

## ECON 3010 Intermediate Macroeconomics – Solutions to Exam #2

### Multiple Choice Questions. (25 points; 2.5 pts each)

#1. To increase the money supply, the Federal Reserve:

- a. buys government bonds.
- b. sells government bonds.
- c. buys corporate stocks.
- d. sells corporate stocks.

#2. Demand deposits are funds held in:

- a. currency.
- b. certificates of deposit.
- c. checking accounts.
- d. money markets.

#3. If there are 100 transactions in a year and the average value of each transaction is \$10, then if there is \$200 of money in the economy, transactions velocity is \_\_\_\_\_ times per year.

- a. 0.2
- b. 2
- c. 5
- d. 10

#4. In the long run, according to the quantity theory of money and the classical macroeconomic theory, if velocity is constant, then \_\_\_\_\_ determines real GDP and \_\_\_\_\_ determines nominal GDP.

- a. the productive capability of the economy; the money supply
- b. the money supply; the productive capability of the economy
- c. velocity; the money supply
- d. the money supply; velocity

#5. The *ex ante* real interest rate is equal to the nominal interest rate:

- a. minus the inflation rate.
- b. plus the inflation rate.
- c. minus the expected inflation rate.
- d. plus the expected inflation rate.

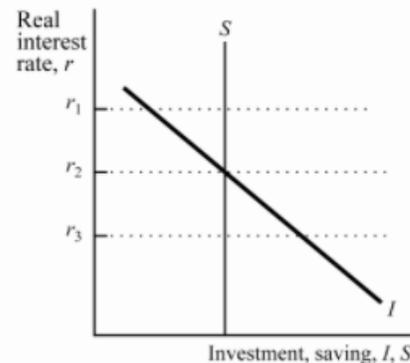
#6. In the case of an unanticipated inflation:

- creditors are hurt because they get less than they expected in real terms.
- creditors gain because they get more than they contracted for in nominal terms.
- debtors do not gain because they pay exactly what they contracted for in nominal terms.
- debtors are hurt because they pay more than they contracted for in nominal terms.

#7. Use the graph to the right to answer the question. In a small open economy, if the world interest rate is  $r_1$ , then the economy has:

- a trade surplus.
- balanced trade.
- a trade deficit.
- negative capital outflows.

Exhibit: Saving and Investment in a Small Open Economy



#8. In a small open economy, when the government reduces national saving, the equilibrium real exchange rate:

- rises and net exports fall.
- rises and net exports rise.
- falls and net exports fall.
- falls and net exports rise.

#9. All of the following are causes of structural unemployment *except*:

- minimum-wage laws.
- the monopoly power of unions.
- unemployment insurance.
- efficiency wages.

#10. If the rate of separation ( $s$ ) is 0.02 and the rate of job finding ( $f$ ) is 0.08 but the current unemployment rate is 0.10, then the current unemployment rate is \_\_\_\_\_ the equilibrium rate, and in the next period it will move \_\_\_\_\_ the equilibrium rate.

- above; toward
- above; away from
- below; toward
- below; away from

**Problem Solving / Essay Questions. (75 points)**

#11. (40 pts) Assume that currency ( $C$ ) is \$20 billion and reserves ( $R$ ) are \$10 billion, the reserve-deposit ratio ( $rr$ ) is 0.1, and the currency-deposit ratio ( $cr$ ) is 0.2. The current price level is  $P = 120$ .

(a) (10 pts) What is the monetary base? What is the amount of demand deposits? What is the money multiplier? What is the money supply? Show your work.

- **The monetary base ( $B$ ) is the sum currency ( $C$ ) and reserves ( $R$ ):  $B = C + R = \$30$  billion.**
- **Demand deposits ( $D$ ) are  $(1/0.2) = 5$  times currency ( $C$ ):  $D = \$100$  billion.**
- **The money multiplier ( $m$ ) is**

$$m = \frac{1+cr}{cr+rr} = \frac{1.2}{0.3} = 4.$$

- **The money supply ( $M$ ) is  $M = m \times B = 4 * \$30 = \$120$  billion.**

(b) (10 pts) The central bank wishes to increase the money supply by 10%. Calculate the dollar amount of open market operations (i.e., increase in the monetary base) necessary to meet the target. Describe in words how the FOMC would do this.

- **To increase the money supply by 10%, the monetary authorities need to increase the monetary base by 10%. This amounts to a \$3 billion increase in the base. The FOMC would do this by purchasing \$3 billion of government securities on the open market.**

(c) (10 pts) Next assume that the central bank wanted to meet the money supply target by lowering the reserve requirement ( $rr$ ) rather than increasing the base. How much would they need to lower  $rr$ ? Which, open-market operations or varying the reserve requirement, is a better tool? Defend your answer.

- **The money target supply is  $\$120 \times 1.1 = \$132$  billion.**
- **The monetary base is  $\$30$  billion.**
- **To solve for new reserve requirement, use the equation**

$$\$132 = \frac{1.2}{rr + 0.2} \times \$30$$

- **The new reserve requirement is ...**

$$rr = \frac{1.2 * \$30}{\$132} - 0.2 = 0.07 \text{ or } 7\%$$

- **It's hard to say which tool is better, but the Fed prefers open-market operations. The reserve requirement is rarely changed and there's no guarantee that banks will loan out the maximum allowable amount of reserves. Also, if reserves are too low, then banks may find it difficult to meet requests of depositors.**

(d) (10 pts) Assume the economy is booming and annualized real GDP growth is 5%, but technological advances in banking have reduced increased the velocity of money by 1%. If the central bank increases the money supply by 10% (as in parts (b) and (c)), what will be the resulting inflation rate and new price level?

- **To answer the question, use the quantity equation in percentage change form:**

$$\% \Delta M + \% \Delta V = \% \Delta P + \% \Delta Y$$

**Substituting the numbers gives:**

$$10\% + 1\% = \% \Delta P + 5\%.$$

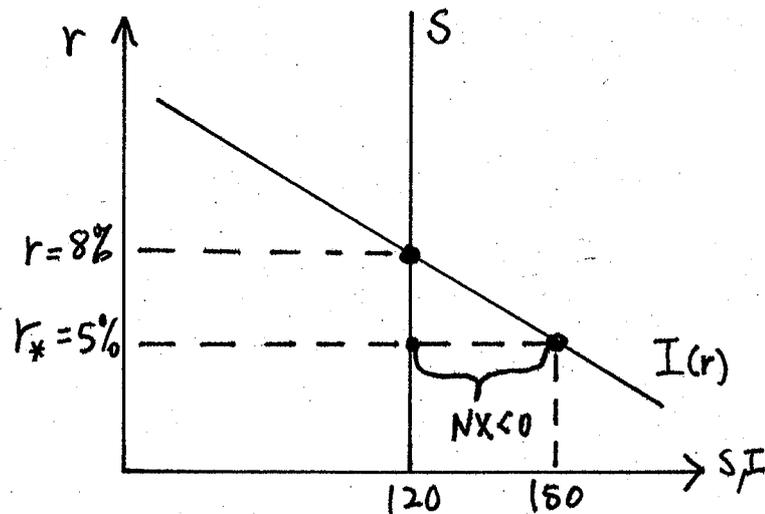
**This implies that inflation will be  $\pi = 6\%$  and the new price level will be  $P = 120 \times 1.06 = 127.2$ .**

#12. (20 pts) Consider the following Neoclassical model of the economy, where the domestic interest rate  $r$  and the world interest rate  $r_*$  are in percentage terms. Show all your work.

Supply	Demand
$Y = 1000$	$C = 50 + 0.7(Y - T)$
$NX = 100 - 100\epsilon$	$I = 200 - 10r$
$r_* = 5\%$	$G = 200, T = 100$

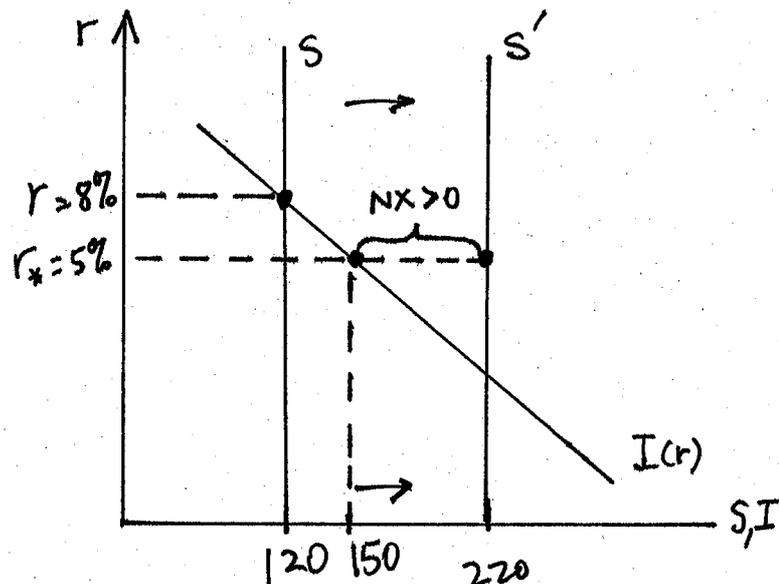
(a) (10 pts) Find the equilibrium real interest rate in a closed economy. Show the equilibrium real interest rate on a saving-investment diagram with  $r$  measured on the vertical axis. Now assume the small economy opens up to trade. Calculate the real exchange rate, trade balance and net capital outflows. Show the trade balance and net capital outflows on the saving-investment diagram.

- To find the equilibrium real interest rate, set  $S = I$ . National savings is  $S = 1000 - 680 - 200 = 120$ . Setting  $S$  equal to investment ( $I$ ) and solving for  $r$  gives  $r = 8\%$ .
- Opening up to trade and accepting the world interest rate, investment is  $I = 150$ . This implies that net exports ( $NX$ ) and net capital outflows ( $S-I$ ) are both equal to  $-30$ . The equilibrium real exchange rate is 1.3.



(b) (10 pts) Assume that fiscal policymakers enact a government spending reduction to balance the budget. If the domestic price level is  $P = 120$  and the foreign price level is  $P_* = 100$ , find the new real exchange rate, nominal exchange rate, trade balance and net capital outflows. Redraw the diagram from part (a) to show the changes.

- After balancing the budget, national savings is  $S = 1000 - 680 - 100 = 220$ .
- Opening up to trade and accepting the world interest rate, investment is still  $I = 150$ . This implies that net exports ( $NX$ ) and net capital outflows ( $S-I$ ) are now equal to 70. The equilibrium real exchange rate is 0.3.
- The nominal exchange rate is then  $e = 0.3 \times \frac{100}{120} = 0.25$ .



**False Statements (15 pts).** Explain why each statement below is false.

1) (3 pts) Tax cuts by President Trump will not impact the trade balance.

**Using our Neoclassical model, the tax cuts will lead to a reduction in national savings and will reduce  $NX$ .**

2) (3 pts) The primary long-run social cost of inflation is that erodes the purchasing power of income.

**In the long run, nominal wages and salaries increase with the price level so purchasing power is not eroded.**

3) (3 pts) Minimum wage laws have no impact on the unemployment rate.

**Minimum wages lead to structural unemployment because wages are set above the market-clearing rates.**

4) (3 pts) The Fed desires 2% inflation in order to reduce the real value of government debt.

**The Fed has an inflation target of 2% to facilitate a better functioning labor market. If necessary, employers can reduce real wages without imposing a nominal pay cut.**

5) (3 pts) Quantitative easing is the school of thought whereby tax cuts stimulate the economy and increase total tax revenues.

**Quantitative easing is the nontraditional monetary policy tool whereby the FOMC purchases targeted long-run securities to increase the monetary base.**