Suggested Solutions to Assignment 5

Part B   True/ False/ Uncertain Questions

Explain why the following statement is True, False, or Uncertain according to economic principles. Use diagrams and / or numerical examples where appropriate. Unsupported answers will receive no marks. It is the explanation that is important

B-1.   Higher bond prices are associated with higher interest rates.

False

Higher bond prices are associated with lower interest rates.

Suppose a bond with no expiration date pays a fixed $100 annual interest and is selling for its value of $1000. The interest yield on this bond is 10 percent:

($100/$1000) *100 = 10%

Now suppose the price of this bond increases to $2000 because of the higher demand of bonds. The $100 fixed annual interest payment will now yield 5 percent to whoever buys the bond:

($100/$2000)*100 = 5%

Because all lenders must compete by offering to charge borrowers interest yields similar to those available on bonds, a lower general interest rate emerges.

This inverse relationship between bond prices and interest rates can also be explained by analyzing the effects of open market purchase of bonds by the central bank (For example - Bank of Canada) on the bond market and money market. Figure B-1(a) shows the bond market and Figure B-1(b) shows the money market. The initial equilibrium in the bond market is at point A with equilibrium bond price at P_0 and equilibrium quantity of bond at B_0. The initial equilibrium in the money market is at point A with equilibrium interest rates at i_0 and equilibrium quantity of money at M_0. An open market purchase by the central bank will increase the demand for bonds in the bond market. As a result, demand for bonds will shift from D_0 to D_1. Thus bond market equilibrium will move from A to B with a higher level of bond price at P_1 and a higher quantity of bonds sold at B_1. As the central bank buys bonds, the reserves in the banking system increases which would lead to an availability of excess reserves. Through the process of money multiplier, the banks would create money as they lend out these excess reserves. This means money supply in the economy will increase which is shown by a shift in money supply function from S_{m0} to S_{m1}

in the money market diagram, Figure-B-1(b). At the initial interest rates i_0, there will be an excess supply of money which will create downward pressure on interest rates. Money market equilibrium would from move from A to B with lower interest rates at i_1. Thus it is clear that as bond prices increase in the bond market, interest rates increase in the money market because of the open market purchase of bonds by the central bank.
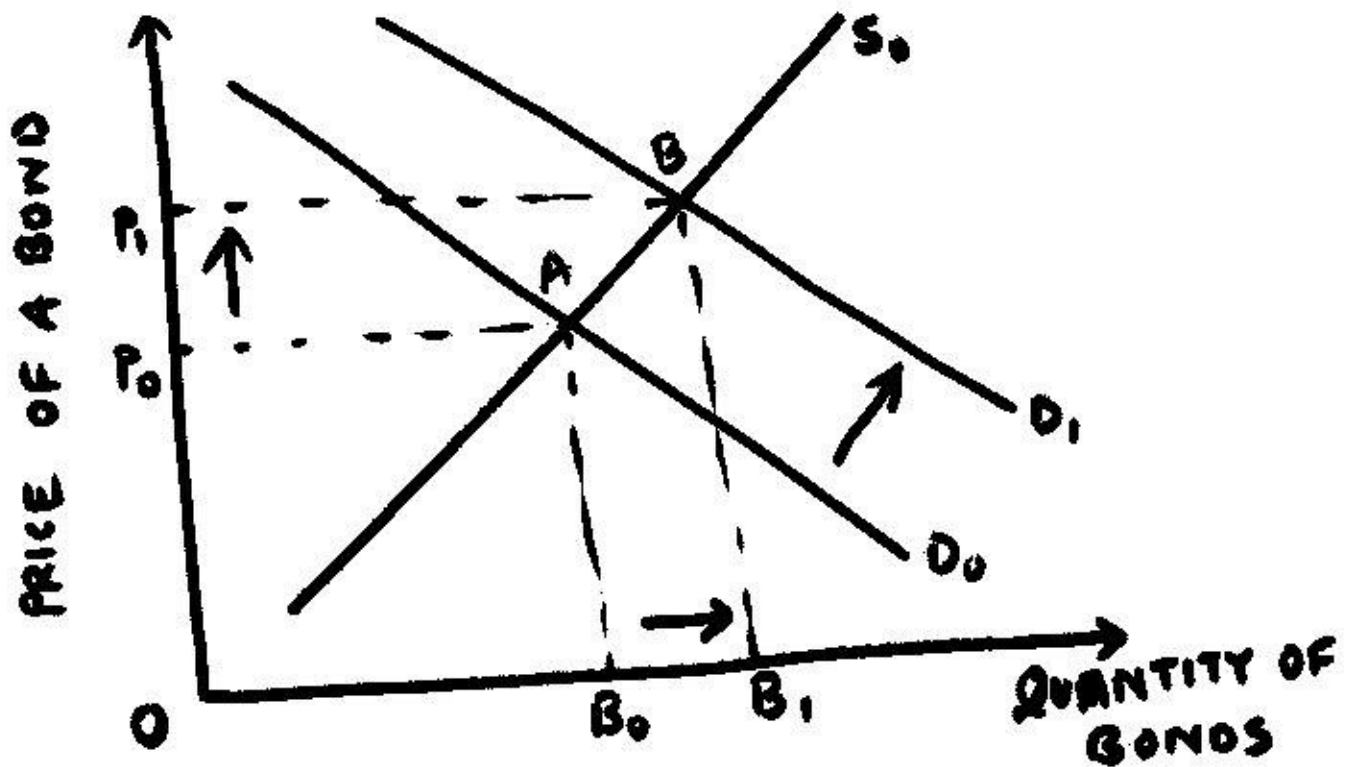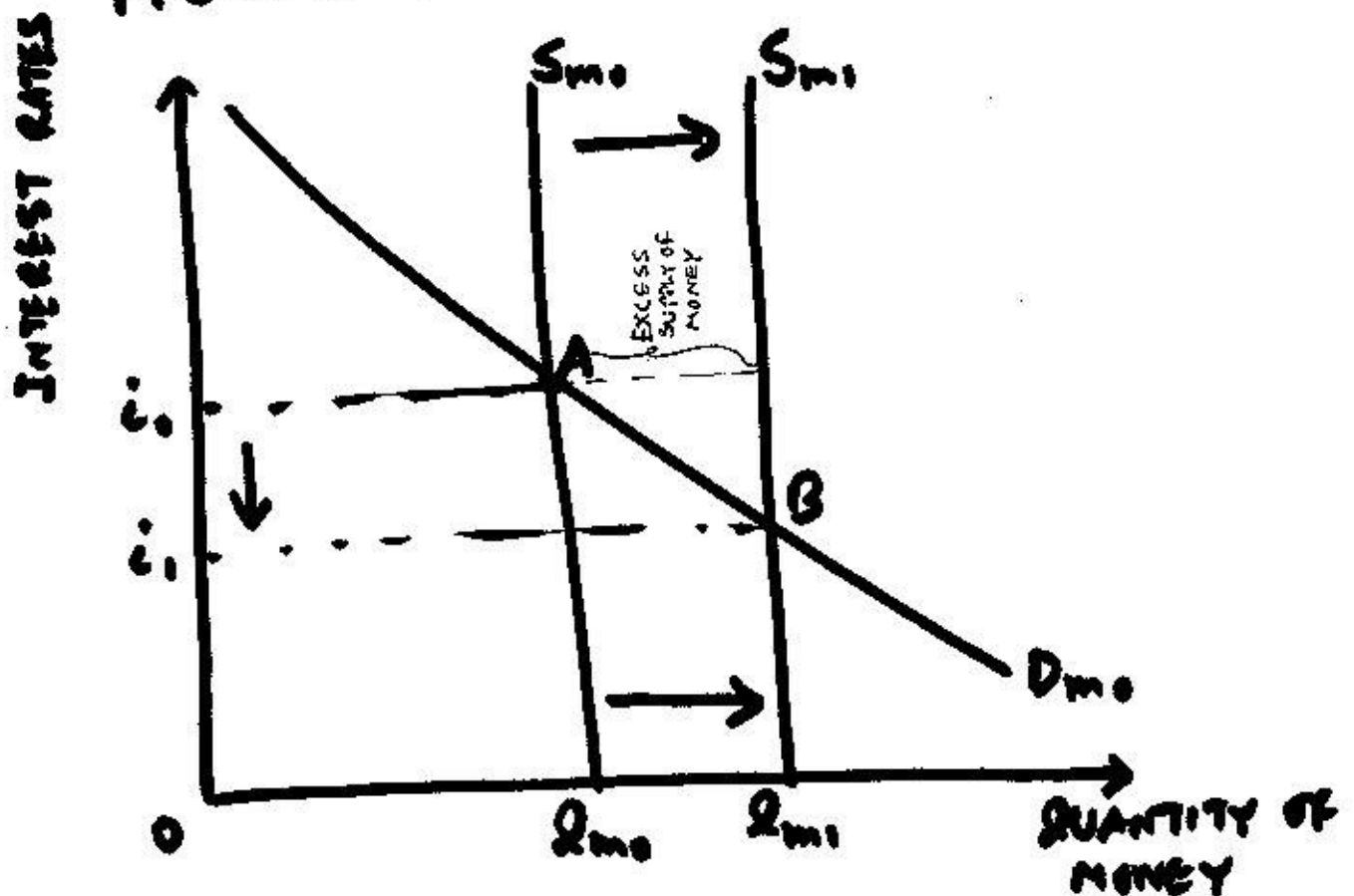
FIGURE B-1(a): BOND MARKET

PRICE OF A BOND

P_1

P_0

S_0

B

A

D_1

D_0

B_0 B_1

QUANTITY OF BONDS

O

FIGURE B-1(b): MONEY MARKET

INTEREST RATES

S_{m0} S_{m1}

EXCESS SUPPLY OF MONEY

i_0

A

i_1

B

D_{m0}

Q_{m0} Q_{m1}

QUANTITY OF MONEY

O

B-2.   The long-run Phillips curve shows a trade-off between inflation and unemployment.

False

The short-run Phillips curve shows a trade-off between inflation and unemployment. But the long-run Phillips curve does not show any such trade-off. The long- run Phillips curve is vertical at the natural rate of unemployment.

The short-run Phillips curve is a downward-sloping curve showing the relationship between inflation and unemployment when expectations of inflation are constant. This inverse short-run relationship can be explained by the AD/AS model with an upward-sloping short-run aggregate supply curve. Figure B-2(a) shows the AD/AS model and Figure B-2(b) shows short-run and long-run Phillips curves.

In Figure B-2(a), the economy begins at point A with price level at P_0 and output at the potential level. Assume that initial expectation of the inflation rate is zero. The point A Figure B-2(b) corresponds to the point A in Figure B-2(a). The point A in Figure B-2 (b) shows the combination of zero actual inflation and the 5.5 percent natural rate of unemployment. Assume that an increase in consumer confidence increases aggregate demand which shifts the AD curve from AD_0 to AD_1, moving equilibrium from A to point B. At the new equilibrium, the price level increases to P_1. Suppose that at B inflation rate rises to 4 percent. When the economy begins at A, nominal wages are set on the assumption that zero percent inflation will continue. The higher product prices due to higher aggregate demand at B raise business profits. Firms respond to the higher profits by hiring more workers and increasing output. Thus in the short-run equilibrium point B unemployment rate falls below the natural rate of unemployment to produce output beyond the potential level. Suppose at B in Figure B-2(a) output increases to Y_1 and unemployment falls to 4.5 percent. In Figure B-2 (b), point B shows the combination of 4 percent actual inflation rate and 4.5 percent unemployment rate. If we connect points A and B in Figure B-2(b) and extend it upward we will get a downward sloping line which is nothing but a short-run Phillips curve, which we denote as PC_0. PC_0 displays a short-run trade-off between inflation and unemployment. Along this curve the expected inflation rate remains fixed at zero percent ($\pi^e = 0$) because actual inflation rate is zero percent when unemployment stays at the 5.5 percent natural rate.

In the long-run, workers staying at point B in Figure B-2(a) will recognize that inflation rate is not 0 percent, but rather 4 percent. So, they will revise their expectation of inflation upward to 4 percent ($\pi^e = 4\%$) and will ask for wage increases to restore the level of real wages that previously existed at point A. As nominal wages rise, business profit will fall to their prior level. The reduction in profit means that original motivation to employ workers and increase output disappeared. As a result, supply curve shifts left from SAS_0 to SAS_1, moving the equilibrium from B to a new long-run equilibrium at C with a higher price level at P_2 and real output back to its potential level. This means at C unemployment is at the 5.5% natural rate of unemployment. Since the aggregate demand remains at AD_1 at point C, the actual inflation rate persists at 4 percent.

The combination of 4 percent actual inflation rate and the 5.5 percent natural rate of unemployment is shown by point C in Figure B-2(b). This point C is to the right and above of the initial short-run Phillips curve PC_0. To represent point C on a short-run Phillips curve we can either draw a new downward sloping line through C or shift the PC_0 curve vertically by 4 percent to PC1. In other words, as people revise their expectations about inflation rate, the short-run Phillips curve shifts upward vertically by the amount of the revision in the expected inflation rate. If we connect points A and C in Figure B-2(b) and extend it upward, we will get a vertical line. This vertical line, which we denote as PC_{LR}, is called the long-run Phillips curve which shows the long-run relationship between unemployment and inflation. It displays that in the long-run any rate of inflation is consistent with the 5.5 percent natural rate of unemployment. This means there is no trade-off between inflation and unemployment in the long-run.
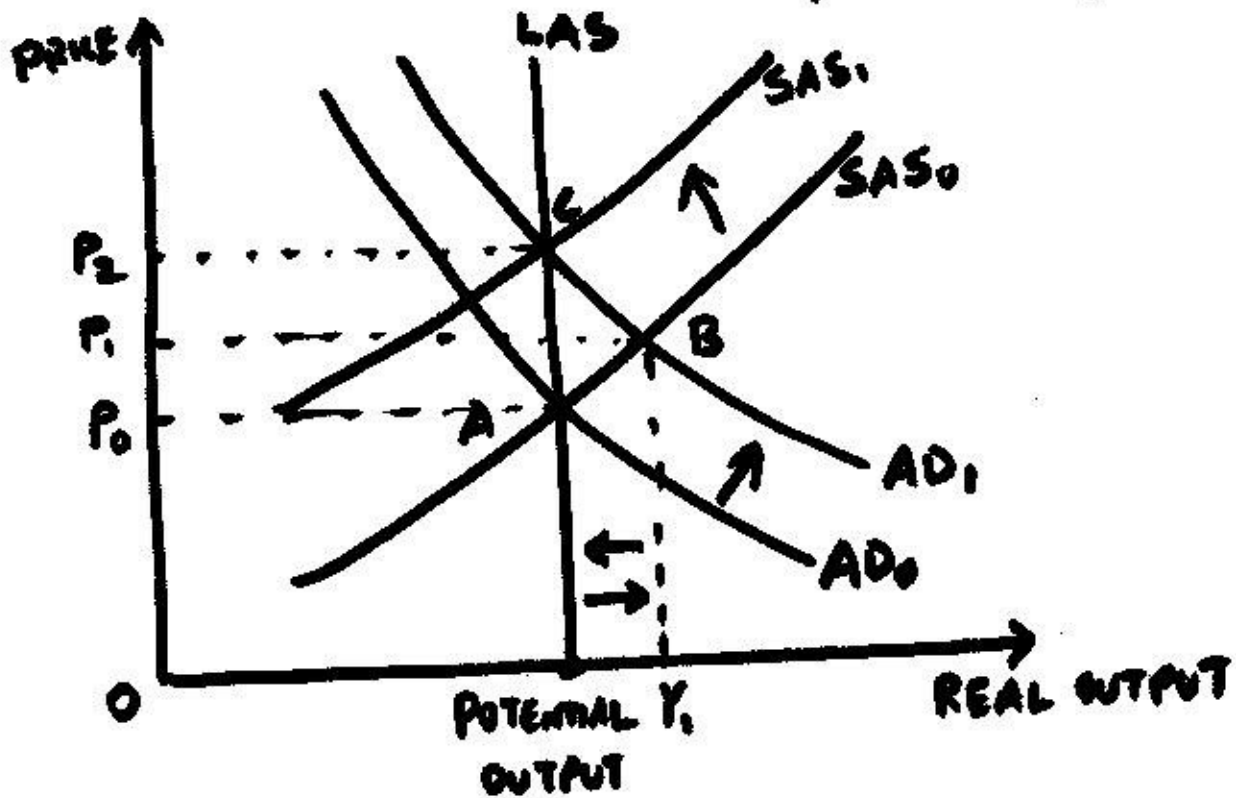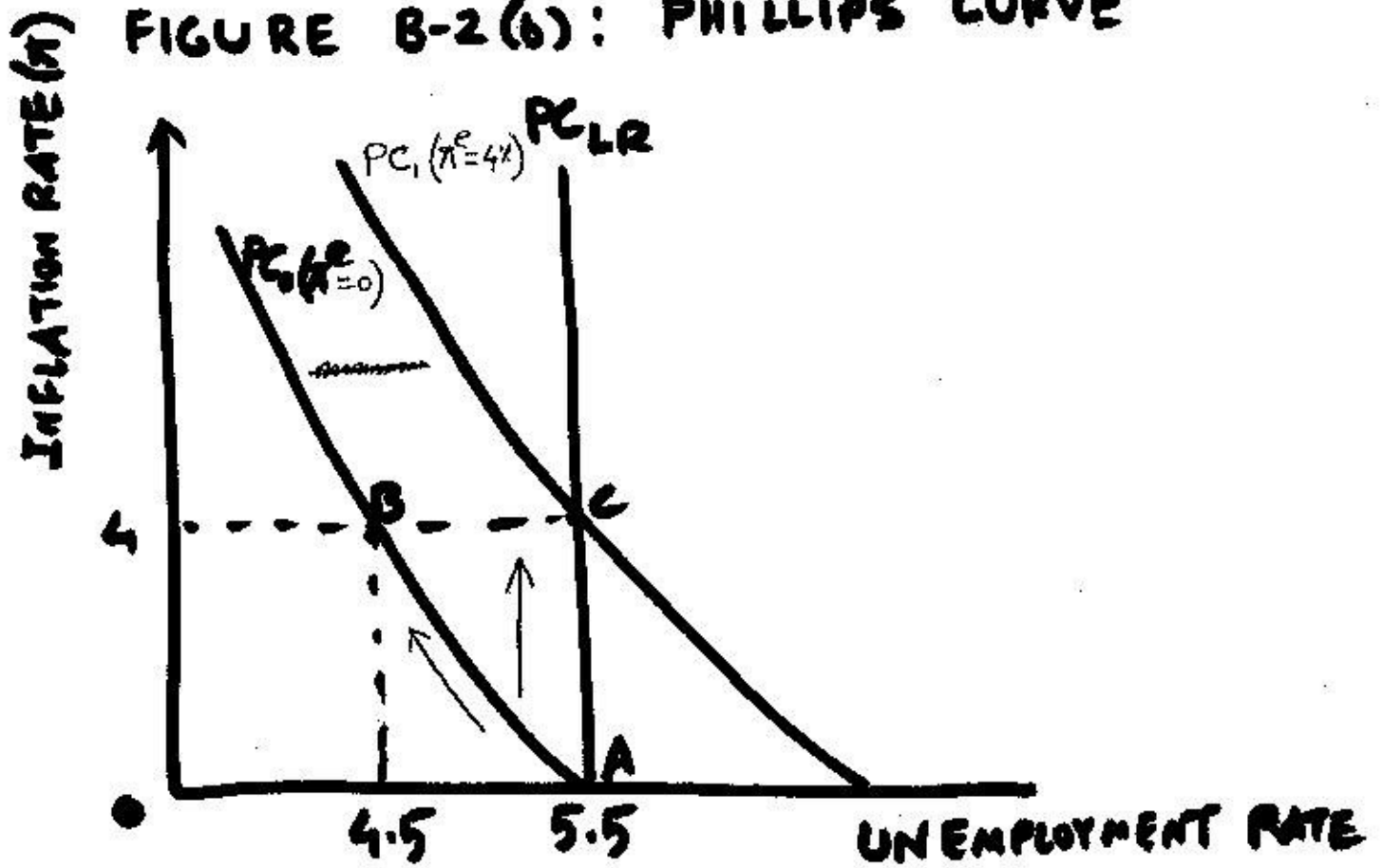
FIGURE B-2(a): THE AD/AS MODEL

LAS
PRICE
SAS₁
SAS₀
P_2 C
P_1 -------------- B
P_0 ---------- A
AD₁
AD₀
O
POTENTIAL Y_1
OUTPUT
REAL OUTPUT

FIGURE B-2(b): PHILLIPS CURVE

INFLATION RATE (π)
$PC_1 (\pi^e = 4\%)$ PC_{LR}
$PC_0 (\pi^e = 0)$
4 ------------ B -------- C
A
4.5   5.5
UNEMPLOYMENT RATE

B-3.   An increase in the bank rate tends to increase real output if prices are fixed.

False

An increase in the bank rate tends to decrease real output if prices are fixed.

The bank rate is the interest rate that the central bank (For example- Bank of Canada) charges on advances made to the chartered banks. Occasionally, chartered banks borrow from the central bank to meet unexpected and immediate needs. An increase in the bank rate discourages the chartered banks from this kind of emergency borrowing from the central bank. The banks respond to the higher bank rate by holding more reserves at their branches. This means the desired reserve ratio in the banking system increases with the rise in the bank rate. If prior to the change in the desired reserve ratio the banking system were fully loaned out, then the increase in desired reserve ratio would lead to shortages of desired reserves in the banking system. Consequently, the banks will stop making any new loans and start calling-in old loans until the actual reserve ratio increases to the new higher level of desired reserve ratio. Through the process of money multiplier, demand deposits or money will be destroyed as the banks call-in old loans. This means the total money supply in the economy will decrease, leading to higher interest rates in the money market.

In Figure B-3(a), the money market begins at point A. Money supply curve shifts from S_{m0} to S_{m1} due to the decrease in money supply. At the initial interest rates i_0, there will be an excess demand of money which will create upward pressure on interest rates. Money market equilibrium would from move from A to B with higher interest rates at i_1.Higher interest rates will discourage investment spending. As a result, aggregate expenditures or aggregate demand will decrease, leading to a decrease in real output. Figure B-3(b) displays the AD/AS model with the short-run supply curve SAS_0 horizontal at the fixed price level P_0. The economy begins at A in Figure B-3(b). As the aggregate demand decreases due to lower investment spending, AD curve shifts left from AD_0 to AD_1, moving the equilibrium from A to B. Thus real output falls from Y_0 to Y_1.

FIGURE B-3(a): MONEY MARKET

INTEREST RATES

S_{m1} S_{m0}

i_1 B

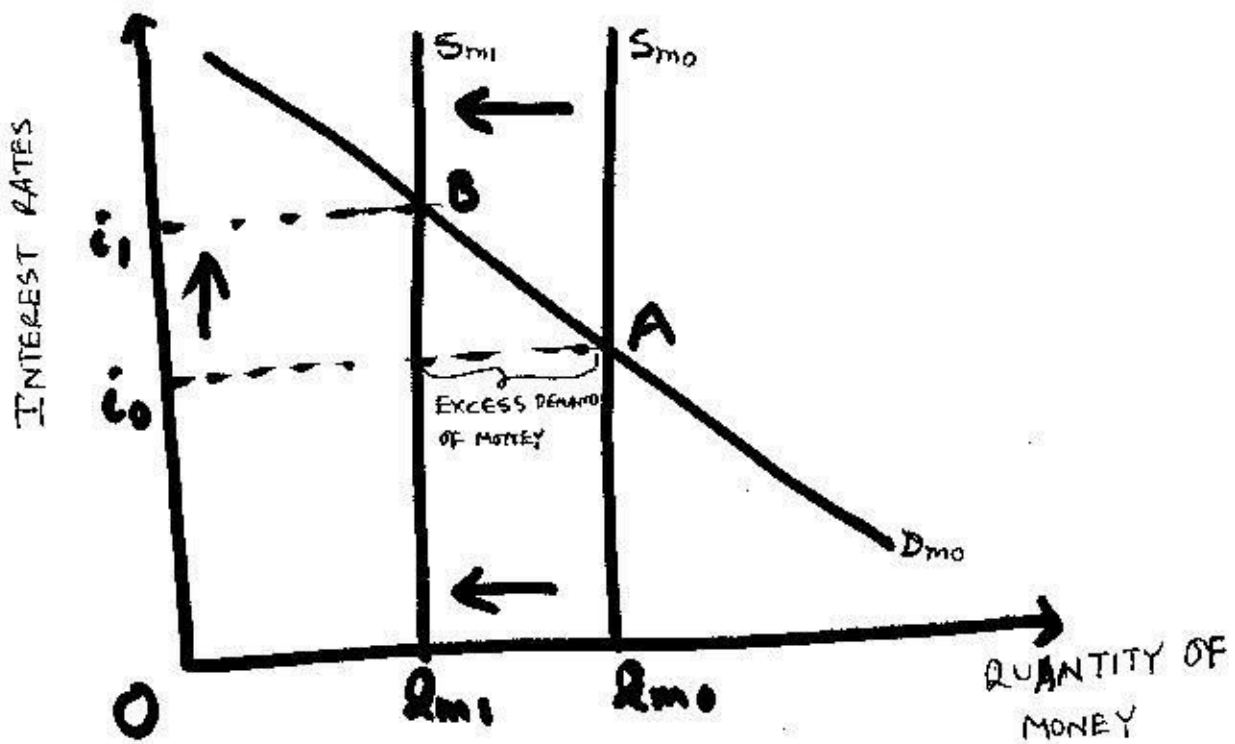i_0

A

EXCESS DEMAND OF MONEY

D_{m0}

O Q_{m1} Q_{m0} QUANTITY OF MONEY

FIGURE B-3(b): THE AD/AS MODEL

PRICE

B   A   SAS$_0$

P_0

AD_0

AD_1

O Y_1 Y_0 REAL OUTPUT