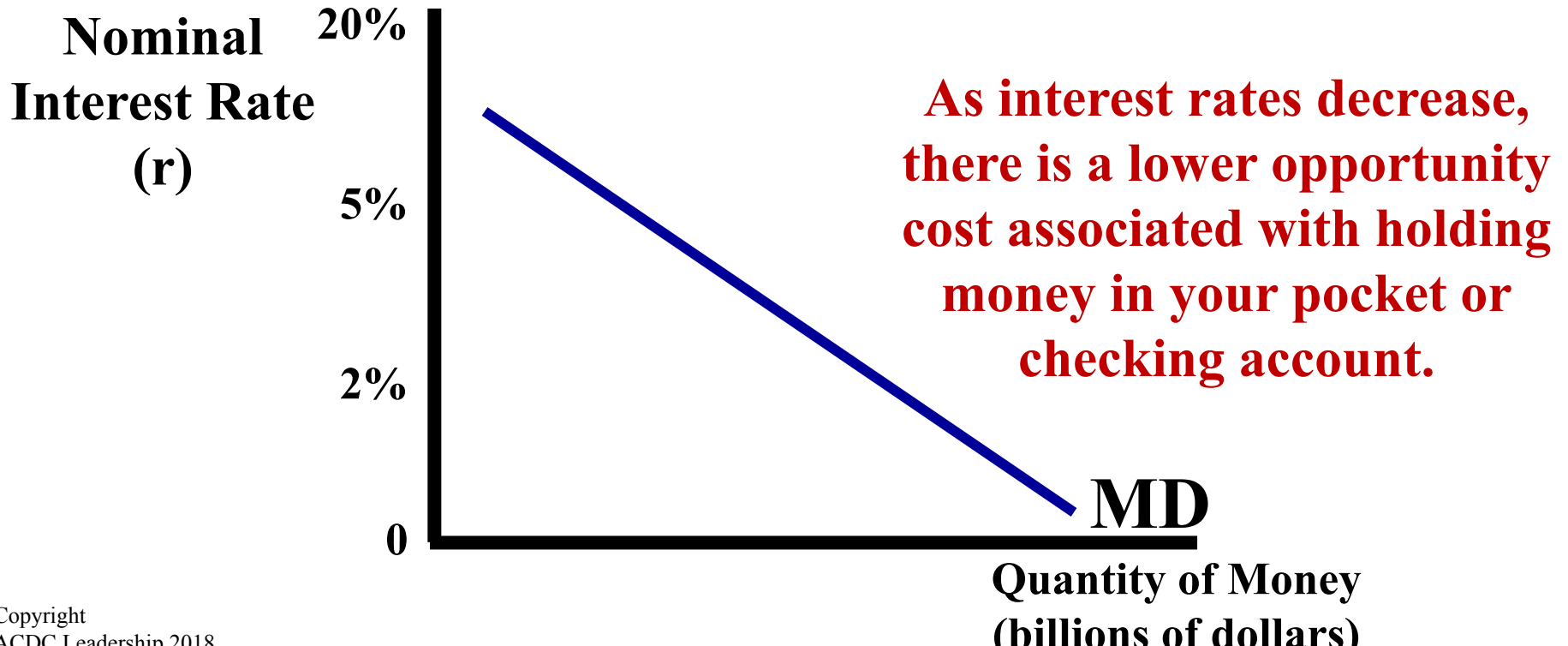
- Warm up: Talk to your neighbor about **what you think about news re. Economic impact of coronavirus.**
- *Learning targets: I can explain the quantity theory of money (velocity of money) to help explain one cause of inflation. I can explain why the price of previously issued bonds is inversely related to interest rates.*
- Quiz on Monday (A day) or Tuesday (B day)
- **No tutorial Thursday, but I will be here Friday after school.**
- Agenda: Warm up (10 min); Work period: review last quiz; notes on velocity of money and price of bonds; review 2017 FRQ (60 min); closing: TOTD (10 min)

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The Demand for Money

There is an inverse relationship between interest rates and the quantity of money demanded.



The Demand for Money

1. What happens to the quantity demanded of money when interest rates increase?

Quantity demanded falls because individuals would prefer to have interest-earning assets instead.

There is an inverse relationship between the interest rate and the quantity of money demanded.

The Demand for Money

2. What happens to the quantity demanded of money when interest rates decrease?

Quantity demanded increases. There is no incentive to convert cash into interest-earning assets.

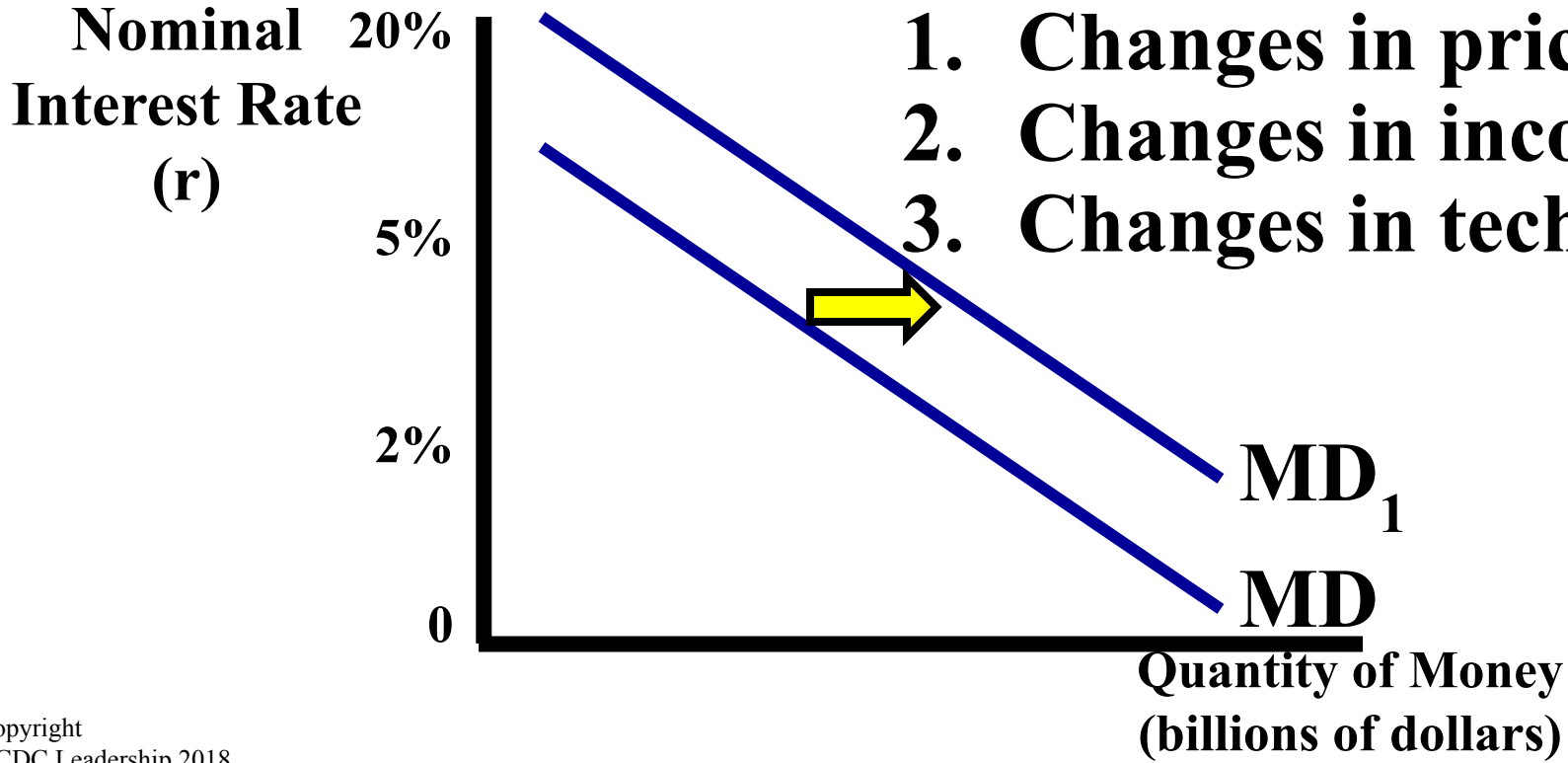
There is an inverse relationship between the interest rate and the quantity of money demanded.

The Demand for Money

What happens if price level increases?

Money Demand Shifters

1. Changes in price level
2. Changes in income
3. Changes in technology



Money Demand Shifters: Change in Price Level

- Higher prices will increase demand for money
- Lower prices reduce the demand for money
 - The demand for money is proportional to the price level, so that a 20% increase in the price level will result in a 20% increase in the quantity of money demanded at any given interest rate

Money Demand Shifters: Change in GDP

- Money facilitates purchases of goods and services, so an increase in GDP (i.e., the total quantity of goods and services produced and sold in an economy) will result in an increase in money demand.
- Also works in reverse with a decrease in GDP

Money Demand Shifters: Change in Technology or Regs

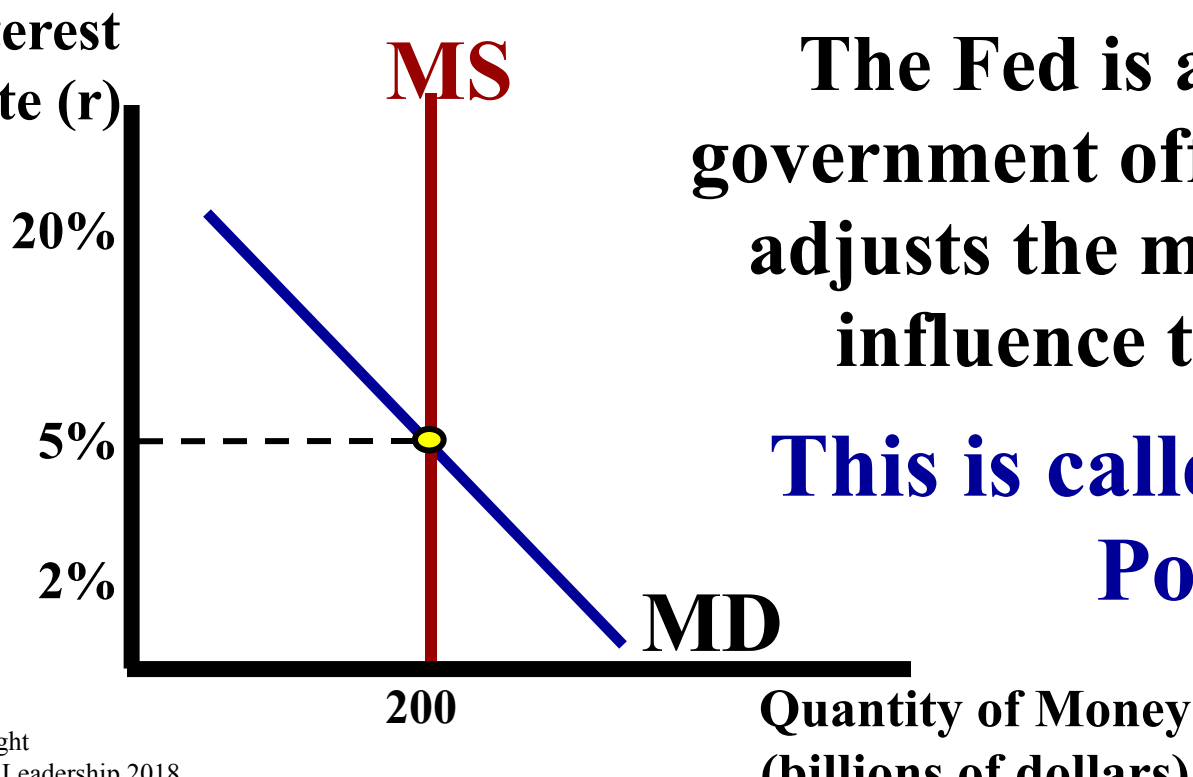
- Technology can make it easier for people to access their cash.
 - Eg, the invention of the ATM and widespread use of credit and debit cards

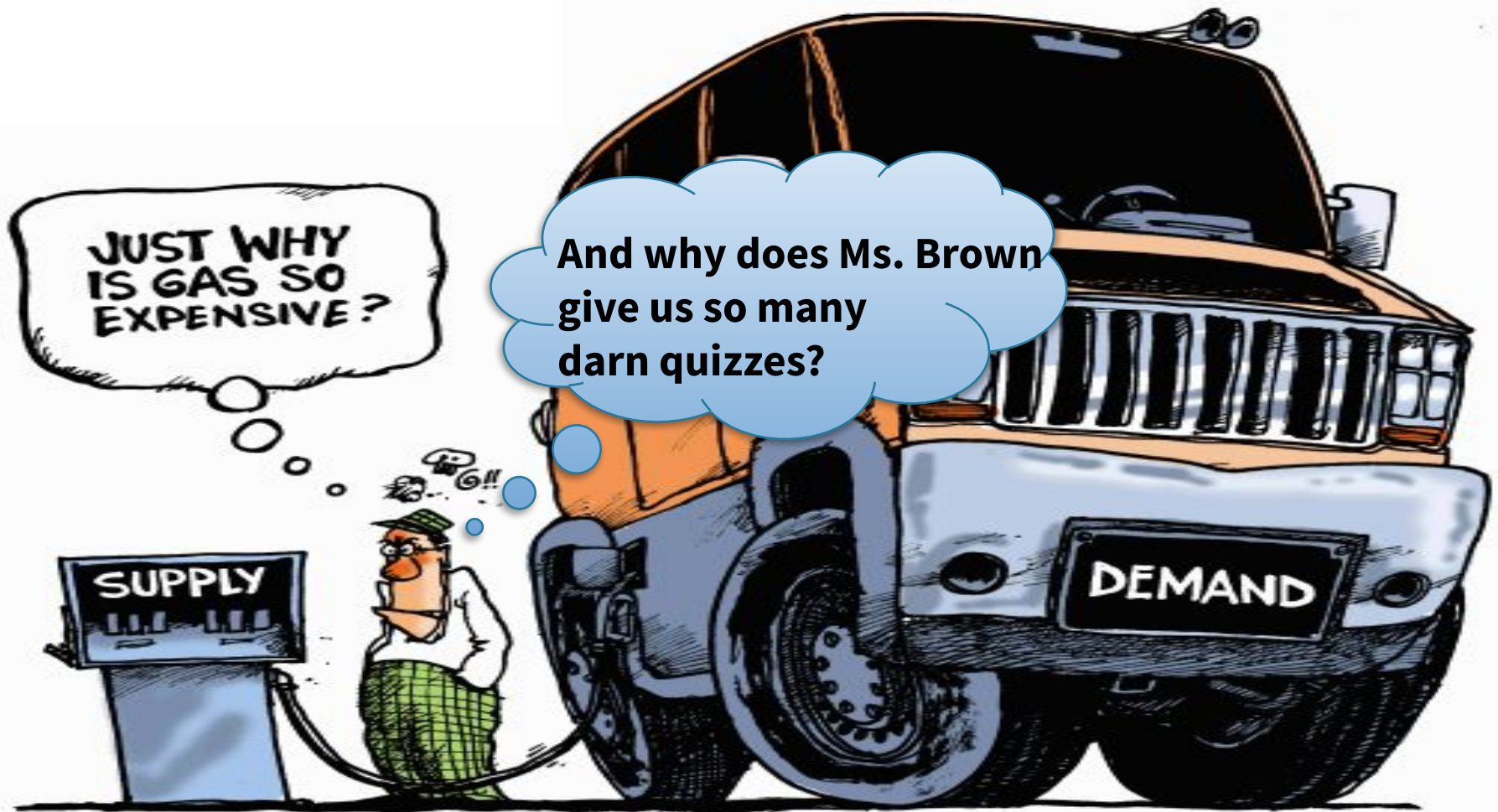
The Supply for Money

The U.S. Money Supply is set by the Board of Governors of the Federal Reserve System (The Fed).

The Fed is a nonpartisan government office that sets and adjusts the money supply to influence the economy.

This is called **Monetary Policy.**





JUST WHY IS GAS SO EXPENSIVE?

And why does Ms. Brown give us so many darn quizzes?

Equation of Exchange or the Quantity Theory of Money

- Quantity theory of money: a theory that emphasizes the positive relationship between the price level and the money supply.
 - It relies on the equation $M \times V = P \times Y$ (or Q)

Quantity Theory of Money

- $M \times V = P \times Q$ Where:
 - M = supply of money
 - V = velocity of money (# of times a year that a dollar is spent on final G & S)
 - P = price level (average price of each unit of output)
 - Q = physical volume of G & S produced (real output)
- MV is the amount spent by consumers. This is the same as the total $C + I + G + X_n$
- PQ is the amount received by sellers. This is the same as nominal GDP (current output at current prices)

Quantity Theory of Money

$$M \times V = P \times Y$$