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.

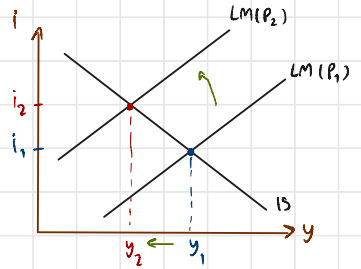
8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?
   (**Hint**: When the central bank changes money supply, M, does this affect output in the long run, i.e. full-employment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

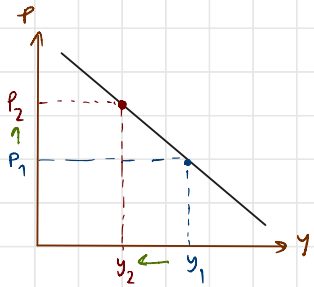
10. Economists usually have macroeconomic goals of low employment and low inflation. It is also believed that economists face the trade-off between these goals, especially in short run. Use relevant diagrams to explain the trade-off. Why does the trade-off no longer exist in long run?

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.



(The IS-LM Model)



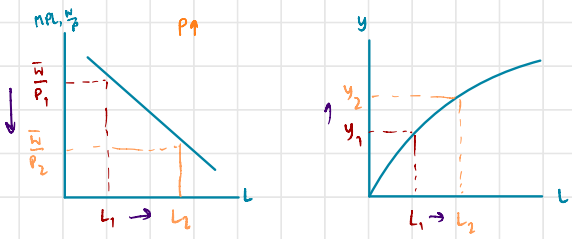
(The Aggregate Demand Curve)

① higher price level (P) shifts the LM curve upward → interest rate ↑ → I ↓ → AE ↓ → Y ↓

② slope of AD show relationship between P, Y

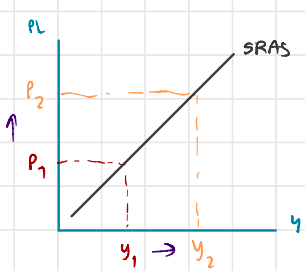
$[P_1 \to P_2] \to [Y_1 \to Y_2]$ downward b/c price level increase, output decrease

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↑ → Y↑

* in short-run nominal wage is sticky b/c of labor contract ($\frac{W}{P}$ real wage)



P↑ → $\frac{W}{P}$ ↓

- workers are not happy but cannot do anything b/c contracts
- firms are happy b/c lower cost of production (profit↑)

→ firms will produce more (Y↑)

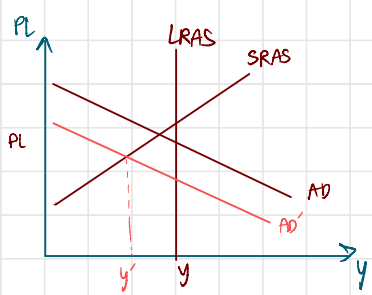
3. Explain why LRAS is vertical.

LRAS dose not depend on Price, and hence 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↑	movement	movement	–
G↓	shift left	–	–
T↓	shift right	–	–
Autonomous C↑	shift right	–	–
Autonomous I↓	shift right	–	–
M↓	shift left	shift left	–
i↑	movement	movement	movement
Temporary epidemic (assuming AD unchanged)	No effect	shift left	–
Permanent increase in population growth rate (assuming AD unchanged)	No effect	shift right	shift right
W↑	–	movement	movement
Bad seasonal weather	–	shift left	–
Permanent loss in agricultural land due to climate change	–	shift left	shift left
Discovery of new technology	–	shift right	shift right
Short-term worker training	–	shift left	–
Permanent education reform	–	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.



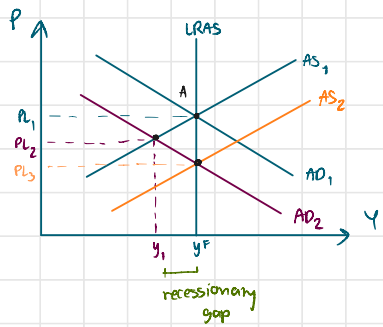
$y_f > y_E$

recessionary gap

- If the government wants to correct such output gap, what policies can it implement? Give examples.

The government can also use fiscal & monetary policy (to shift AD) to return the economy to the LRE

- If there is no government intervention, explain <u>with the AD-AS diagram</u> how the economy will return to the long-run equilibrium.



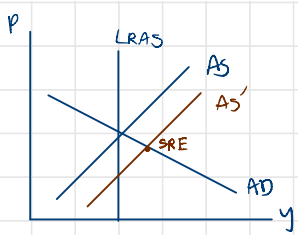
firm hire less → fall in AD ($AD_1 \rightarrow AD_2$)
real wage increase (PL↑)
→ cost of hiring increase, so they hire less

in the long run (nominal wage is flexible)
→ cost of production decrease
firms hire more labor → produce more

6. Suppose the economy faces a <u>temporary, positive</u> AS shock.
   - Give one example of a temporary, positive AS shock.

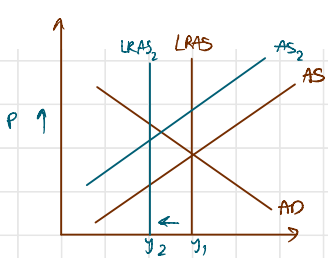
good weather

   - If there is no government intervention, explain <u>with the AD-AS diagram</u> how the economy will return to the long-run equilibrium.



Temporary AS shocks shift SRAS
Afterwards, the shocks disappear
and the SRAS move back to its original

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



① Permanent, negative shifted the LRAS leftward
And AS curve upward

② So the economy returns to long-run equilibrium with output lower and inflation higher

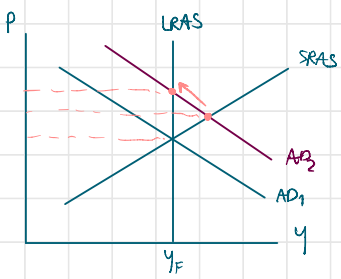
8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?
(**Hint**: When the central bank changes money supply, M, does this affect output in the long run, i.e. full-employment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

Yes, because in Long run the economy will move back to LRE there will be no output gap

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?)

Using supply-side policies to shift the AS.

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 aggregate demand is higher where it is short run equilibrium that is low unemployment rate but the price level is high. Hence inflation.
in short run wage are sticky due to labor contract then labor will ask for more wage firm will reduce production (less aggregate supply) → it will reach LRAS which is new long run equilibrium. So there no inflation and trade-off no longer exist

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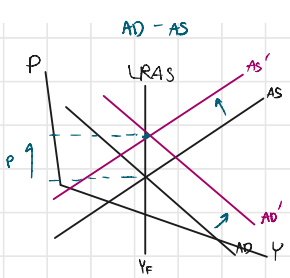
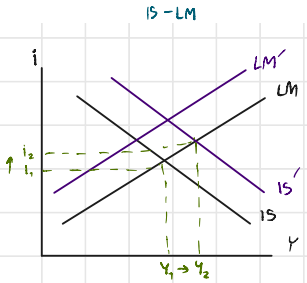
(**Hint**: In long run, what happens to P in the AD-AS model? How will this change in P affect the IS-LM model?)





- when government use expansionary fiscal policy, the IS curve and AD curve will shift rightward

- in long run, with higher cost of living, the wage will be increase and production will decrease, so SRAS shift leftward toward new LRE with higher P

- it will affect money supply, AS curve shift rightward → make LM curve shift rightward in long run.