

Question 1

a) The desired consumption

$$C^D = C_0 + aY - br + cW$$

depends on national income (or real GDP) Y , real interest r and wealth W_0 as well as an autonomous (or a constant) part of consumption C_0 that is independent of the other variables. Here since there is no government - and hence no taxes, the disposable income Y^D is actually equal to the national income Y . We next look at how each variable affects consumption:

- ⇒ Holding all others constant, an increase in income is assumed to lead to an increase in desired consumption. This is because people would naturally want to consume more both now and in the future when income rises. Specifically, a is the change in consumption that results from a \$1 change in national income, which is referred to as the marginal propensity to consume.
- ⇒ Holding all others constant, an increase in real interest rate would lead to a decrease in desired consumption. This is because households usually purchase on credit those expensive durable goods such as cars and household appliances. An increase in interest rate increases the cost of borrowing, and this will generally lead to a decrease in desired consumption.
- ⇒ Holding all others constant, an increase in wealth would lead to an increase in desired consumption. This is because when household wealth goes up, less current income needs to be saved for the future, and thus households will tend to spend a larger fraction of their current income.

The desired investment

$$I^D = I_0 - dr$$

depends on the real interest rate r and the autonomous part of investment I_0 that is independent of national income and interest rate. Holding all others constant, an increase in interest rate leads to a decrease in desired investment. This negative relationship can be illustrated through the three components of investment: inventories, residential construction, and new plant and equipment.

- ⇒ When a firm ties up funds in inventories, those same funds cannot be used elsewhere to earn income. As an alternative to holding inventories, the firm could lend the money out at the going rate of interest. Hence, the higher the real rate of interest, the higher the opportunity cost of holding an inventory of a given size. Other things being equal, the higher the opportunity cost, the smaller the inventories that will be desired.
- ⇒ Most houses are purchased with money that is borrowed by means of mortgages, and thus interest payments constitute a large part of mortgage payments. An increase in interest rate increases the cost of borrowing, and this will generally lead to a decrease in demand for housing.
- ⇒ The real interest rate is also a major determinant of firms' investment in factories, equipment, and a whole range of durable capital goods that are used for production. When interest rates are high, it is expensive for firms to borrow funds that can be used to build new plants or purchase new capital equipment.

The desired exports function is

$$X = X_0,$$

which means that the value of exports is not related to changes in the value of national income.

The desired imports function is

$$IM = IM_0 + eY$$

where IM_0 is the value of imports that would exist if national income were zero, and is not related to changes in the value of national income. e is the change in imports that results from a \$1 change in national income, which is referred to as the marginal propensity to import. Ceteris paribus, an increase in income is associated with an increase in consumption of foreign goods and services.

Remark 1. *You don't have to write this much. The answer is mainly for your understanding. However, when you explain the effect of interest rate on consumption, investment and net exports, do not just write "A rise in r will decrease both desired consumption and investment." without explaining why. It would be considered inadequate.*

Remark 2. *How to identify which variables are endogenous or exogenous?*

A model usually has two broad types of variables: endogenous variables and exogenous variables. An endogenous variable is the one whose value is determined within the model. An exogenous variable influences the endogenous variables but is itself determined outside the model or taken as given. Here Y, C^D, IM are endogenous variables while $C_0, r, W, I_0, I^D, X_0, X, IM_0$ and P are all exogenous variables. One quick way or a trick to identify "who is who" is to first figure out what you need to solve within the model (here Y) and then what depends on the variables you solve for will be also endogenous variables (here C^D, IM). If you still can't get it through this way, one last way you can try is to solve for the equilibrium Y , which will be a function of all exogenous variables and parameters. (You can check the equilibrium Y^ in part f)*

b) The desired aggregate expenditure is equal to desired consumption plus desired investment plus desired net exports as there is no government:

$$\begin{aligned} AE(Y) &= C^D + I^D + X - IM \\ \Rightarrow AE(Y) &= C_0 + aY - br + cW + I_0 - dr + X_0 - IM_0 - eY \\ \Rightarrow AE(Y) &= \underbrace{C_0 - (b+d)r + cW + I_0 + X_0 - IM_0}_A + \underbrace{(a-e)}_z Y \end{aligned}$$

where A is the autonomous part of desired aggregate expenditure and z is the marginal propensity to spend out of national income. It shows the amount which economic agents want to spend on purchasing domestic output.

c) The equilibrium condition is $AE(Y) = Y$, that is, the equilibrium level of real GDP occurs at which desired aggregate expenditure equals actual national income. It is very important as without it, we can't solve anything within the model and then we can't further infer any policy implications regarding various shocks to the economy. The associated intuition is that when desired aggregate expenditure exceeds actual income, inventories are being depleted and this will lead firms to increase the level of output so they can replenish their inventories; when desired aggregate expenditure is less than actual income, inventories are being accumulated and this will lead firms to reduce the level of output. Only when actual output is exactly equal to the level of desired AE, inventories are neither depleted nor accumulated and the economy eventually settles down.

d) When we say output is demand-determined, we mean national income depends only on how much is demanded and we are not considering any supply-side influences on national income. This equation from part (c) can be interpreted as: In equilibrium, the demand for goods (the left side), is equal to income (the right side), which is itself equal to output.

e) Here we are using everything in their real terms (real GDP, real interest rate, real exports and

real wealth). That's why the price level P does not enter the equations. The assumption that the price level is constant implies that firms are willing and able to produce any amount of output that is demanded without requiring higher prices to cover higher costs. This can happen when there are unemployed resources and firms have excess capacity, or firms are price-setters.

f) We have

$$\begin{aligned}
 AE(Y) &= Y \\
 \Rightarrow C_0 - (b + d)r + cW + I_0 + X_0 - IM_0 + (a - e)Y &= Y \\
 \Rightarrow C_0 - (b + d)r + cW + I_0 + X_0 - IM_0 &= (1 - a + e)Y \\
 \Rightarrow Y^* &= \frac{C_0 - (b + d)r + cW + I_0 + X_0 - IM_0}{1 - a + e} = \frac{A}{1 - z}
 \end{aligned}$$

Remark 3. *Many of you were confused about the graphs in part b, c and f because you think they were exactly the same. That's not the case. So in b, you only need to draw the aggregate expenditure function $AE = AE(Y)$; in c, you need to add the equilibrium condition $AE(Y) = Y$, i.e., the 45-degree line; finally in f, you add the equilibrium point Y^* you obtained by solving $AE(Y) = Y$.*

g) We now look at how different shocks affect the equilibrium national income Y^* .

- i) A rise in r will decrease both desired consumption and investment. This will shift the AE function down in a parallel fashion. Others thing being equal, this event leads to a reduction in equilibrium national income.
- ii) A rise in W will increase desired consumption and thus shifts the AE function up in a parallel fashion. Others thing being equal, this event leads to an increase in equilibrium national income.
- iii) A rise in X_0 shifts the AE function up in a parallel fashion. Others thing being equal, this event leads to an increase in equilibrium national income.
- iv) A rise in IM_0 shifts the AE function down in a parallel fashion. Others thing being equal, this event leads to a reduction in equilibrium national income.
- v) A rise in I_0 shifts the AE function up in a parallel fashion. Others thing being equal, this event leads to an increase in equilibrium national income.

h) The multiplier measures the change in equilibrium national income that results from a change in the autonomous part of desired aggregate expenditure. The multiplier is equal to $1/(1 - z)$, where z is the marginal propensity to spend out of national income. In our model with no government but international trade, z is simply the marginal propensity to consume (a) minus marginal propensity to import (e).

$$\text{The multiplier} = \frac{1}{1 - z} = \frac{1}{1 - a + e}$$

So parameters a and e affect the size of the multiplier. The higher is a , other things constant, the larger is the multiplier. The lower is e , other thing constant, the larger is the multiplier. Indeed, a larger a or a small e means a larger z ($z = a - e$), and then a steeper AE function and thus a larger simple multiplier.

Question 2

a) Given the information provided, we have

$$MPC = 0.85, \quad t = 0.3, \quad m = 0.45, \quad Y_e = 2000$$

So the marginal propensity to spend is

$$z = MPC(1 - t) - m = 0.145$$

In equilibrium, we have

$$\begin{aligned} AE(Y_e) &= A + zY_e = A + 0.145Y_e = Y_e \\ \Rightarrow A &= (1 - 0.145) \times 2000 = 1710 \end{aligned}$$

Thus, the AE function is

$$AE(Y) = 1710 + 0.145Y$$

We can also calculate the simple multiplier as

$$\frac{1}{1 - z} = \frac{1}{1 - 0.145} = 1.17$$

b) The potential GDP should be at the right of the equilibrium GDP. The statement that at current Y_e , firms have plenty of excess capacity, implies that Y^* is above current Y_e (which is \$2000 billion).

c) An increase in desired investment by \$100 billion will shift the AE function up in a parallel fashion by \$100 billion. Equilibrium national income will rise by \$100 billion times the simple multiplier.

$$\Delta Y = 1.17 \times \$100b = \$117b$$

d) A reduction in exports by \$75 billion will shift the AE function down in a parallel fashion by \$75 billion. Equilibrium national income will decrease by \$75 billion times the simple multiplier.

$$\Delta Y = 1.17 \times \$75b = \$87.75b$$

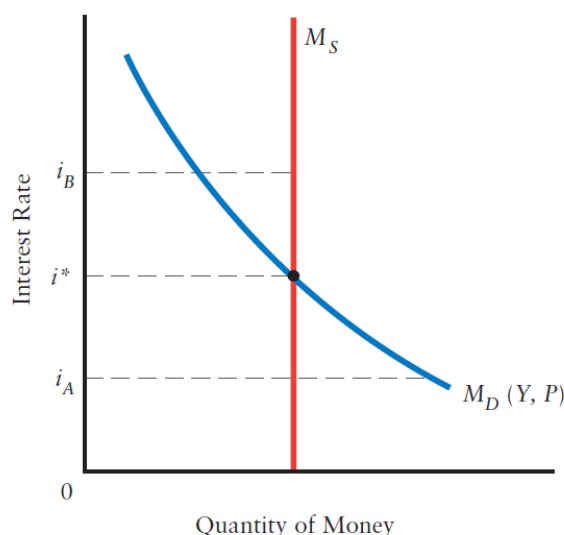
e) A decrease in the net tax rate rotates the AE function up and so it becomes steeper but maintains its vertical intercept, i.e., same as the one in d). Equilibrium national income will go up, but whether it is larger than \$2000 billion remains ambiguous, depending on the magnitude of tax reduction.

f) If firms begin to feel pessimistic about future economic conditions, this leads them to reduce their planned investment spending. Such a decline in planned investment would shift the AE function down and lead to a decrease in national income. The “bad” economic times will then be seen by the firms as justification for their initial pessimism, and many will take pride in their predictive powers. But their pride would be misplaced; the truth is that sufficient pessimism on the part of firms will tend to create the conditions that they expected.

g) Because any negative comments from government officials will give firms an impression that there may be a possible future downturn and bad times ahead. This will induce firms to feel pessimistic about the future state of economy and thus scale down or cancel planned investment.

Question 3

e) The M_D function is downward sloping because the nominal interest rate is **the opportunity cost of holding money**. Thus a fall in the nominal interest rate should lead to an increase in the quantity of money demanded. The equilibrium interest rate i^* occurs at the intersection of money demand and money supply. (Note, you could use r to denote it as well.)



Suppose the interest rate is at i_A , then there is **excess demand for money balances**. Firms and households attempt to sell their current holdings of bonds (in return for money). This attempt in the aggregate to sell bonds **drives down their price** and thus drives the interest rate up. As the interest rate rises, firms and households reduce the quantity of money demanded. This process continues until i^* is reached, at which point the amount of money available is willingly held.

Suppose the interest rate is at i_B now. At i_B , there is **excess supply of money balances**. Firms and households attempt to get rid of their excess money holdings by purchasing bonds. This attempt in the aggregate to buy bonds drives the price of bonds up and thus reduces the interest rate. As the interest rate falls, firms and households increase the quantity of money demanded. This process continues until i^* is reached, at which point firms and households are willing to hold the available supply of money.

f) An increase in the money supply shifts M_S to the right, leading to now **an excess supply of money**. Firms and households try to purchase bonds with their excess money holdings, and this drives the price of bonds up and the interest rate down. As the interest rate falls, desired aggregate spending will increase.

1. Other things being equal, a decrease in the interest rate reduces the opportunity cost of borrowing or using retained earnings for investment purposes, and thus the quantity of desired investment increases.
2. A lower interest rate will also lead to an increase in desired consumption. This is because households usually purchase on credit those expensive durable goods such as cars and household appliances, a decrease in interest rate thus decreases the cost of borrowing for those big-ticket durable items.
3. In an open economy, there is another channel through which the interest can have an effect. Because of the international mobility of financial capital, the lower interest rate also leads to a

capital outflow, a depreciation of the domestic currency, and thus an increase in the net exports.

g) An increase in the perceived risk associated with holding government bonds will shift the M_D curve upward, leading to an excess demand for money. People try to sell some of their current bond holdings to satisfy their increased demand for cash. But there is only so much cash available. **The effort in the aggregate to sell bonds drives the price of bonds down and thus causes the interest rate to rise**, choking back the quantity of money demanded (an upward movement along the new MD curve). This adjustment continues until the existing supply of money is willingly held, at a new higher equilibrium interest rate. As the interest rate increases, desired aggregate spending will decrease. The same above reasons apply, but in opposite direction!

Question 4

a) For the endogenous/exogenous variables in goods market, **please refer to Remark 2**. But note that in Q1, there is no government. Suppose now I am adding information about government purchase, tax revenue and disposal income:

$$G = G_0, \quad T = T_0 + cY, \quad Y^D = Y - T$$

then the additional endogenous variables are T, Y^D , and the exogenous variables are G_0, T_0 .

Now, let's look at the money market. If we use the equations that describe the money market in Q3 without the riskiness of holding bonds, then we can easily solve the equilibrium interest rate as

$$\begin{aligned} M^D = M^S &\Rightarrow P[aY - br] = M \\ \Rightarrow r^e &= \frac{aY - P/M}{b} \end{aligned}$$

As you can see here, Y, P, M are all exogenous variables, and r, M^D are endogenous variables, whereas a and b are parameters.

Remark 4. For b), c), and d), the main aim is to make sure that you understand the “transmission mechanism” of monetary policy in this basic IS/LM model. Basically, the first part of the transmission mechanism depends on **the interest sensitivity of money demand**, or the slope of the money demand curve (the parameter b in Q3). The second part depends on **the interest sensitivity of aggregate demand**, or how aggregate demand responds to changes in interest, or the slope of the investment/consumption curve with respect to interest rate (the parameter b, d in Q1). Mostly it will be on investment, but it also includes consumption and net exports. By varying the size of these two things, you shall see how the effectiveness of the monetary policy changes.

e) There are two situations in which the changes in the money supply will have no short-run effect on real GDP:

1. the M_D curve is horizontal (the so-called liquidity trap);
2. the I_D curve is vertical.

In the first case, a flat M_D curve means that a given change in the money supply will have a no effect on the interest rate. In the second case, a steep I_D curve means that a given change in the interest rate will have no effect on desired investment expenditure (and thus, through the multiplier, no effect on real GDP).

Question 5

Remark 5. Following an increase in G , the AD curve shifts to the right and as a result, real GDP and the price level both increase. An increase in GDP and price then leads to an increase for money demand, causing an excess demand for money balances. **Firms and households attempt to sell their current holdings of bonds in return for money. This attempt in the aggregate to sell bonds drives down their price and thus drives the interest rate up.** The fiscal expansion has pushed up both the interest rate and the price level and thus “crowded out” some private expenditure (net exports, consumption and investment).

- ⇒ Other things being equal, an increase in the interest rate increases the opportunity cost of borrowing or using retained earnings for investment purposes. As a result, the higher interest rate leads to a decrease in desired investment expenditure. A higher interest rate will also lead to a decrease in desired consumption. This is because households usually purchase on credit those expensive durable goods such as cars and household appliances, an increase in interest rate thus increases the cost of borrowing for those big-ticket durable items. In an open economy, there is another channel through which the interest can have an effect. Because of the international mobility of financial capital, the high interest rate also leads to a capital inflow, an appreciation of the domestic currency, and thus a decrease in the net exports.
- ⇒ The higher price level (for a constant exchange rate and foreign prices) makes domestic goods more expensive relative to foreign goods. This will lead to a reduction in net exports. In addition, by reducing private-sector wealth (real value of money and bonds), the higher price level will also lead to a reduction in consumption.

An increase in M shifts the money supply curve to the right, leading to now an excess supply of money. Firms and households try to purchase bonds with their excess money holdings, and this drives the price of bonds up and the interest rate down. A decrease in interest rate will then lead to an increase in consumption, investment and net exports for the opposite reasons listed above. As aggregate expenditure increases, the AD curve shifts to the right and as a result, real GDP and the price level both increase. However, a higher price level will lead to a decrease in consumption and net exports, which will dampen the initial increase.

A major difference you can see here is that monetary policy affects aggregate demand indirectly whereas fiscal policy (especially changes in G) affects aggregate demand directly.

e) Take Canada as an example. The increase in the world price of oil is both an AD and an AS shock for Canada. Since many Canadian firms produce and sell oil on the world market, the increase in price is a positive AD shock for Canada. But since many Canadian firms also use oil as an input to their production processes, the increase in price is a negative AS shock for Canada. The net effect on Canadian GDP depends on the size of these two effects. But since Canada is a net exporter of oil (and so we produce more than we use), we can conclude that the demand effect outweighs the supply effect, and so the overall effect is to increase Canadian GDP. But if we take China – a net importer of oil – as an example, then the result will be a reduction in real GDP if others remain the same.

Question 3: Credited to Nandini Paliwal

a) Explain intuitively why an increase in real GDP increases the demand for money—in other words, why “a” is positive.

For any given interest rate, the demand for money is assumed to be positively related to GDP, so when the real GDP increases, the demand for money also increases. This happens because increase in GDP means more production in the economy. More production implies more volume of transactions are generated and thus more money is desired to conduct these economic transactions. This raises the demand for money.

b) Explain intuitively why an increase in the interest rate reduces the demand for money—in other words, why “b” is positive. As r rises, and people demand less money, what are they holding more of instead, and why?

A decision to hold more bonds is at the same time a decision to hold less money. Alternatively, the decision to hold more money is a decision to hold fewer bonds. Other things being equal, the demand for money is negatively related to interest rate. An increase in interest rate increases the opportunity cost of holding money and makes holding bonds more attractive. Since holding money becomes less attractive, people substitute away from money towards bonds. This leads to a reduction in the quantity of money demanded. As r rises and people demand less money, they will be holding more bonds instead of money as holding bonds now has become more beneficial due to the higher returns from the bonds.

c) Explain intuitively why an increase in the riskiness of bonds increases the demand for money—in other words, why “c” is positive. In the real world, provide two examples of possible events that could increase the riskiness of bonds.

The riskiness of bond makes holding bonds less attractive due to the uncertainty over returns. As bonds become riskier to hold, people want to hold more money. This increases the demand for money as holding money becomes a safer option as compared to bonds. Two examples that may increase the riskiness of the bond could be:

- If the Business Credit rating of a company is decreased, then the credibility of the company is reduced in the market as a result bonds issued by it may be perceived as riskier.
- If a company becomes bankrupted, then the bonds issued by it could be perceived as riskier due to the possibility of a default in payment or even nonpayment.

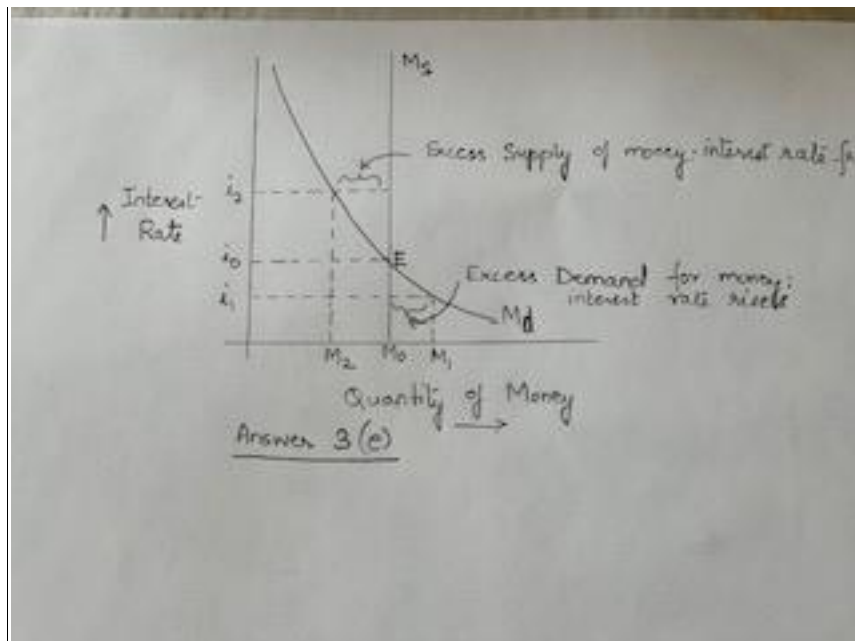
d) Explain intuitively why an increase in the price level leads to an increase in the demand for money. Explain also why this increase should be “equi-proportional”, so that an $X\%$ increase in P leads to exactly an $X\%$ increase in money demand.

Other things being equal, the demand for money is positively related to price level. So when the price level rises the demand for money rises and when the price falls the demand for money also falls. Due to the rise in price, the dollar value of a given transaction increases, even if the real value

of the transaction stays the same. This implies that at a given level of consumption people will need more money to carry out the same value of transactions. That's why the price level will lead to an increase in the demand for money. This increase is equi-proportional as other factors like income and interest rate are unchanged. Since the real value of transactions (indicator of income) and the opportunity cost of holding money (indicator of interest rate) are constant; in order to make the same transactions as before, people must not just hold more money than before- they must hold precisely that much more by which the price has increased. For this reason the increase in the price level will be equi-proportional to the increase in demand for money.

e) Draw a diagram of the money market (in r, M space) and explain how the equilibrium interest rate is determined.

In the money market, the interest rate is the "price" that adjusts to bring about equilibrium. The interest rates are determined in the short run by the interaction of money demand and money supply. Monetary equilibrium occurs when the interest rate is such that the quantity of money demanded equals the quantity of money supplied.



In the diagram, the supply curve of money is a straight line M_s (by the central bank) and the money demand is denoted by curve M_d , its negative slope indicating that a fall in interest rate causes money demand to increase. The equilibrium is at point E and the equilibrium demand is at M_0 and interest rate is i_0 . In a disequilibrium situation in which firms and households would like to hold more money and fewer bonds, there will be an excess demand for money (M_1). In order to increase their money holdings, people will try to sell some bonds. This excess supply of bonds will put downward pressure on the price of bonds which will cause the interest rate to increase. Eventually, the interest rate will rise enough (from i_1 to i_0), that people will no longer be trying to add to their money balances by selling bonds. Similarly, in a disequilibrium in which firms and households would like to hold less money and more bonds, there will be an excess supply of money. In order to decrease their money holdings, people will try to purchase more bonds; this excess

demand for bonds will push bond prices up and the interest rate down. As the interest rate falls (from i_2 to i_0), households and firms become willing to hold larger quantities of money. The interest rate falls until everyone is content to hold the existing supply of money and bonds, as at point equilibrium point E .

f) Now suppose that the central bank decides to increase the money supply. Explain what this does to the equilibrium interest rate, and why. Show this in your diagram of the money market.

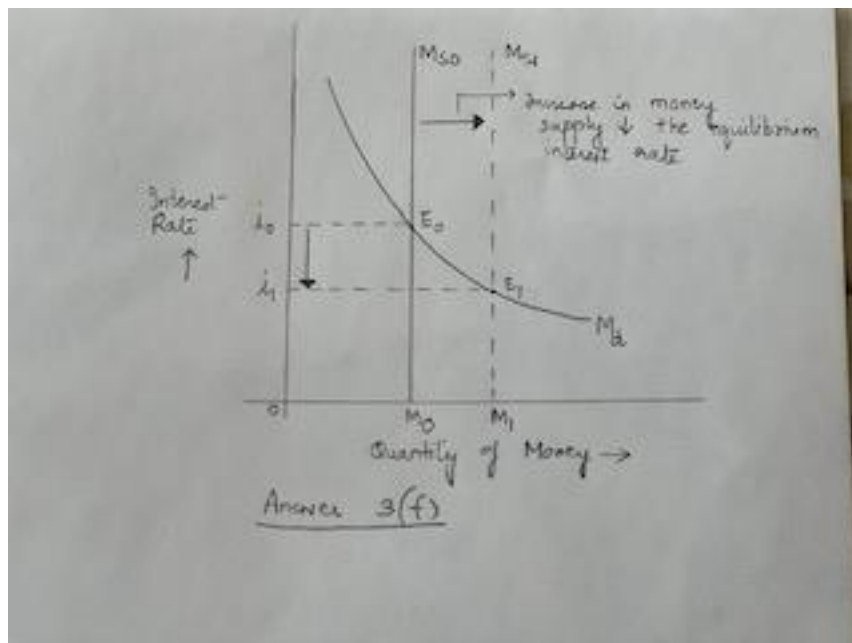
Increase in the supply of money causes changes in the short-run equilibrium interest rate. The interest rate will decrease if the equilibrium is disturbed by an increase in the supply of money but no change in the money demand curve:

Increase in money supply \Rightarrow excess supply of money at initial interest rate

\Rightarrow firms and households buy bonds

\Rightarrow bond prices increase

\Rightarrow equilibrium interest rate decreases.



The money supply is shown by the vertical curve M_s , and the demand for money is shown by the negatively sloped curve M_d . The initial monetary equilibrium is at E_0 , with corresponding interest rate i_0 . An increase in the money supply causes M_{s0} to shift to M_{s1} . The new equilibrium is at E_1 , where the equilibrium interest rate has fallen to i_1 .

g) Suppose instead that there is an increase in the perceived risk associated with holding government bonds—so there is an increase in \emptyset . Explain what happens to the equilibrium interest rate, and show this in your diagram.

An increase in the perceived risk associated with holding government bonds means that as compared to bonds, holding money has become more attractive. This preference to hold money rather than bonds will mean that the demand for money will increase. An increase in the demand for money increases the equilibrium interest rate.

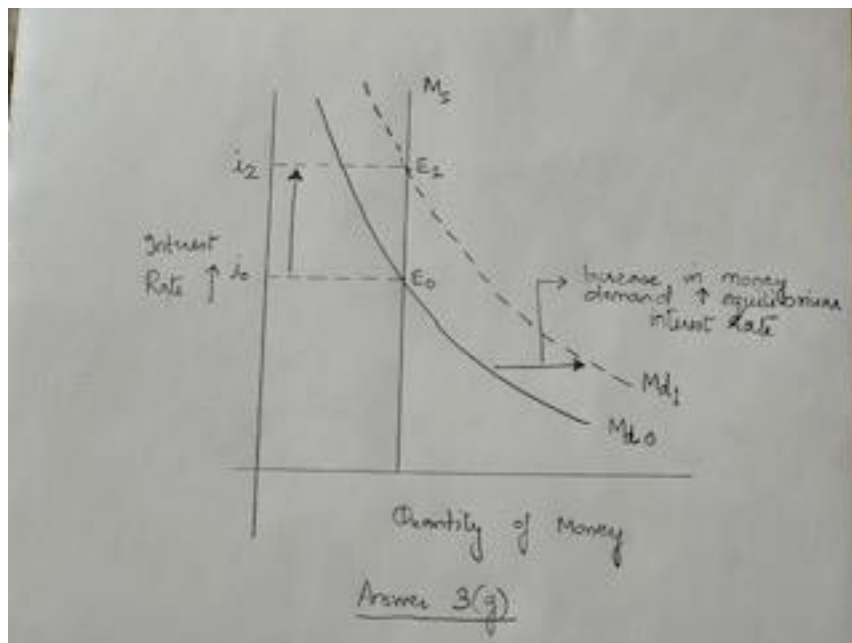
An increase in the demand for money, with an unchanged supply of money, leads to the following sequence of events:

Increase in money demand \Rightarrow excess demand for money at initial interest rate

\Rightarrow firms and households sell bonds

\Rightarrow bond prices decrease

\Rightarrow equilibrium interest rate increases



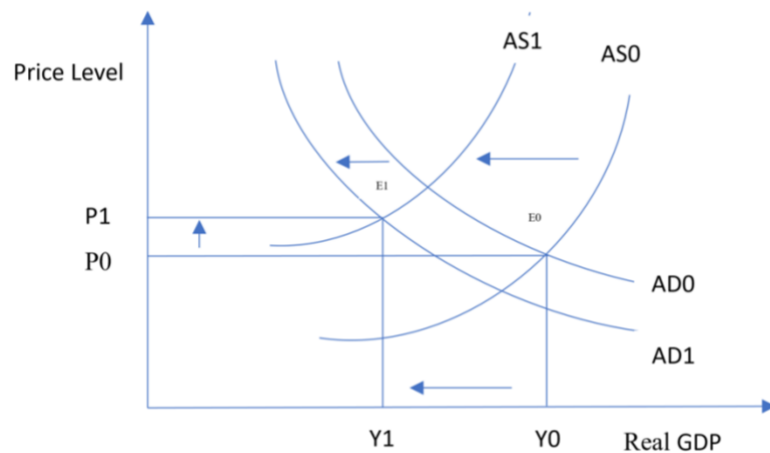
The money supply is shown by the vertical curve M_s , and the demand for money is shown by the negatively sloped curve M_d . The initial monetary equilibrium is at E_0 , with corresponding interest rate i_0 . An increase in the money demand causes M_{d0} to shift to M_{d1} . The new equilibrium is at E_2 , where the equilibrium interest rate has increased to i_2 .

h) Suppose a government minister you are advising suggests that “changes in interest rates always indicate what the central bank is doing”, and she asks for your response. Write one paragraph (less than 100 words) explaining your thoughts on this matter.

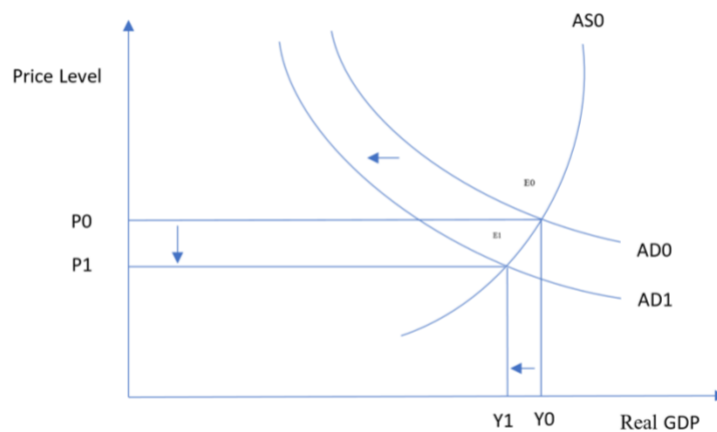
Most of the times the interest rates are determined by the central bank of the countries however not every change in interest rate comes from the monetary policy of the central bank. Changes can come from other shocks as well. Any shock in the demand for or supply of money in the economy can lead to a change in the interest rate. For example, during the likelihood of a war in any country, the people may want to have more cash rather than bonds. More withdrawals from the bank deposits will increase the supply of money and push the interest rates down.

Question 6: Credited to Montajima Tasnim and Nimmi Hamid

A) Considering that during the COVID 19 pandemic, millions of people were unable to work near others and thus were required to isolate themselves safely in their homes, it resulted in billions of dollars worth of output not being generated. This led to a massive supply shock. Consequently, it contributed to billions of dollars worth of income not being earned and reduced consumers' ability or willingness to purchase goods and services, at given prices which is a demand shock. Hence both the AS curve and AD curve shift left. The “key characteristic” that the COVID 19 pandemic exposed is a unique scenario where the change in supply contributed to the change in demand as we learned in class. Hence, the magnitude of the change in supply shock is visibly greater than the magnitude of the change in demand shock, increasing the prices of goods and services from P_0 to P_1 but decreasing the Real GDP from Y_0 to Y_1 as shown in the Fig. below:



B) Millions of people were able to continue their work from home (remotely) and thus continued to earn their regular incomes. However, there was little ability to do much of their “regular” spending—at restaurants, in retail stores, for travel due to covid lockdown and restrictions. The animal instinct to save during troubling times also contributed to saving more and refraining from making large investments. This led to the negative demand shock, the “secondary characteristic”. Consequently, both the price of goods and services and the Real GDP have decreased, as illustrated in the graph below:



C) When in crisis people and companies tend to spend less, so the government fills that gap with big-spending measures of its own. Usual fiscal stimulus is all about getting people back to work and increasing GDP. Because usual fiscal stimulus happens when work is safe. However, during the COVID 19 pandemic, work was not safe. After the onset of the pandemic, the Government of Canada took immediate and significant action through Canada's COVID-19 Economic Response Plan (CERP) to support people, businesses, and organizations facing hardship through a range of programs. The fiscal provision of relief payments and the monetary massive monetary expansion were aimed to shift the aggregate demand curve back to the right. It did not do anything to the aggregate supply curve. The financial relief package was not trying to shift the aggregate supply curve. However, when the government gave businesses financial relief one of the things it wanted to ensure was that there were no scars left by the pandemic. The scars would take the form of a bunch of businesses, that went bankrupt, and then when the pandemic went away, the businesses did not come back. Hence, the government aimed to keep the businesses alive during the rough patch however long it lasted so that when the pandemic went away, the businesses could still be up and running which would allow people to be able to go back to work. The financial relief was trying to keep those businesses alive to the point where when the pandemic goes away, then the aggregate supply curve would shift back on its own more or less as people went back to work. While a significant portion of the financial relief package was geared more toward addressing the fall in the aggregate demand resulting from the loss of income so that consumption could be sustained and the economy could be revived as promptly as possible, all of the financial reliefs or transfer payments that were made by the government could not be fully translated into a pre-covid level of consumption during the pandemic lockdown. Even though some substituted going to restaurants or malls for buying goods online, amid fragile confidence and ongoing health concerns, many households opted to keep savings high. Hence it can be suggested that there would be a fall in AD, but the availability of financial relief would dampen the fall.

On the other hand, during the 2008 financial crisis, political leaders coordinated efforts to stimulate the economy and lift it out of recession. They believed that short-run fiscal stimulus to their economies was necessary to dampen the effects of the recession. The fiscal stimulus provided during the 2008 financial crisis followed the usual role of the fiscal stimulus which is about getting people back to work and increasing GDP unlike seen in the COVID 19 pandemic. As for fiscal policy, the G-20 leaders agreed that significant fiscal expansions and thus budget deficits—would be necessary. Increases in spending and reductions in taxes would need to be implemented as soon as possible. Much of the new spending was committed to infrastructure projects such as roads, highways, bridges, and sewer systems, items that could be built relatively quickly and would have positive long-run effects on the country's productive capacity. Most countries also implemented some policies designed to protect the most economically vulnerable of their citizens, including tax reductions for low-income individuals and extensions to unemployment-insurance programs.

D) In the covid-19 context, vaccination is critical for changing planned or desired production driven by a change in production profitability for any given amount of domestic real GDP. It allows people to work close to one another until the facility can be reopened and people can return to work. This implies that the availability of vaccination can contribute to the supply curve reverting to the right. While monetary and fiscal policies can dampen the aggregate demand shock, they are unable to shift the aggregate supply curve, which is crucial. Furthermore, by vaccinating

vulnerable segments of the population, consumers may gain confidence, and governments may relax longstanding restrictions on businesses and social gatherings. Businesses can support recovering consumer demand if they can operate at a higher capacity. As a result, it can be stated that vaccination is the single best policy to cure a pandemic recession.