

Exercise 7

AD-AS Model

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

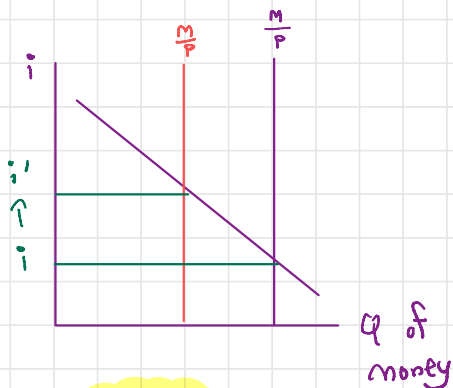
Variable/Event	AD	SRAS	LRAS
$P \uparrow$	movement	—	—
$G \downarrow$	shift-left	—	—
$T \downarrow$	shift-right	—	—
Autonomous $C \uparrow$	shift-right	—	—
Autonomous $I \downarrow$	shift-left	—	—
$M \downarrow$	shift-left	—	—
$i \uparrow$	shift-left	—	—
Temporary epidemic (assuming AD unchanged)	No effect	shift-left	—
Permanent increase in population growth rate (assuming AD unchanged)	No effect	shift-right	shift right
$W \uparrow$	—	shift-left	—
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-right	—
Permanent education reform	—	—	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.

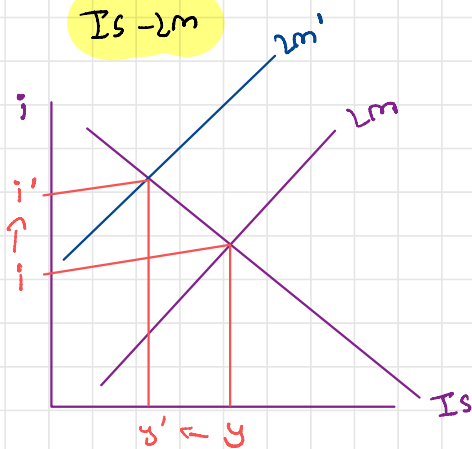
1. Explain why AD is downward-sloping (that is, how AD is derived), using the money market diagram and the IS-LM.

As $P \uparrow \rightarrow Y \downarrow$

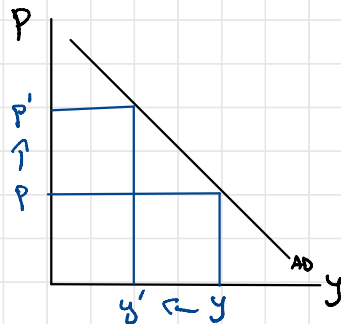
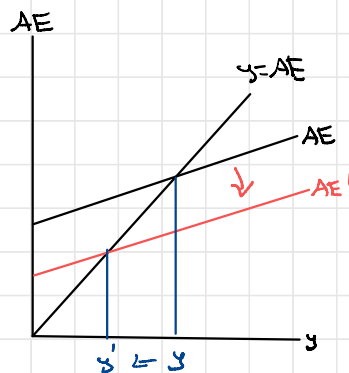
Money market $\rightarrow P \uparrow \rightarrow m_s \downarrow$



IS-LM



Gross market



LM: Shift left
IS: movement

As $P \uparrow$

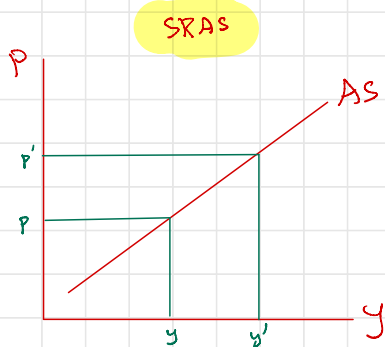
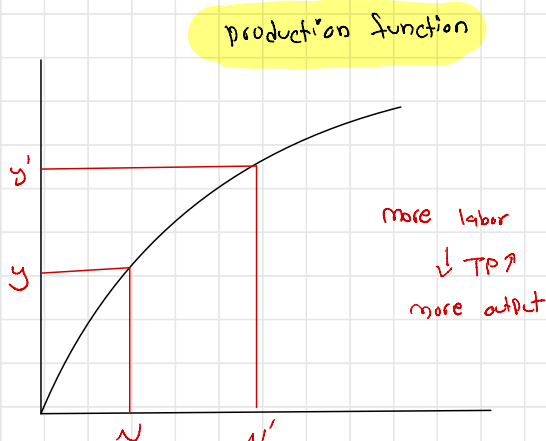
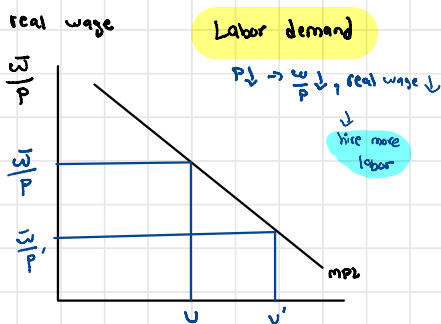
mm: $P \uparrow \rightarrow m_s \downarrow \rightarrow i \uparrow$

gm: $i \uparrow \rightarrow I \downarrow \rightarrow Y \downarrow$

Due to the $P \uparrow \rightarrow Y \downarrow$



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.



From the diagram when $P \uparrow$ the real wage $\downarrow$ due to $\frac{\bar{w}}{P} \downarrow$ which is the labor contract

which means the wages are fixed. That means the real wage that firm pay for labor decrease, so firm hire more labor. when firm hire more labor the total product increase that means output increase.

★ in SR,
wages are fixed
because of
labor contract.

∴ positive relationship between P and y

$P \uparrow \rightarrow y \uparrow$

In SR, nominal
wage is sticky

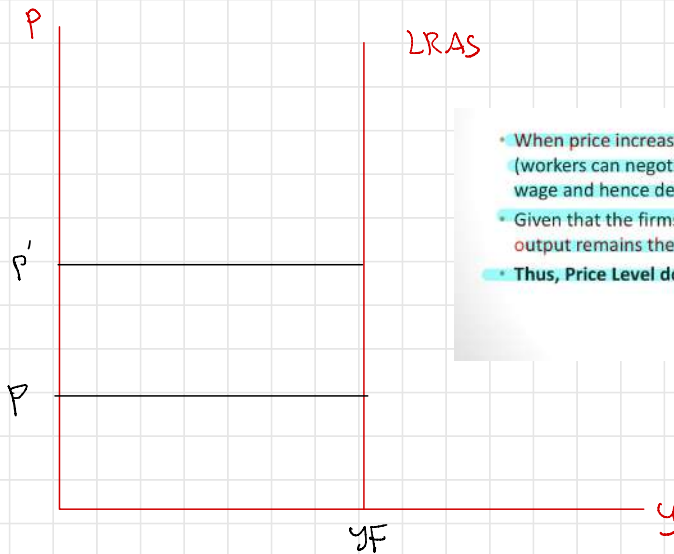
$P \uparrow \rightarrow \frac{\bar{w}}{P} \downarrow$ (real wage $\downarrow$)

workers are not happy but cannot do anything b/c of contract.

firms are happy because of lower cost of production (profit will increase)

∴ firm will produce more ($y \uparrow$)

3. Explain why LRAS is vertical.



- When price increases, nominal wage also increases (workers can negotiate for higher wages), leaving the real wage and hence demand for labor unchanged.
- Given that the firms do not hire additional labor, the output remains the same.
- Thus, Price Level does not affect Output.

LRAS is vertical

For example

In Long-run wage is flexible that means it can adjust and it is not sticky. when $P \uparrow \rightarrow w \uparrow$ follow, so real wage is unchanged. when real wage is unchanged output is still the same that means Y is unchanged.

In Long-run: As $P \uparrow$ Y stays the same due to total product, real wage is unchanged.

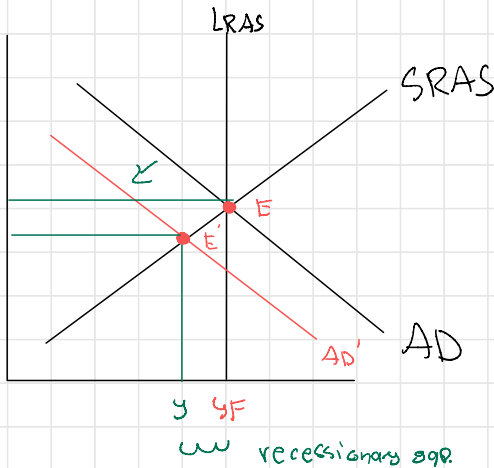
when price level go up, worker are going to ask for higher wage.
(real wage unchanged)

$$\begin{aligned} w_1 &= 100 \\ P_1 &= 1 \\ &= \\ w_2 &= \frac{200}{2} = 100 \\ P_2 &= 2 \end{aligned}$$

$$\text{real wage} = \frac{w}{P}$$

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.



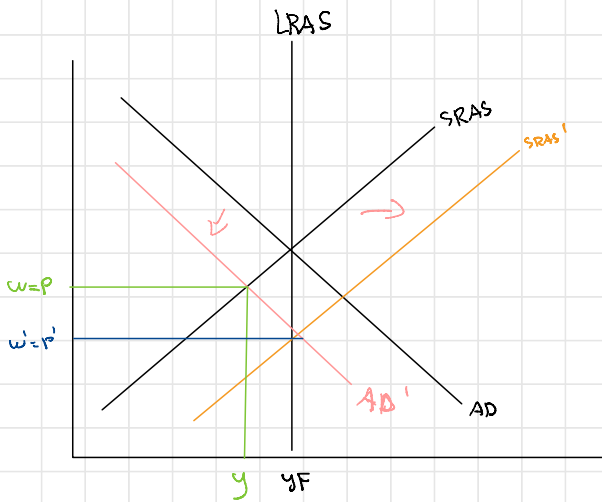
Due to the economy losing consumers confidence that is negative demand shock that make AD shift left so E move from E to E' that is lower P and Y .

After E change Y is lower that cause recessionary gap which is $Y < Y_F$ in SR.

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

Government need to use fiscal policy to boost consumers confidence to spend from this policy, AD will shift right to the normal E as before which is Y increase to Y_F .

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

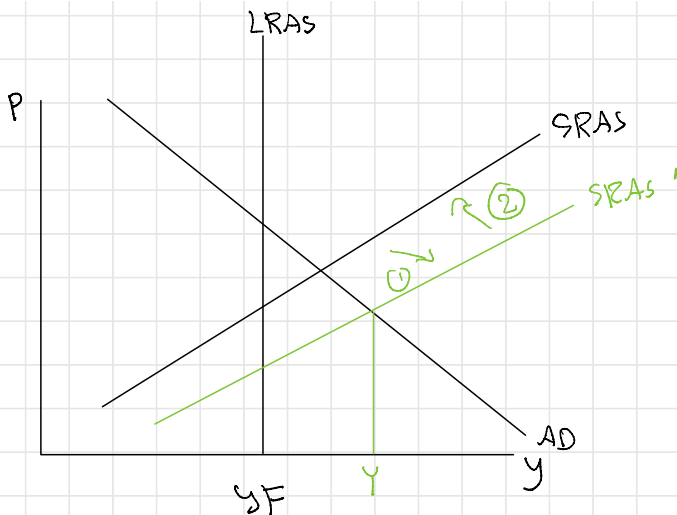


without intervention the economy will slowly
 adjust by itself due to the long-run,
 wage is flexible and now economy
 is produce at $y < Y_F$ and
 $U > U_n$

So the firm need to lower wage follow P
 to increase production to Y_F and hire more
 labor to capture maximizing profit.

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

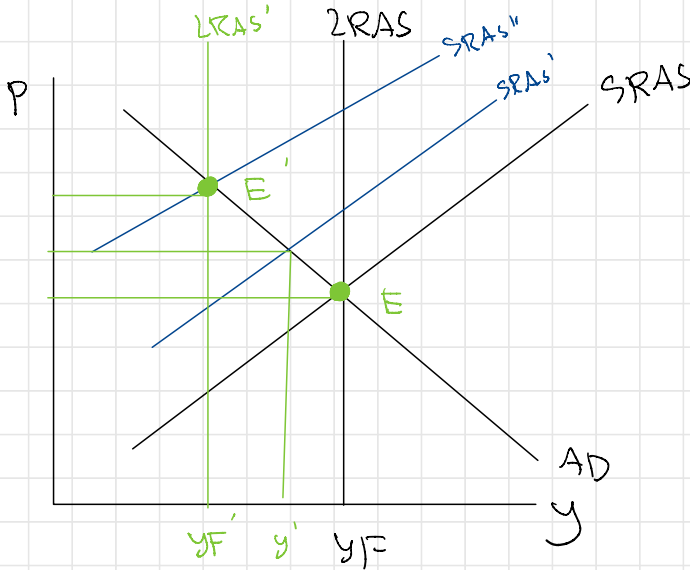
- Give one example of a temporary, positive AS shock.
- If there is no government intervention, explain with the AD-AS diagram how the economy will return to the long-run equilibrium.



- Temporary positive AS shock $\rightarrow$ SRAS shift right
Such as government reduce company tax 1 year
that is an temporary positive policy that make
 Y increase from Y_F to Y
- If there is nothing change after 1 year
the $SRAS'$ will shift back to $SRAS$ by itself
due to it is temporary policy is no longer use
So, output move from Y to Y_F .

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.



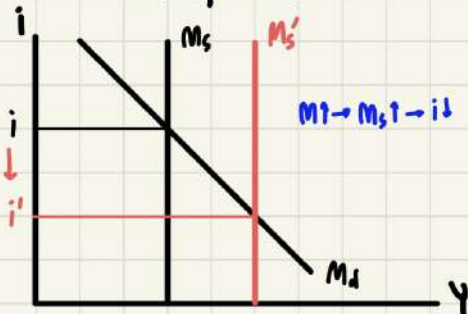
- Gasoline gone from the world that is the negative permanent shock due to the production line need to use it, so, SRAS shift left.

- If government didn't intervene some policy and let it go, the SRAS will still shift left and LRAS will shift left follow to make new E from E to E' which higher inflation and low y_F .

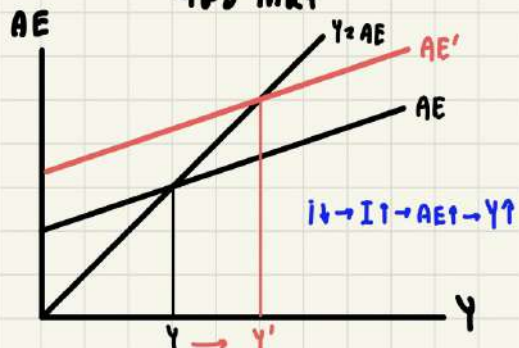
8. In macroeconomics, **Money Neutrality** is the idea that a change in the stock of money (M) does not affect real variables, like employment and real GDP. Is this true in the AD-AS model?

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

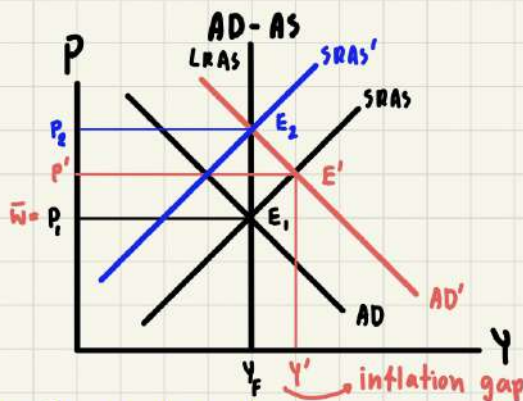
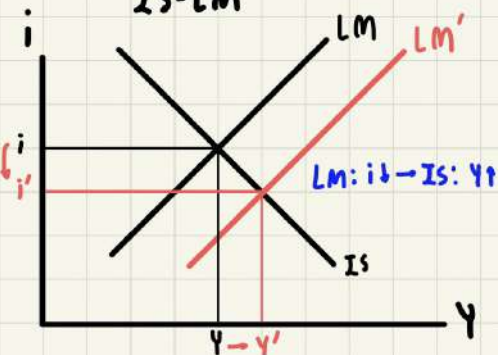
Money Mkt



GBS Mkt



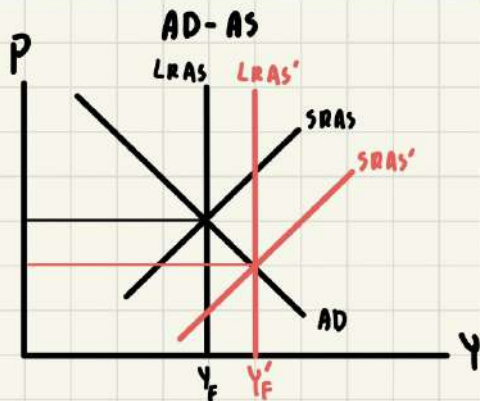
IS-LM



- MM, $M \uparrow$ that make $M_s \uparrow$ follow then the interest rate decrease
 GM, when $i \downarrow$ that make $I \uparrow$ so $AE \uparrow$ finally output increase ($Y \uparrow$)
 IS-LM, Due to $i \downarrow$ from MM that make LM shift right then $Y \uparrow$
- Due to LM shift right but P still constant, so, AD shift right, SRE at E'
 In short-run wage is sticky that mean firm pay wage at $\bar{w}$ but P_1 to P'
 that mean real wage falls, firm hire more labor from Y_F to Y'
 At E' output is over Y_F ($Y > Y_F$) that inflation gap occurred at E'
- In long-run wage is flexible that make firm need to pay higher wage than SR
 when w is the production cost is higher, so, firm lay-off some labor and
 output are slowly decrease from Y' to Y_F (inflation gap gone)
 When labor decrease mean $SRAS$ slowly shift left till E_2 that $Y = Y_F$ and $P \uparrow$ to P_2

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

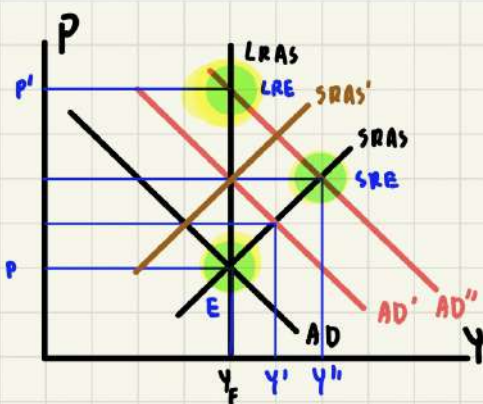
(Hint: Monetary and Fiscal Policies are demand-side policies, but do we have other alternatives?)



In long-run if the government want to increase output, they can use supply-side policy to boost output by the quality of factor production such as education due to it will improve quality and quantity of F&P to be more productivity that make labor can produce more output

For the whole economy price level will decrease and Y will increase.

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?



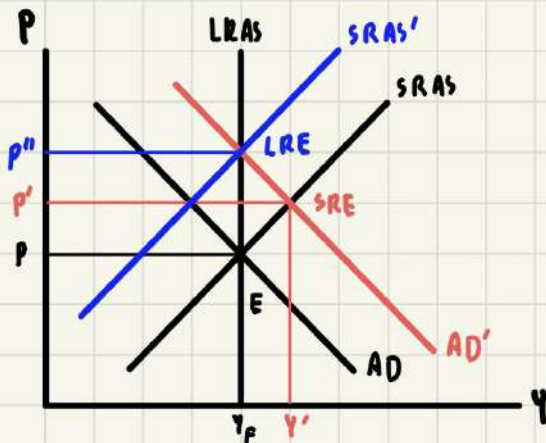
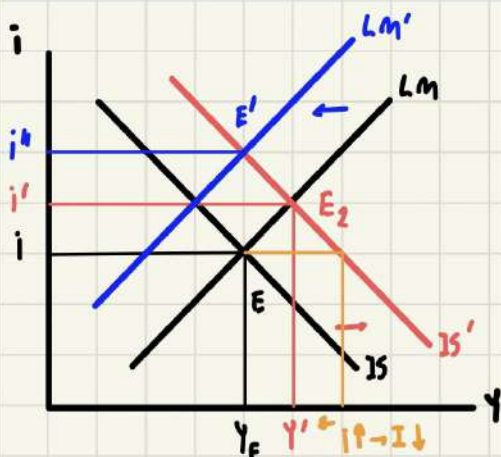
In short-run when AD ↑ that cause SRE is higher price level (inflation) and higher output (employment) because wage is fixed that mean real wage that firm pay for workers decrease then firm can hire more workers due to real wage ↓

From the situation we can see that economic growth by increase demand of people are trade-off with goal of economists

In long-run wage is flexible that mean firm need to pay higher wage for workers following the price level, as a result firm can't hire more labor due to the real wage is same as before, So, firm can produce output at the same rate as usual at Y_F and price level increase to P'

- 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?)

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?)



Let say government increase spending (expansionary fiscal policy) that shift IS curve due to $G \uparrow$ also AD shift right due to $G \uparrow$

In short-run, At SRE, Price level are increase due to fix wage firm can produce more with lower cost of production that make $Y \uparrow$
At E_2 , interest rate is higher that reduce investment abit so, Y at Y' but for the overview output is increase

In long-run, when $P \uparrow$ that affect to MM which is $\frac{M}{P}$ or $M_s \downarrow$
So, LM shift left that cause higher interest rate and output decrease

Also long-run wage is flexible, as $P \uparrow$ wage also increase that cause production cost increase too which make SRAS shift left

When SRAS shift left to LRE, output decrease back to Y_F but P is increase

Conclude

In short-run, output increase due to $G \uparrow$ (E_2 and SRE)

In long-run, due to the $P \uparrow$, it that reduce the output, so, Y stay the same at Y_F