

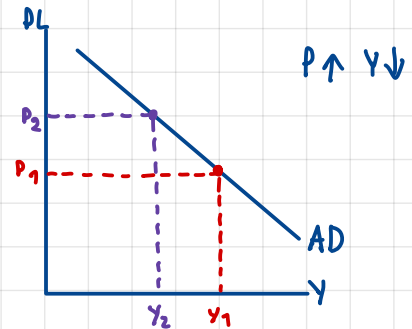
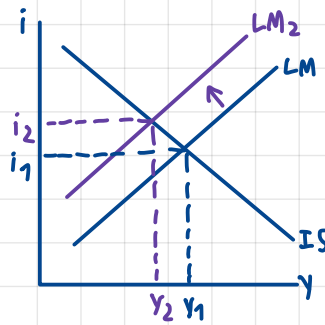
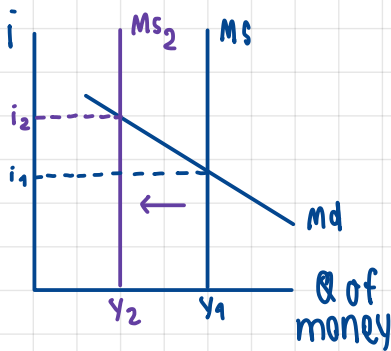
Exercise 7

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AD-AS Model

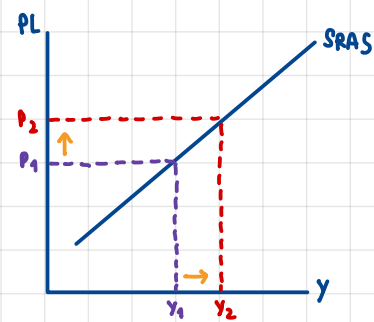
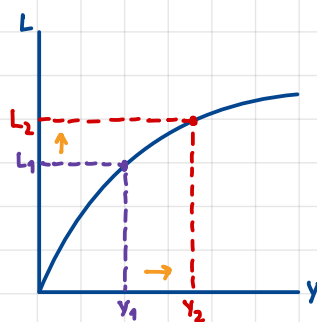
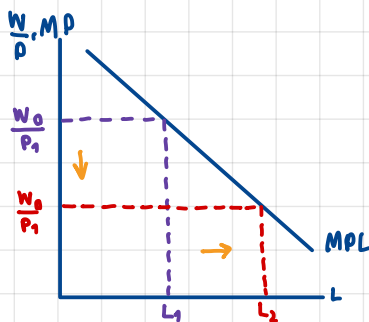
1. Explain why AD is downward-sloping (that is, how AD is derived), using the money market diagram and the IS-LM.



AD curve shows the negative relationship between price level (PL) and output or income (y). When the price increase, the money supply curve will increase (shift left) and makes higher on interest rate. Because of decreasing in money supply curve, making LM curve shift to the left at the point that higher interest rate and lower output. And then there is movement along the curve on AD curve because of shifting on LM curve by price factor. As a result, AD is downward sloping.

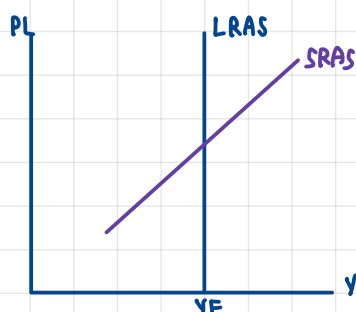
2. What is Sticky Wage Theory? Explain why SRAS is upward-sloping (that is, how SRAS is derived), using the sticky wage theory, labor demand diagram, and production function.

$$P \uparrow \rightarrow \frac{W}{P} \downarrow \rightarrow L_D \uparrow \rightarrow L \uparrow \rightarrow Y \uparrow$$



Sticky wage theory is the theory which economists believe that output is not at full-employment level. As you see in the labor demand diagram when price of goods & services increase the wage remains the same. Economists believe that the market will not adjust in quickly because of sticky wage. When the price increase, it means that the real wage will decrease because at the same wage we have less purchasing power. As a result of reducing in real wage, the firms will want to hire more labor. The amount of labor increase, so the output will increase. SRAS is upward-sloping because SRAS shows the positive relationship between price level (P) and output (y).

3. Explain why LRAS is vertical.



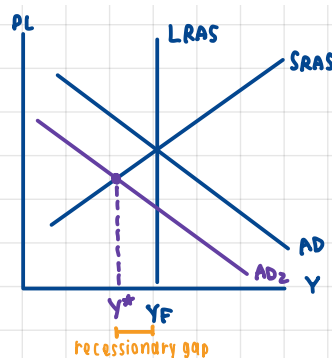
The economist believed that LRAS does not depend on price level. The output always stay at full employment point (Y_F) at any price level.

4. **Ceteris Paribus** (other things equal), how will each variable/event affect each curve – shift (to which direction?) or movement?

Variable/Event	AD	SRAS	LRAS
$P \uparrow$	movement	movement	movement
$G \downarrow$	shift left	no effect	no effect
$T \downarrow$	shift right	no effect	no effect
Autonomous $C \uparrow$	shift right	no effect	no effect
Autonomous $I \downarrow$	shift left	no effect	no effect
$M \downarrow$	shift left	no effect	no effect
$i \uparrow$	shift left	no effect	no effect
Temporary epidemic (assuming AD unchanged)	No effect	shift left	no effect
Permanent increase in population growth rate (assuming AD unchanged)	No effect	shift right	shift right
$W \uparrow$	no effect	shift left	no effect
Bad seasonal weather	no effect	shift left	shift left
Permanent loss in agricultural land due to climate change	no effect	shift left	shift left
Discovery of new technology	no effect	shift right	shift right
Short-term worker training	no effect	shift right	shift right
Permanent education reform	no effect	shift right	shift right

5. Suppose the economy faces a negative AD shock (e.g. loss in consumers' confidence).

- What output gap do we have? Draw the AD-AS diagram to show the output gap at the new short-run equilibrium.
- If the government wants to correct such output gap, what policies can it implement? Give examples.
- If there is no government intervention, explain with the AD-AS diagram how the economy will return to the long-run equilibrium.



• Negative AD shock makes the AD curve shift to the left. And then, the output (y) will decrease. So, we have a recessionary gap because of Negative AD shock.

• The government should use the expansionary fiscal or monetary policy. Because if the economy have a recessionary gap, it means that we have high unemployment and usually have deflation.

For example, we have deflation which is people don't use the money and also make less consumption in the economy. If we use the expansionary

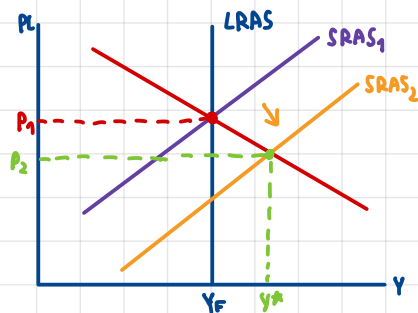
fiscal policy which makes government spending increase so that the consumption in the economy will increase.

• Shift SRAS to the right because when the AD curve shift to the left, it makes price level decrease. As a result, the firms will want to hire more labor so that the output will increase and turn back at long run equilibrium at lower price.

6. Suppose the economy faces a temporary, positive AS shock.

- Give one example of a temporary, positive AS shock.
- If there is no government intervention, explain with the AD-AS diagram how the economy will return to the long-run equilibrium.

- Good weather, short-term regulations change

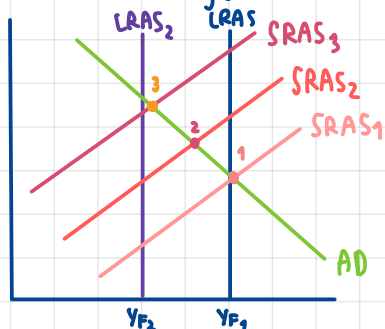


• The temporary positive AS shocks makes the SRAS curve shift to the right at the lower price and higher output. When the shock is gone, everything will return to original point.

7. Suppose the economy faces a permanent, negative AS shock.

- Give one example of a permanent, negative AS shock.
- If there is no government intervention, explain with the AD-AS diagram how the economy will return to the long-run equilibrium.

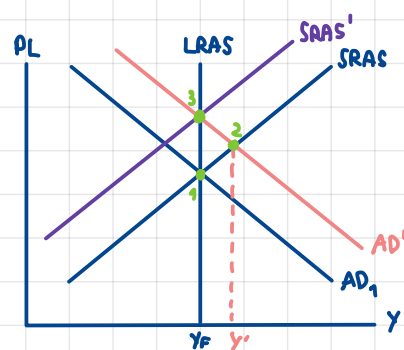
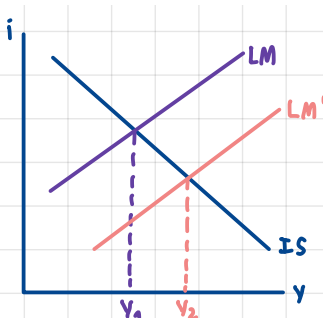
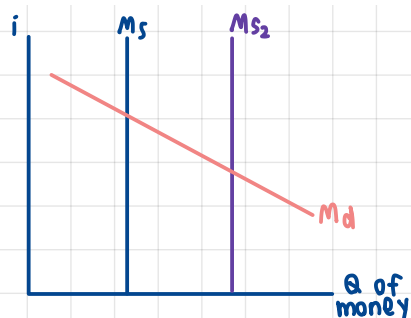
- change in amount of population



Because of a permanent negative AS shock make the LRAS and SRAS curve shift to the left and we have have SR Equilibrium at ②. As a result of permanent negative AS shock, the output (Y) we be permanently lower. So, we will get into the LR equilibrium at ③ at the lower Y and higher price level which makes an inflation.

8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?

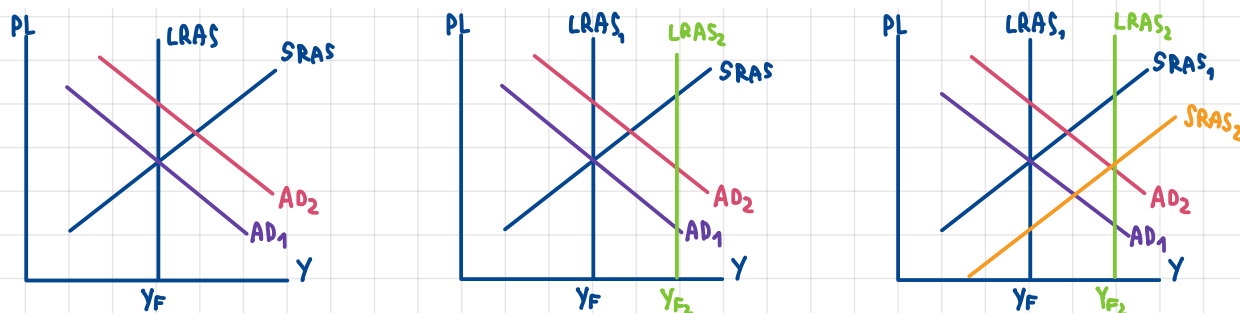
(Hint: When the central bank changes money supply, M, does this affect output in the long run, i.e. full-employment Y_F ?)



Suppose the central bank increase money supply, so the M_s curve will shift to the right at lower interest rate. In money market, the LM curve will shift to the right due to the money supply curve shift to the right and have lower interest rate. As a result the AD curve will shift to the right because LM curve shift to the right by non-price factors. AD will shift from AD_1 to AD_2 at short-run equilibrium. At point ②, we have higher price level so the firms will hire a labor more because they want to sell more output. This good for them cause the wage of labor is the same due to sticky wage in short-run. So, more labor makes less output Y_F will decrease to Y' on the other hand, in long-run wage is flexible so the labor will ask for higher wage so that the firms are not happy and they decide to fire a labor. Finally SRAS will shift left because less labor causing less supply and we will return to new LR equilibrium at point ③ with higher price level. The output will turn back from Y' to Y_F , so change in money supply does not affect the Y_F .

9. Based on Question 8 above, what can the government do to change output in the long run?

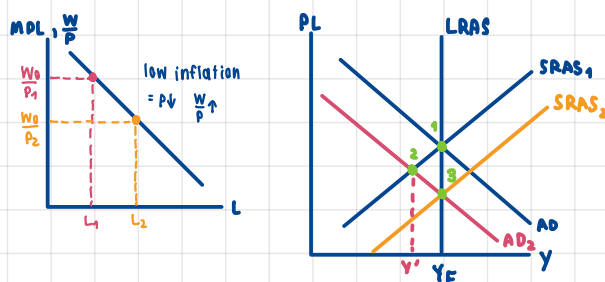
(Hint: Monetary and Fiscal Policies are demand-side policies, but do we have other alternatives?)



The government use expansionary fiscal policy to shift AD curve. AD curve will shift to the right from AD_1 to AD_2 by increasing govern spending which leads to the right in IS curve. All of this is the demand-side policy. So, when we want to change in supply-side, we will use supply-side policy which makes a change in productivity of labor. For in this case, if we have better in technology or labor have a good education. All of this reasons can lead to shift to the right in LRAS from $LRAS_1$ to $LRAS_2$. And, better in technology or education can make the SRAS increas as LAAS. So, the SRAS curve will shift to the right from $SRAS_1$ to $SRAS_2$.

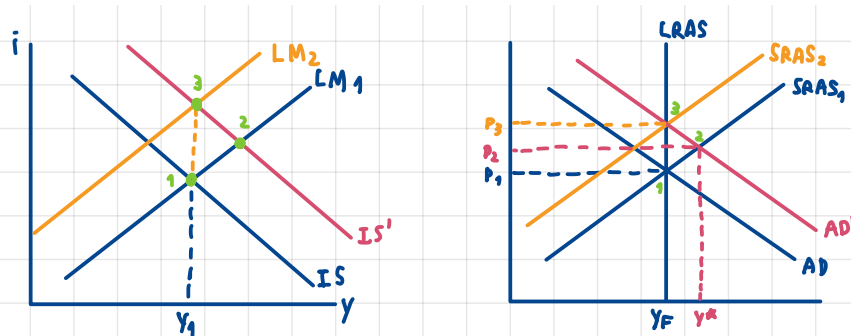
Finally, we will return to new long-run equilibrium at higher Y_F .

10. Economists usually have macroeconomic goals of low employment and low inflation. It is also believed that economists face the trade-off between these goals, especially in short run. Use relevant diagrams to explain the trade-off. Why does the trade-off no longer exist in long run?



When we have low inflation rate, it means that we have lower price level which makes the wage is more higher so that the firms do not want to hire labor anymore. So, the employment rate is low. The AD curve will shift to the left from AD_1 to AD_2 with lower P and Y . In short-run, it is true that low inflation leads to low employment. However, in the LR the wage is flexible so if we have lower price or low inflation which makes a lower in real wage. So, the firms will return to hire more labor which leads to higher in output Y . As a result, the SRAS will shift to the right from $SRAS_1$ to $SRAS_2$. Therefore, we will also return back to the new LR equilibrium at point ③ with lower price level. In conclusion, the trade-off is no longer exists in Long-run.

11. *** The IS-LM is for short-run analysis, while the AD-AS is for long-run analysis. Now, let's link them together. Suppose the government implements expansionary fiscal policy. Use the IS-LM and AD-AS models to show the policy effect in both short run and long run.
(Hint: In long run, what happens to P in the AD-AS model? How will this change in P affect the IS-LM model?)



The government use expansionary fiscal policy, so the IS curve will shift to the right due to higher government spending or lower tax. Now, we have higher interest rate and higher output (y) in IS-LM model. The shift in IS curve leads to shift in AD curve as well. So, in AD-AS model we will move from LRE at point ① to point ② with higher price level and higher output (y). However, in LR when we have higher price level which means higher wage because in LR wage is flexible and it depends on price level, the firms will hire less labor so the output (y) will decrease because SRAS shift to the left from $SRAS_1$ to $SRAS_2$ and output (y) return back from y^* to y_F . At new LRE point ③ the price level is higher so when the price level is higher, the M_s will decrease. Therefore the LM curve will shift to the left from LM_1 to LM_2 with the same amount of output (y) because we return back from point ② to ③ in IS-LM model.