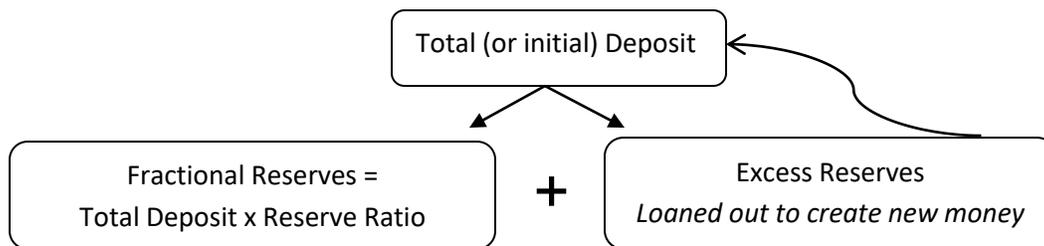




## Macroeconomics: Money Creation & Monetary Policy

The banking system creates money by lending out a fraction of the deposits. A bank only has to keep a fraction of deposits on hand to meet the day-to-day needs of its clients. The rest of the money can be loaned out, where it will be re-spent or reinvested, and the recipients of those transactions will deposit the amount back into the bank, and so on.

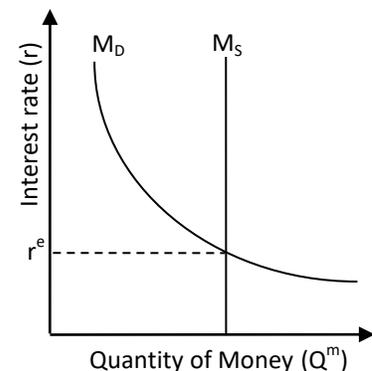


The percent of a deposit that a bank must keep on hand is called the **reserve ratio (RR)**. The reserve ratio is always expressed as a percentage. The amount of money kept on hand (in the bank) is called the **fractional reserves**; any money in excess of that amount is called the **excess reserves**. If the reserve ratio is set at 20%, it means that for every \$1 deposited (total deposits), a bank must keep 20¢ on hand (fractional reserves), but can loan out 80¢ (excess reserves).

There is a multiplier effect relating the change in excess reserves to the change in the amount of money supply ( $M^S$ ). The change in  $M^S$  is also referred to as the amount of money created.

$$\text{Change in } M^S = \frac{\text{Change in Excess Reserves}}{\text{Reserve Ratio}}$$

Money demand and money supply make up the money market, where interest rate ( $r$ ), the price of money, is on the y-axis and quantity of money ( $Q^m$ ) is on the x-axis. The total money supply is controlled by the Bank of Canada. The money supply is a constant quantity at a given point in time and does not depend on the interest rate, so it is represented by a vertical line (perfectly inelastic).



The money demand curve shows the relationship between the price of money (interest rate) and the quantity of money people demand. People will demand more money when interest rate is low, and demand less money when interest rate is high (choosing to put the money in high interest bearing investments instead). Note that a change in interest rate will mean a movement **ALONG** the money



demand ( $M^D$ ) curve just like a change in product price would mean a movement along the demand curve for the product.

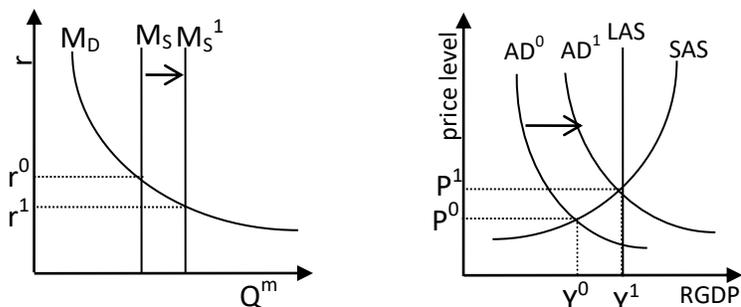
The equilibrium interest rate ( $r^e$ ) occurs when the quantity of money demanded equals the quantity of money supplied.

$M^D$  comes from households and firms.  $M^D$  has 3 determinants: transactionary, precautionary, and speculative purposes. **Transactionary** purposes are the daily exchange of money for goods and services. **Precautionary** purposes means having money on hand for unexpected expenses, like a rainy day fund. **Speculative** purposes involve storing wealth in investments: speculating about how interest rates are likely to change in the future and deciding whether holding money is worth forgoing the opportunity cost of earning interest.

The only determinant for money supply ( $M^S$ ) is the Bank of Canada, which can increase or decrease the money supply, causing the curve to shift to the left or the right, as well as changing the required reserve ratio. Changes in the money supply will affect the equilibrium point of the money market and result in new interest rates. Recall that changes in the interest rate will affect consumption and investment spending directly, and will indirectly affect net exports. These changes in spending levels will shift AD accordingly (and equilibrium GDP).

When the Bank of Canada uses interest rates and the money supply to affect the level of quantity demanded for money, this is called **monetary policy**. The Bank of Canada uses the overnight rate, open market operations, government deposits and moral suasion (see class notes for more details on these) to enact monetary policy.

For example, let's say the economy is in a recession. The Bank of Canada could choose to buy more government securities (e.g. treasury bills, bonds, etc.) from the market. This money goes to the charter banks and increases their reserves, and the amount they can loan → the supply of money increases. When the money supply shifts to the right, interest rate is lowered (graph below left). This results in an increase in consumption spending, investment expenditure, and net exports, which results in an increase in aggregate quantity demanded. AD shifts right and the price level, national output, and employment will increase (graph below right).



## Practice Problems

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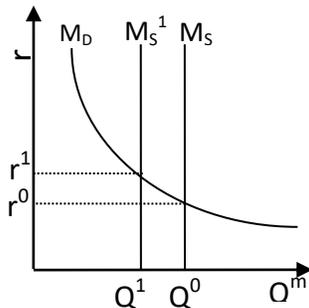
1. If a bank's fractional reserves are \$275,000 and its total deposits are \$1 million, calculate the reserve ratio.
2. If a bank's reserve ratio is 15% and the bank has \$400,000 of deposits, what is the amount of excess reserves?
3. A bank has no existing customers. Its reserve ratio is 20%. Its first customer deposits \$800 into an account. What is the maximum amount the bank can now loan?
4. If the banking system expands the money supply by \$55,000 from a change in excess reserves of \$10,000, what is the reserve ratio?
5. What is the initial deposit needed to create \$35 million when the reserve ratio is 14%?
6. If all the chartered banks in Canada have total deposits of \$60 billion, and have a desired reserve ratio of 8%, what is the maximum amount of money that can be created?
7. A decrease in the demand for money will:
  - a. decrease the interest rate
  - b. increase the interest rate
  - c. decrease the money supply
  - d. increase the money supply
8. (a) True or false: If the Bank of Canada decreases the money supply, the nominal interest rate falls. (b) Explain your reasoning with a graph. (c) Predict the short-term effect on the consumer goods market (RGDP). Use a graph to explain.
9. What effect does the Bank of Canada decreasing the bank rate have on the money supply? Explain and show graph.



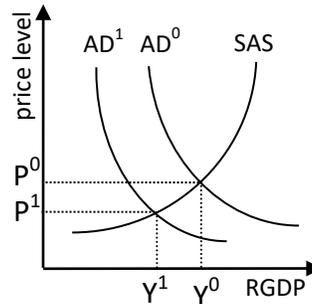
## Solutions

1. 27.5%
2. \$340,000
3. \$640
4. 18%
5. \$5.7 million
6. \$690 billion
7. a
8. False. If the Bank decreases the money supply,  $M^S$  shifts left. This results in a higher interest rate. An increase in interest rate results in  $C$ ,  $I$ , and  $(X-M) \downarrow$ , therefore  $AD \downarrow$ . This results in a decreased equilibrium price and GDP. See graphs below.

8(b)



8(c)



9. If the Bank of Canada lowers the bank rate, other interest rates will also decrease. The decrease in the bank rate signifies that the Bank of Canada will pursue an easier monetary policy, by increasing the money supply and lowering interest rates. A decrease in interest rate will in turn increase  $C$ ,  $I$  and  $(X-M)$ . Therefore  $AD$  will increase.

