ECON 3010 Intermediate Macroeconomics
Solutions to Exam #2

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

#1. In a 100-percent-reserve banking system, banks:

A) can increase the money supply.
B) can decrease the money supply.
C) can either increase or decrease the money supply.
D) cannot affect the money supply.

#2. In the United States, the money supply is determined:

A) only by the Fed.
B) only by the behavior of individuals who hold money and of banks in which money is held.
C) jointly by the Fed and by the behavior of individuals who hold money and of banks in which money is held.
D) according to a constant-growth-rate rule.

#3. When the Federal Reserve conducts an open-market purchase, it buys bonds from the:

A) public.
B) U.S. Treasury.
C) Internal Revenue Service.
D) International Monetary Fund.

#4. If the money supply increases 12 percent, velocity decreases 4 percent, and the price level increases 5 percent, then the change in real GDP must be ______ percent.

A) 3
B) 4
C) 9
D) 11

#5. In a small open economy, if the world interest rate increases, then the supply of domestic currency on the foreign exchange market will _____ and the real exchange rate will _____, holding all else constant.

A) decrease; decrease
B) decrease; increase
C) increase; decrease
D) increase; increase

#6. Protectionist policies implemented in a small open economy with a trade deficit have the effect of ______ the trade deficit and ______ the quantity of imports and exports.

A) decreasing; decreasing
B) not changing; decreasing
C) decreasing; not changing
D) not changing; not changing

#7. In a small, open economy if net exports are negative, then:

A) domestic spending is greater than output.
B) saving is greater than investment.
C) imports are less than exports.
D) net capital outflows are positive.

#8. The unemployment resulting when real wages are held above equilibrium is called ______ unemployment, while the unemployment that occurs as workers search for a job that best suits their skills is called ______ unemployment.

A) efficiency; inefficiency
B) efficiency; structural
C) frictional; efficiency
D) structural; frictional

#9. If wage rigidity holds the real wage above the equilibrium level, an increase in the supply of labor will ______ the number unemployed.

A) increase
B) decrease
C) not change
D) possibly increase, decrease, or leave unchanged

#10. If the rate of separation is 0.02 and the rate of job finding 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.

A) above; toward
B) above; away from
C) below; toward
D) below; away from

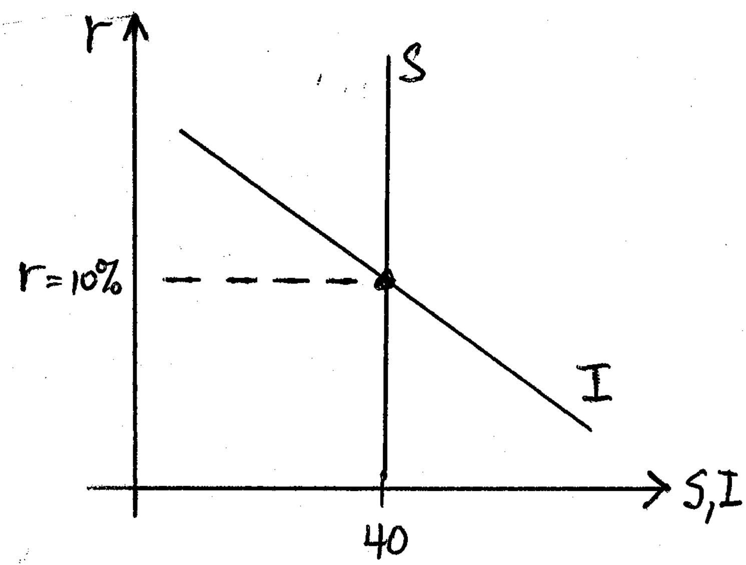
Problem Solving / Essay Questions / True-False. (75 points)

#11. (60 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, Money, and Prices	Demand and Money
$Y = F(K, L) = \sqrt{KL}$	$C = 75 + \left(\frac{1}{2}\right)(Y - T)$
$K = 900; L = 100$	$I = 80 - 4r$
$r_* = 5\%$	$G = 60, T = 50$
$P = 10; P_* = 11; M = 1000$	$NX = 20 - 20\epsilon$

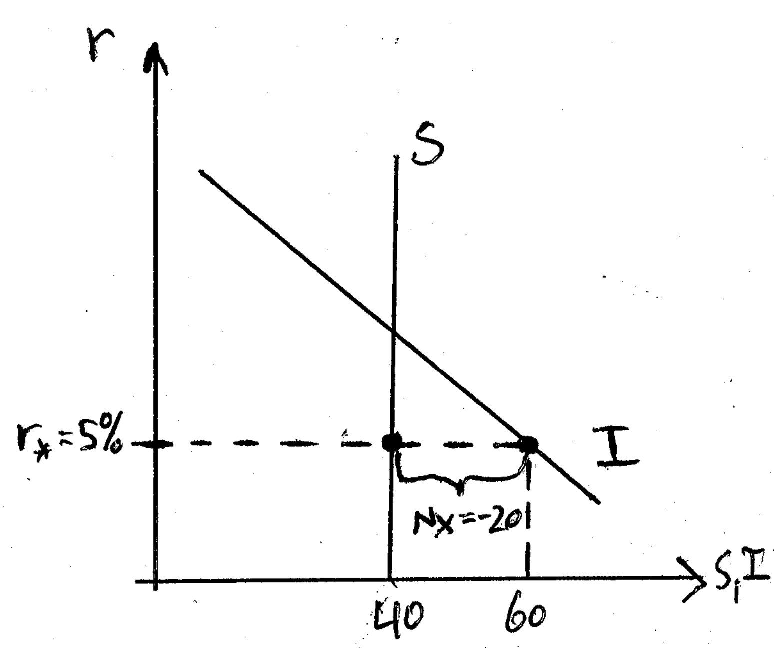
(a) (10 pts) What is the level of <u>real</u> GDP in the economy? In a closed economy, find the equilibrium real interest rate, national saving, and investment. Show the loanable funds equilibrium in a diagram.

<u>SOLUTION</u>. The level of real GDP (Y) is $Y = \sqrt{KL} = \sqrt{900 \times 100} = 300$. The equilibrium real interest rate in a closed economy is given by $S = I$. National savings (S) is $S = Y - C - G = 300 - 200 - 60 = 40$. Investment is $80 - 4r$. Therefore, if $r = 10\%$, then $S = I = 40$.



(b) (10 pts) Calculate the trade balance and net capital outflow for the small open economy. Show the trade balance on a saving-investment diagram with r measured on the vertical axis.

<u>SOLUTION</u>. For an open economy, the trade balance (net capital outflows) is given by $NX = S - I(r_*) = 40 - 60 = -20$.



(c) (10 pts) Calculate <u>nominal</u> GDP in the domestic country and the velocity of money. Provide an interpretation for the velocity of money. What are the values for the real and nominal exchange rates? Contrast the two exchange rate, discussing how to interpret each.

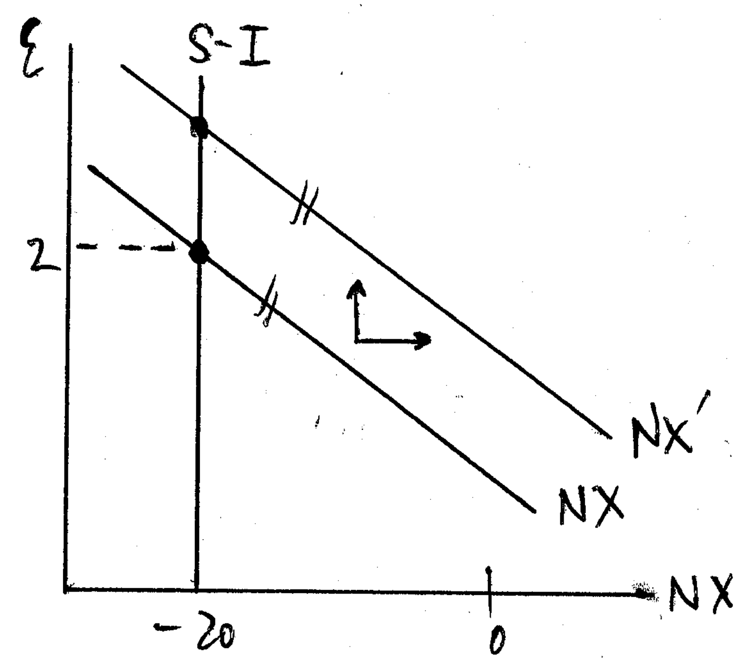
<u>SOLUTION</u>. Nominal GDP is given by $P \times Y = 10 \times 300 = 3000$. Velocity can be calculated from the quantity equation as $V = \frac{P \times Y}{M} = \frac{3000}{1000} = 3$. Each dollar turns over an average of 3 times per year to carry out all the transactions in the economy. The real exchange rate (ϵ) can be calculated from the net export schedule, $NX = 20 - 20\epsilon$. Since $NX = -20$, the equilibrium real exchange rate must be $\epsilon = 2$. The nominal exchange rate is $e = \epsilon \times \frac{P_*}{P} = 2 \times \frac{11}{10} = 2.2$. The real exchange rate says that the relative price of foreign goods relative to domestic goods is 2. In other words, you can get 2 units of foreign goods for 1 unit of U.S. goods. The nominal exchange rate says that one dollar is worth 2.2 units of the foreign currency.

(d) (10 pts) Assume the reserve-to-deposit ratio (rr) is 0.1 and the currency-to-deposit ratio (cr) is 0.2. How much does the Federal Reserve need to increase the monetary base to attain a money supply equal to $M = 1050$? Explain how the FOMC accomplishes this objective.

<u>SOLUTION</u>. First off, the money multiplier is $m = \frac{1+cr}{cr+rr} = \frac{1.2}{0.3} = 4$. To achieve a new money supply of $M = 1050$, the FOMC needs to increase the money supply by 50: $\Delta M = 50$. Using the equation $\Delta M = m \times \Delta B$, the necessary change in the base is $\Delta B = 12.5$. The FOMC would accomplish this by buying government securities and injecting the $12.5 of new reserves in the banking system. These new reserves would then get loaned out and eventually (through the money multiplier effect) create $\Delta M = 50$ of new money.

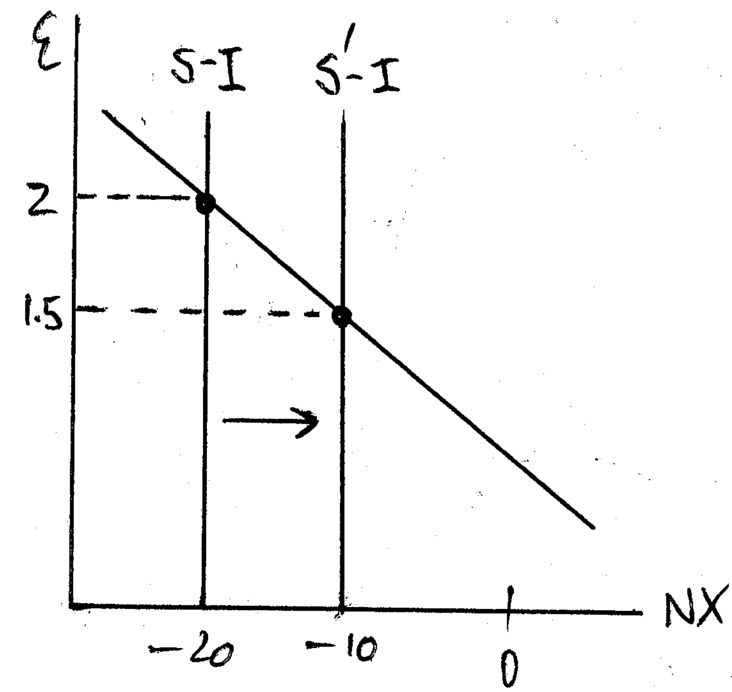
(e) (10 pts) Consider the following scenario. President Trump is interested in protecting the domestic auto industry and enacts international trade legislation that shifts the net export schedule to $NX = 40 - 20\epsilon$. What impact does the legislation have on the real exchange rate and the trade balance? Show your results in a diagram with ϵ on the vertical axis and write a short paragraph explaining the results.

<u>SOLUTION</u>. Using our Classical model of a small open economy, the trade legislation would shift the net exports schedule to up and to the right. One way to interpret this, is an increase in the demand for dollars on the international currency market. However, since net capital outflows (i.e., supply of dollars) are fixed at $S - I = -20$, the legislation will only increase the price of the dollar (i.e., the dollar will appreciate), but the trade balance will remain unchanged.



(f) (10 pts) Now assume that President Trump enacts legislation to balance the federal government's budget by reducing spending. Show the impact on the real exchange rate and trade balance in a diagram (using our model of a small open economy). How does the nominal exchange rate change?

<u>SOLUTION</u>. To balance the federal government budget, President Trump would need to reduce spending to $G = 50$. The federal budget is then balanced: $T - G = 50 - 50 = 0$. The reduction in government spending will cause national savings to increase to $S = 300 - 200 - 50 = 50$. Net capital outflows (S-I) and the trade balance (NX) would then increase to $NX = S - I(r_*) = -10$. The real exchange would decrease to $\epsilon = 1.5$ and the new nominal exchange is $e = 1.5 \times \frac{11}{10} = 1.65$.



#13. (15 pts) True or False.

(a) (3 pts) "The natural rate of unemployment in the U.S. has been constant since World War II at approximately 5%."

FALSE

(b) (3 pts) "The primary interest rate target of the FOMC is 30-year mortgage rates."

FALSE

(c) (3 pts) "Ex ante real interest rates can be negative."

TRUE

(d) (3 pts) "China is the biggest debtor nation in the world."

FALSE

(e) (3 pts) "If goods and services cost exactly the same in another country, then the real exchange rate between the U.S. and that country should equal one."

TRUE