Economics & Society
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Practice Set 9

Banking & The Monetary System

This set contains problems for your own practice. It is highly recommended to work on the problems on your own. Do not just read the provided solutions. Instead, try to solve the problems and use the solutions only when you cannot continue on your own. Reading problems that someone else has solved has the same value for your preparation like watching someone else running a marathon on TV and then expecting to be able to run it, too. If you have questions on this set, please ask your section's teaching assistant.

1. Bank A pays rate r_D to its depositors per year and it will always reserve 10% of deposits in case some depositors wish to withdraw cash from their accounts. Bank A can loan out funds to non-bank customers at rate r_L per year and can borrow funds from other banks for r_I per year, or by the CB for r_C per year. The CB has mandated that banks must have at least $1 in cash, reserves, or other liquid assets for every 9 dollars of loans.
   (a) Bank A has $100 of checking deposits. How much can it loan out to customer X and how much will the bank earn?
   (b) Bank A only has $10 of its owner's money. How much can it loan out to customer X and how much will the bank earn if X spends the loan to vendor V who has an account at bank B? Assume that bank A can borrow funds from other banks (the interbank market).
   (c) Bank A only has $10 of its owner's money. How much will bank A earn loaning to customer X, if X spends the loan to vendor V who has an account at bank B? Assume that the interbank market does not have excess funds to loan out.
   (d) Bank A only has $10 of its owner's money. How much will bank A earn loaning to customer X, if X spends the loan to vendor V who also has an account at bank A?
   (e) Rank cases (a), (b), (c) and (d) in terms of bank A's profitability.
   (f) Explain if bank A has created M1 money in (a), (b), (c) or (d).
   (g) Explain if bank A has created wealth (beyond the value of its banking services) in (a), (b), (c) and (d).

2. In the interbank market, banks who have more cash than they need can loan it out at a rate r_I to other banks who have less cash than they need. r_I is privately agreed upon between the lender bank and the borrower bank. Banks can also borrow directly from the CB at rate r_C or deposit their excess cash to the CB receiving an interest rate r_R. The CB sets r_C and r_R. Explain how the CB can also manipulate r_I.

3. The Monetary Authority of Singapore (MAS) owns government securities valued at S$6.3B. Singaporean households and firms own another S$8.2B in government securities.
   (a) Explain how MAS can do Open Market Sales to decrease the money supply in Singapore by S$183.2M?
   (b) Explain how MAS can do Open Market Purchases to increase the money supply in Singapore by S$96.73M?

4. A money market account offers an interest rate of 1% per month but charges you 4.5% for each withdrawal. You currently have $24,000 in your checking account that yields no interest and you know that you need to spend $2,000 per month.
   (a) How much money would you want to transfer to the money market account and how much you would leave in the checking account?
   (b) Will you hold less or more cash for transactions if the monthly interest rate increases to 1.6%?
   (c) Explain how an increase in the interest rate like the one in (b) will affect M1 for transactions?

5. Bond A is a security that you can acquire for \$100, it will pay interest to you of \$10 per year, and after 30 years (at maturity), the issuer will buy it back from you for \$100. If you wish, you can sell your bond before its maturity at the so called "secondary market" to someone else at a price that you and the potential buyer agree to. If the bond is resold, the new buyer will be eligible to claim the interest every year and the \$100 principal at maturity.
   (a) How much is the interest rate on bond A?
   (b) Two years after the issuing of bond A, a similar bond B is being issued offering an interest rate of 10%. How would this affect the price of bond A if its owner wanted to sell it?
   (c) Four years after the issuing of bond A, a similar bond C is being issued offering an interest rate of 20%. How would this affect the price of bond A if its owner wanted to sell it?
   (d) Six years after the issuing of bond A, a similar bond D is being issued offering an interest rate of 5%. How would this affect the price of bond A if its owner wanted to sell it?
   (e) If you were a speculator, would you buy bonds at the secondary market when the interest rates were lower than usual or when they were higher than usual?
   (f) Would you expect a bond speculator to hold more M1 money when the interest rate is low or when it is high?

6. Consider the country of Cornovia, which produces only corn and nothing else. This year, Cornovia's real GDP was 1,000 kg of corn. Cornovia's Central Bank issues a fiat money supply of 500 cornals (the currency of Cornovia).
   (a) If the price of 1 kg of corn is 10 cornals, for how many transactions per year on average is a cornal used?

   Cornovia's Central Bank prints another 50 cornals and gives it to the government for spending it to buy corn and trade it with another country for vaccines against cornvid-19.

   (b) If the number of average transactions for each cornal remains constant, what will happen to the price of corn?
   (c) How much purchasing power will a Cornovian lose if he holds 20 cornals?
   (d) How much purchasing power will all Cornovians who held cornals lose in total?
   (e) How much purchasing power will a Cornovian lose if she used all her 20 cornals of cash holdings to buy 2 kg of corn right before the Central Bank printed the extra 50 cornals?