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Exercise 7

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.

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.

3. Explain why LRAS is vertical.

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

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

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.

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.

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.

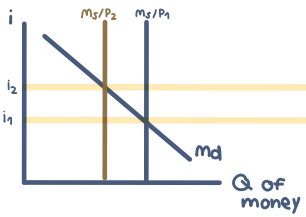
8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?
   (**Hint**: When the central bank changes money supply, M, does this affect output in the long run, i.e. full-employment Y?)

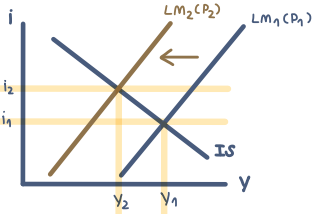
9. Based on Question 8 above, what can the government do to change output in the long run?
   (**Hint**: Monetary and Fiscal Policies are demand-side policies, but do we have other alternatives?)

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?

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?)

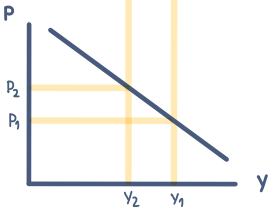
1. Explain why AD is downward-sloping (that is, how AD is derived), using the money market diagram and the IS-LM.



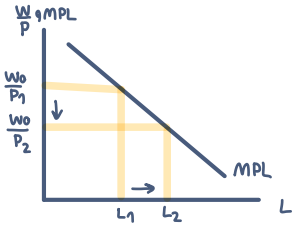


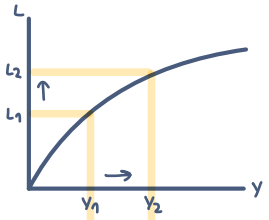
$P\uparrow \rightarrow M_S\downarrow \rightarrow i\uparrow \rightarrow I\downarrow \rightarrow AE\downarrow \rightarrow Y\downarrow$

AD is downward-sloping due to the "interest rate"



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.





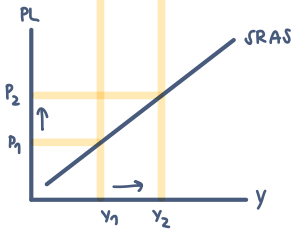
$P\uparrow \rightarrow \frac{W}{P}\downarrow \rightarrow L_D\uparrow \rightarrow L\uparrow \rightarrow Y\uparrow$

$P\uparrow \rightarrow Y\uparrow$

★ In SR, wage are fixed bic of labor contract ★

$\bar{w}$ fixed nominal wage

$\frac{\bar{W}}{P}$ real wage

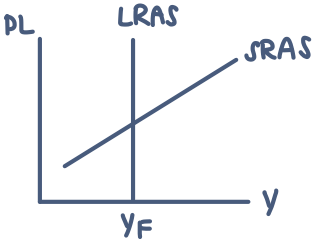


Why SRAS is upward-sloping bic $P\uparrow \rightarrow Y\uparrow$

$P\uparrow \rightarrow \frac{\bar{W}}{P}\downarrow$

- workers are not happy but cannot do anything bic of contract.
- firms are happy bic of lower cost of production (profit↑)
- ★ Firms will produce more (Y↑)

3. Explain why LRAS is vertical.



- LRAS doesn't depend on PL.
- Firms not hire additional labor so y remain the same.

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

Variable/Event	AD	SRAS	LRAS
P↑	movement	movement	movement
G↓	shift left	no effect	no effect
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Autonomous C↑	shift right	no effect	no effect
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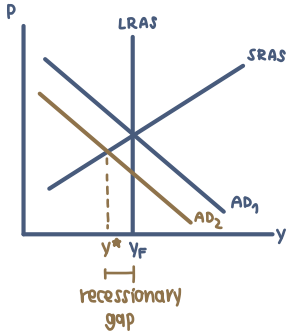
Short-term worker training	no effect	shift right	shift right
Permanent education reform	no effect	shift right	shift right

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 <u>with the AD-AS diagram</u> how the economy will return to the long-run equilibrium.

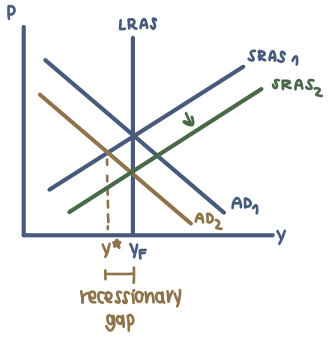


- Govt. have to use the expansionary fiscal policy or monetary policy ; Because if the econ. have recessionary gap, it means we have high unemployment and deflation.

  Ex: we have a deflation which ppl don't use money. If govt use the expansionary fiscal policy, the AE will be increase. Then, IS↑ and AD↑.

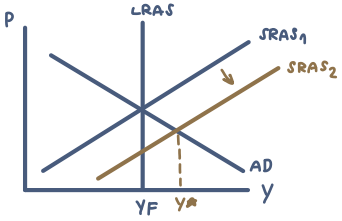
- If there is no govt. intervention, there will be self-correlation mechanism. In the long-run, nominal wager is flexible, unemploy workers willing to accept lower nominal wage. As a result, cost of production decreases. Thus, firms firms hire more and produce more at YF.

  SRAS will shift down



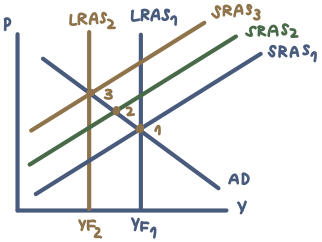
6. Suppose the economy faces a <u>temporary, positive</u> AS shock.
   - Give one example of a temporary, positive AS shock.
   - If there is no government intervention, explain <u>with the AD-AS diagram</u> how the economy will return to the long-run equilibrium.

Ex. Good weather, short-term regulation change.



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

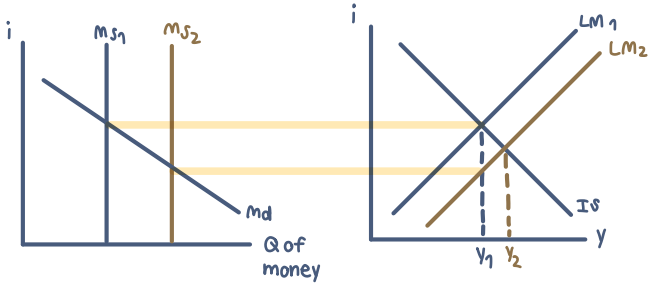
7. Suppose the economy faces a <u>permanent, negative</u> AS shock.
   - Give one example of a permanent, negative AS shock.
   - If there is no government intervention, explain <u>with the AD-AS diagram</u> how the economy will return to the long-run equilibrium.

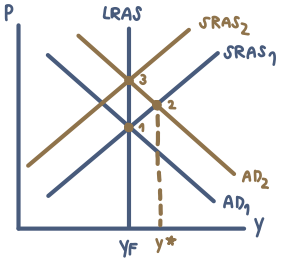


ex. change in amount of population, discovery of very large natural resources, Global warming

Permanent negative as shocks make the LRAS and SRAS curve shift to the left, so the econ. returns to long-run eqbm. with output permanently lower and inflation permanently higher.

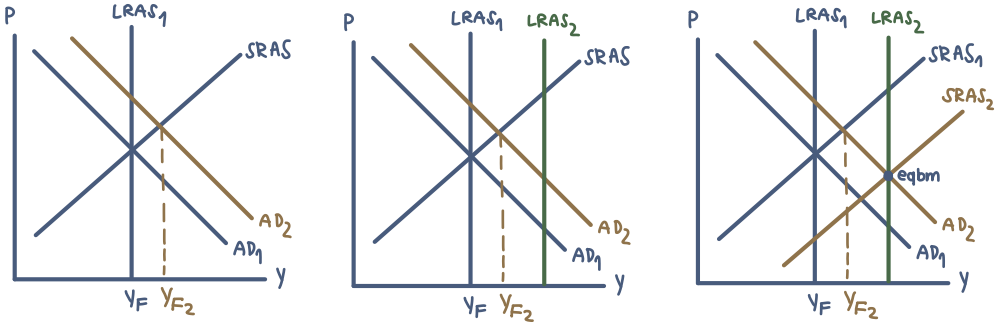
8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?
(**Hint**: When the central bank changes money supply, M, does this affect output in the long run, i.e. full-employment Y?)





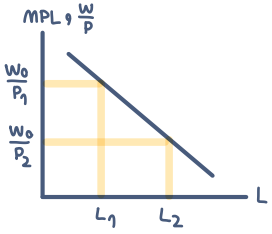
Suppose that CB increase money supply, so the M_S curve will shift to the right at lower i. In money market, LM curve shift to the right b/c of lower i. As a result AD curve shift to the right because LM-curve shift to the right is non-price factors. AD will shift from AD_1 to AD_2 at short-run eqbm. At point 2, we have higher price level, so the firms will hire more labor to produce and sell more output. This is good for them b/c the wage of labor is the same due to sticky wage in short-run. So, more labor make less output. Y_F will decrease to y'. On the other hand, in long-run wage is flexible, and labors will ask for higher wage so that the firms are not happy and they decide to fire labors. Finally, SRAS will shift to the left b/c less labor less labor causing less supply and we will return to new LRAS eqbm at point 3 with higher price level. The output will return from y* to Y_F, so change in M_S doesn't affect 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?)



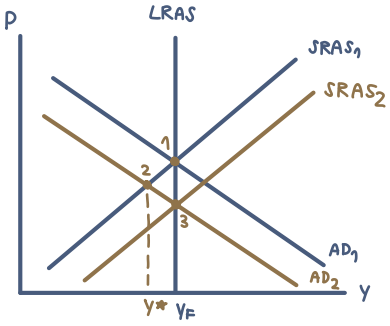
The govt. use expansionary fiscal policy to shift AD curve, AD curve will shift to the right from AD_1 to AD_2 by increasing the govt spending (G) which lead to shift to the right in Is curve. All of this is demand-side policy, So, when we want to change in supply side policy which make a change in productivity of labor, In this case, if we have a better in technology or labor have a good education, All of these reason can lead to shift right in $LRAS_1$ to $LRAS_2$, and better in technology or eduction can make the $SRAS_1$ to $SRAS_2$, Finally we will return to new long-run eqbm. 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?



low inflation

P↓, L↑



When we have low inflation rate, it means that we have lower price level which make wage is more higher, so firms will fire the labor. Therefore, 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 LR wage is flexible, If we have low price level or low inflation which makes a lower in real wage, the firms will return to hire more labor which leads to higher 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 eqbm. at point 3 with lower price level. In conclusion, the trade-off is no longer exist 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.
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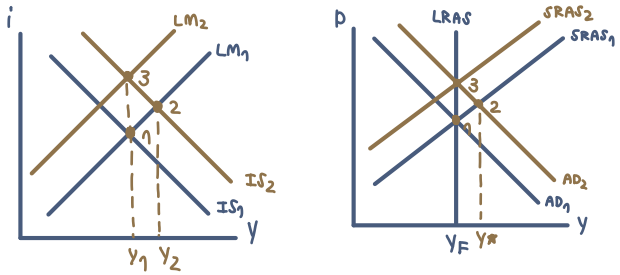

The govt. use expansionary fiscal policy, so the IS curve will shift to the right due to higher govt. spending or lower tax. Now, we have higher i and higher output(y) in IS-LM model. The shift of IS curve leads to the shift of AD curve, The AD curve will shift to the right from point 1 to 2 because of higher price level and output. However, in LR when we have higher price level which mean lower real wage. The firms will hire more labor so the output (y) will increase. But in long-run, labor will ask for higher wage, so the firms not happy and fire the labors and y* return to y_F. As a result, decrease labor leads to lower output, so LM return back from point 2-3 in IS-LM model.