TA note 10 - May 3rd

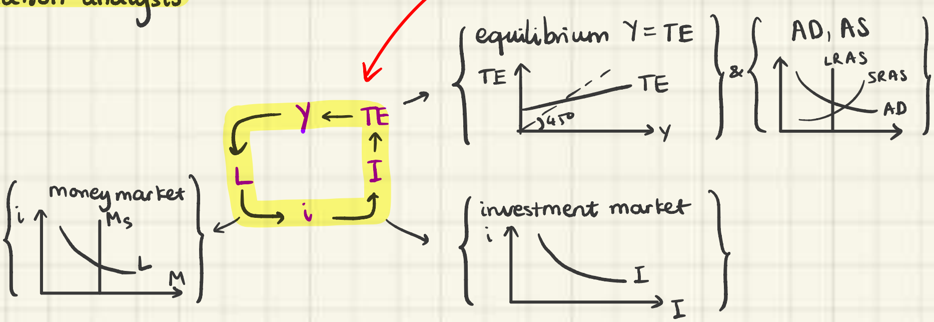
Misc | Final : Cummulative , heavy emphasis on materials after Prelim 2
Note : Always get the most updated TA notes (I corrected some notes)

Quiz | Answer for quiz 3 attached at the end.

Today | Section 3 (application) has important info.

1 Circulation analysis

expanded ver!! You should use Terry's L ← Y ← I, ↓ i ↗ in exam!



The impact of a policy takes many round across this circle. It's important to know where it starts.

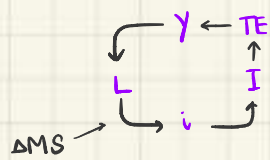
I'll give some example to some fiscal policies (ΔG, ΔLST, Δt, ΔTR) and to monetary policy (ΔMs).

Example :

eg1: Change in Money supply (last TA note)

Where does it starts ?

(The 1st thing affected is i)



⇒ The flow is thus:

outcome for short-run

$\Delta MS \to i \to I \to TE \to Y^*$

We often stop here

$\to L \to i \to TE \to Y$

$\to L \to \dots$

Overall:

$M_s\uparrow \to i\downarrow \to I\uparrow \to TE\uparrow \to Y\uparrow \to L\uparrow \to i\uparrow \to I\downarrow \to TE\downarrow \to Y\downarrow$ $(Y\uparrow)$

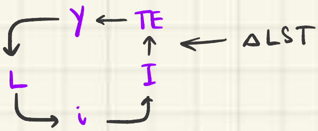
Note: $Y\downarrow$ in round 2 is not enough to offset $Y\uparrow$ earlier.

$M_s\downarrow \to i\uparrow \to I\downarrow \to TE\downarrow \to Y\downarrow \to L\downarrow \to i\downarrow \to I\uparrow \to TE\uparrow \to Y\uparrow$ (SOTO $Y\downarrow$) $(Y\downarrow)$

eg2: Change in LST

Where does it start?

(1st thing affected is TE)



The flow is thus:

$\Delta LST \to TE \to Y$

$\to L \to i \to I \to TE \to Y$

Overall:

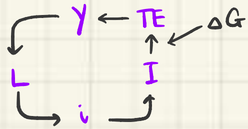
$LST\uparrow \to TE\downarrow \to Y\downarrow \to L\downarrow \to i\downarrow \to I\uparrow \to TE\uparrow \to Y\uparrow$ (SOTO $Y\downarrow$) $(Y\downarrow)$

$LST\downarrow \to TE\uparrow \to Y\uparrow \to L\uparrow \to i\uparrow \to I\downarrow \to TE\downarrow \to Y\downarrow$ (SOTO $Y\uparrow$) $(Y\uparrow)$

eg3: Change in Gov's spending

Start where?

(1st thing affected is TE)



Thus, the flow should look like this:

$\Delta G \to TE \to Y$

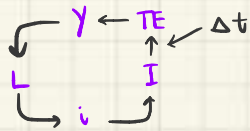
$\to L \to i \to I \to TE \to Y$

Overall:

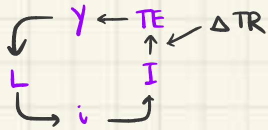
$G\uparrow \to TE\uparrow \to Y\uparrow \to L\uparrow \to i\uparrow \to I\downarrow \to TE\downarrow \to Y\downarrow$ (SOTO $Y\uparrow$) $(Y\uparrow)$

$G\downarrow \to$ ... (just reverse the signs from above) $(Y\downarrow)$

eg 4 : Change in t (Direction similar to LST)

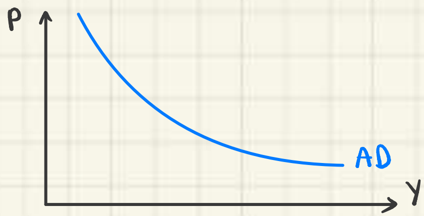


eg5 : Change in TR (Direction similar to G)



2. New graph: AD – AS graph

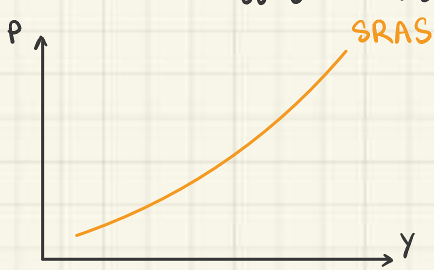
- Purpose: Showing how price level changes when something else in the market changes.
- Demand side: Aggregate demand



→ AD downward sloping because lower prices → more output being purchased

AD shifts when we directly adjust something besides price P, such as ΔLST, ΔG, Δt, ΔI, ΔTR, ...

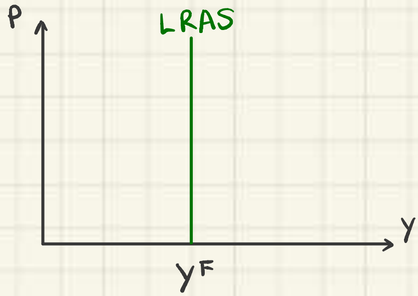
- Supply side: Short-run aggregate supply



→ SRAS upward-sloping because of sticky wage, ... (cheaper to produce → I'll produce more if Price ↑)

SRAS shifts when we change expectation, factor prices (inputs like labor or intermediate goods, etc.), ...

- Supply side: Long-run aggregate supply

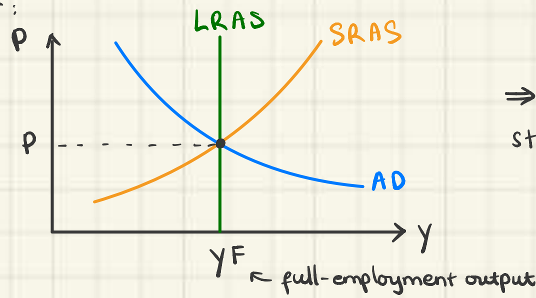


→ LRAS is vertical because an increase in price is eventually caught up by wage increase → firms'll just produce the same Y regardless of P in the long run

LRAS does not shift in the scope of our class (up until today)

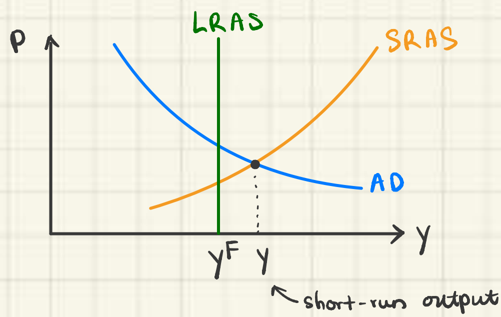
- All together:

If:



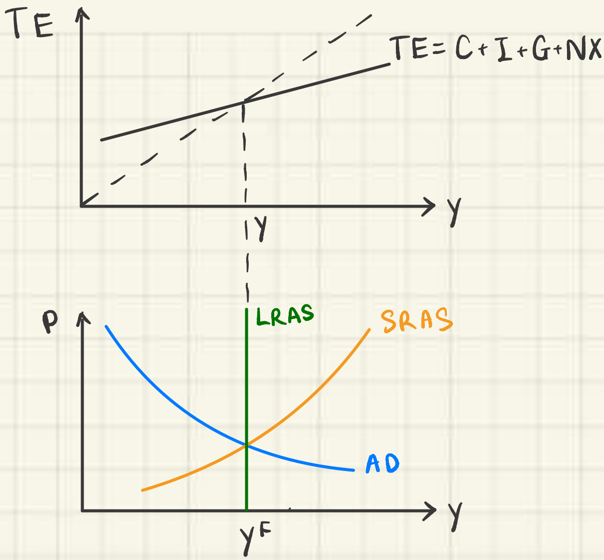
⇒ Nice! Economy stays where it's at!

If:



⇒ Not so nice! Economy'll adjust until Y goes back to Y^F, either thru shifting AD or SRAS.

- We normally put it underneath the Y = TE graph because they have the same horizontal axis. Normally corresponds to where AD cuts SRAS.

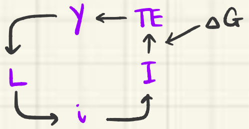


3. Application : An example

Assume we are initially at full-employment Y^F.
(The economy will look like the above graph)
Now, the gov decides to increase spending ($G\uparrow$). What'll happen in 1st period vs in the long run?

Part 1. Showing the early effect on Y ($\Delta G^{\uparrow} \rightarrow \dots \rightarrow Y$?)

We know from the circulation diagram (eg 3 from section 1) :



$\Rightarrow$ $\boxed{\begin{array}{l} \Delta G^{\uparrow} \rightarrow TE^{\uparrow} \rightarrow Y^{\uparrow} \rightarrow L^{\uparrow} \rightarrow i^{\uparrow} \rightarrow I^{\downarrow} \rightarrow TE^{\downarrow} \rightarrow Y^{\downarrow} \text{ (SOTO } Y^{\uparrow}\text{)} \\ \text{Overall, in the short-run, } Y\uparrow \end{array}}$

Graphical illustration (next page)

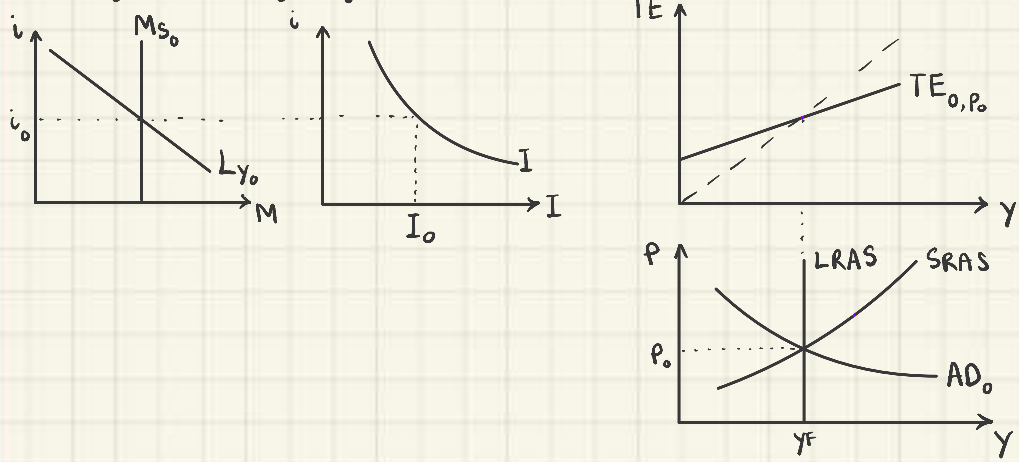
- Initial level : subscript 0
- Middle steps : subscript $0'$
- Final (short-run level) : subscript $0''$

} You can choose different numbers, as long as steps are clear

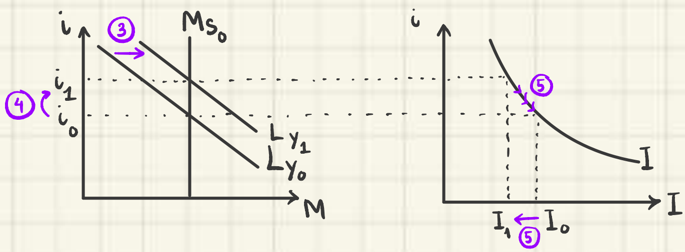
(I'll enumerate the steps on the graph)

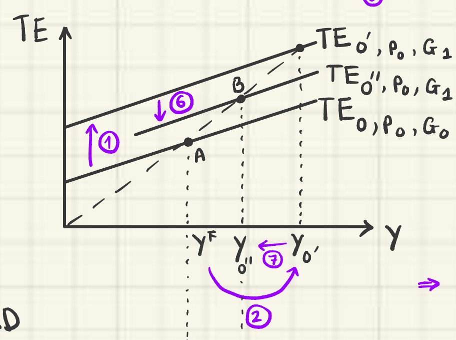
(Normally put these underneath, I'm just saving space here)

• Initially, before anything happen:



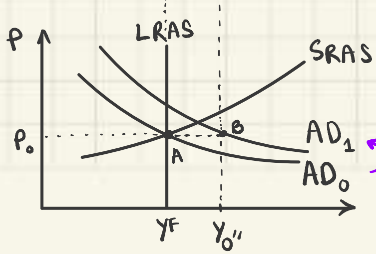
• When $\Delta G\uparrow \xrightarrow{①} TE\uparrow \xrightarrow{②} Y\uparrow \xrightarrow{③} L\uparrow \xrightarrow{④} i\uparrow \xrightarrow{⑤} I\downarrow \xrightarrow{⑥} TE\downarrow \xrightarrow{⑦} Y\downarrow$ (SOTO $Y\uparrow$)





⇒ $Y\uparrow$ (from YF to $Y_{0''}$)

• Mapping to AS-AD



(due to TE_0 goes up to $TE_{0''}$)

Part 2. Showing the change in P, using TE and AS-AD graph

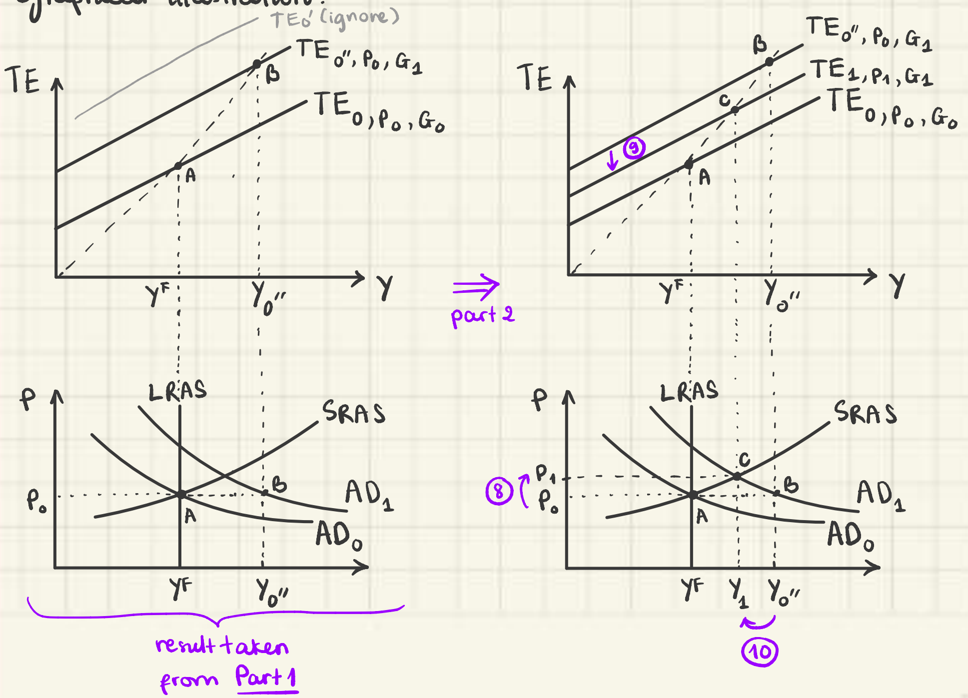
After Y↑ (from Y^F to Y_0'') in step 1, what happens next?

Narrative:

$Y\uparrow \rightarrow P\uparrow \rightarrow TE\downarrow \rightarrow Y\downarrow$

8. As Y increases, there are increases in production costs for businesses (because output is above Y^F), which leads them to raise prices, which leads to an increase in price level, P.
9. As P increases, TE falls due to
   a) Purchasing Power Effect: P↑ → Value of money↓ → Value of wealth in money form↓ → C↓
   b) Interest rate effect: P↑ → value of money↓ → demand for transactional money (L)↑ → i↑ → I↓
   c) International Trade effect: P↑ → Competitiveness of domestic goods↓ → Imports↑ & Exports↓ → NX↓
10. As TE falls, Y falls. We arrive at point C (P_1 vs Y_1)

Graphical illustration:

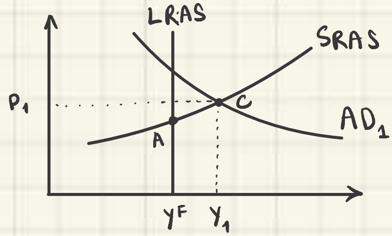


* After Part 1, Part 2 happened. In the end, we have illustrated the 1st period (short-run) effect of a change in $G\uparrow$, which is:

$Y\uparrow$ (from $Y^F \to Y_1$)
$P\uparrow$ (from $P_0 \to P_1$)

Part 3 Long-run effect: Using AS-AD graph

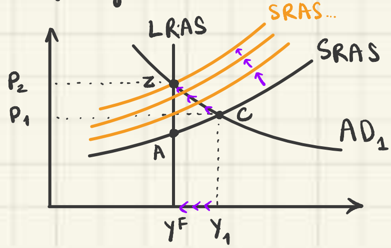
In the short-run, we have shown that $Y^F \to Y_1$.



result taken from part 2.

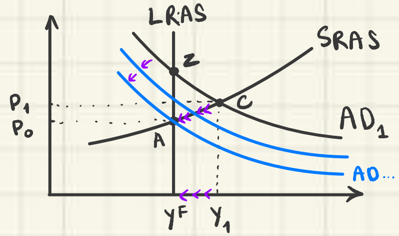
Since $Y_1 > Y_F$, we are having an inflationary gap, which means the economy will (theoretically) adjust itself back to Y^F in the long run. But how? There are 2 ways:

* Shifting SRAS through Self-adjustment:
  The economy is currently exceeding its full-employment level, thus workers are in demand. Also, seeing that price $P\uparrow$, workers know that their current real wage is too low to keep up with how expensive the economy is. Thus, they have the leverage & the will to reach higher wage. As a result, production is more expensive → shifting SRAS back & back until crossing AD at Y^F (point Z)



* Shifting AD through government policies:

To shift AD back (since we're now exceeding Y^F and the economy needs to calm down), gov can use contractionary policies. Gov could shift AD back & back until AD cuts SRAS at Y^F (point A)



Conclusion

In the short-run, a positive AD or AS shock (above is positive AD shock, as AD_0 shifts right to AD_1 when G↑) only gives you a temporary boost in output. Eventually, economy will shifts back to Y^F in the long-run.

For negative AD or AS shock: back to Y^F in long-run.

Section 12 supplement

The expectation framework

- Old Phillips curve in class: higher inflation → lower u → higher output

  ⇒ positive correlation between π and Y
- Consistent with UK 1950 - 1960 data.
- But: US data says otherwise

Why? Misconception theory!

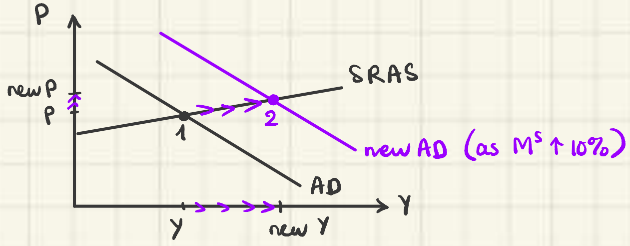
→ Phillips curve only work with higher unexpected inflation

→ Given flexible prices, some of government policies work only when inflation is unexpected.

① Intuition - examples

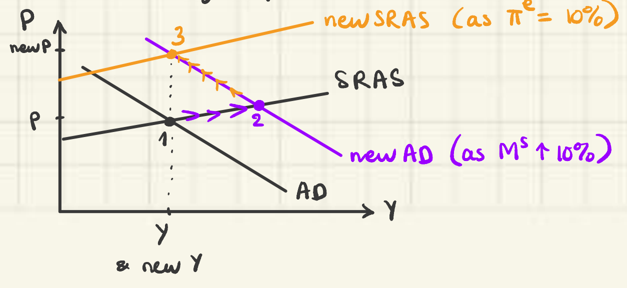
Case 1: When prices are sticky (old framework that we've been working with so far)

If the government prints more money (says 10%), and prices are sticky, this means in the short run, real M^s ↑ and MP shifts right, so AD shifts right, increasing both price level and output → consistent with the old Phillips curve in class



Case 2: When prices are flexible, and people have a correct expectation on inflation (new framework on Monday)

Same policy, but people also expect $\pi^e = 10\%$, so they raise all prices by 10% rightaway (SRAS also shifts up)

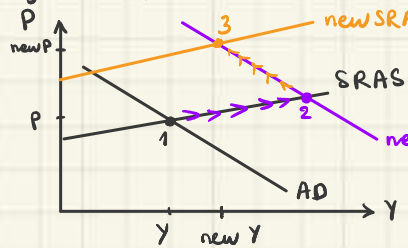


⇒ When $\pi^e = \pi$, people correctly predict inflation and adjust prices right away and keep the same level of output (and employment)

→ Inconsistent with old Phillips curve in class

Case 3: <u>When prices are flexible, but there is unexpected inflation</u>

New AD shifts more, but new SRAS doesn't shift as much



⇒ Both prices and output increase, consistent with old Phillips curve in class

② New Phillips curve: incorporates the last 2 cases above

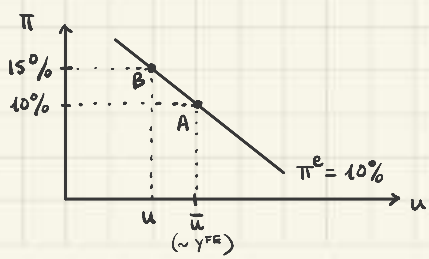
The new Phillips curve care about expected inflation, not inflation!

$$\pi = \pi^e - h(u - \bar{u})$$

π^e: Population's expectation of inflation; h: parameter; u: unemployment; $\bar{u}$: natural unemployment (also parameter)

< New Phillips curve is graphed on (π, u) space instead of (π, Y) like before, but they are very similar: Y is just a function of u ! >

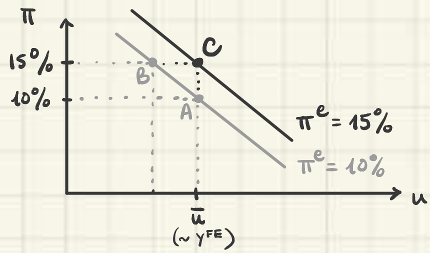
- Each curve corresponds to a π^e level



A: When $\pi^e = \pi = 10\%$ (correctly predict inflation) ⇒ $u^* = \bar{u}$ & $Y^* = Y^{FE}$ (~ Case 2 above)

B: When $\pi = 15\% > \pi^e = 10\%$ (unexpected inflation) ⇒ lower u^* ⇒ higher Y^* (~ Case 3 above)

- What is now, people adapt and expect $\pi^e = 15\%$? New Phillips curve :



C: When $\pi^e = \pi = 15\%$ (correctly predict inflation) $\Rightarrow$ $u^* = \bar{u}$ & $Y^* = Y^{FE}$ (~ Case 2 above)

$\Rightarrow$ Y only rises above Y^{FE} (or u only falls below $\bar{u}$) when there's unexpeted higher inflation (case 3 & point B)

If all inflations are correctly predicted, then Y doesn't change (Case 2 & point A & point C)

TA note - Section 15

① Open economy accounting

$CA + FA = 0$

$CA = NX + NFP + NUT$

If $NFP = NUT = 0$, then $CA = NX = S^d - I^d$

Budget deficit & CA often move in opposite direction

eg: A decrease in P_{world} of the goods you are exporting $\Rightarrow NX\downarrow$

2 ways to do this:

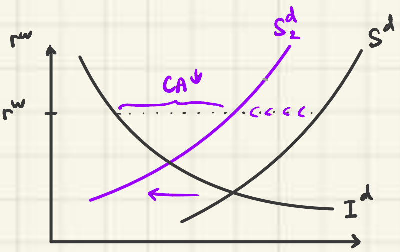
(1) Applying equations in lecture:

Assume $\Delta NFP = \Delta NUT = 0 \Rightarrow CA^{\downarrow} = NX^{\downarrow} + \tilde{NFP} + \tilde{NUT} \Rightarrow CA^{\downarrow} \Rightarrow FA^{\uparrow}, (S^d - I^d)\downarrow$

If investment behavior stays the same, this means there's a decrease in desired saving

(2) Using the IS framework: $S^d = GNP^{\downarrow} - C - G$ (lecture 2)

due to NX ↓



CA ↓ & Budget deficit ↑

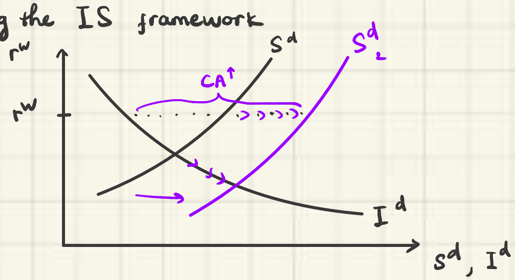
FA (= - CA) ↑

S^d ↑

eg 2: A shock from G^d spending decreases

$S^d = Y^d - C^d - G^d$ will increases given any level of interest rate

Using the IS framework



CA ↑ , budget deficit ↓

FA ↓

S^d ↑

② Interest rate

Nominal exchange rate : $e_{nom} = \frac{\# FC}{\# HC}$ → $\uparrow$: HC appreciate ; $\downarrow$: HC depreciate

Real exchange rate : $e = \frac{P}{P_{for}} \cdot e_{nom}$ → $P_{for} \uparrow$ or $P \downarrow$: $e \downarrow$: H depreciate ; $P_{for} \downarrow$ or $P \uparrow$: $e \uparrow$: H appreciate

Neutral investor, relative interest rate, expectation of exchange rate :

$$(1+i_f)\, e_{nom,t} = (1+i_h)\, e^{e}_{nom,t+1}$$

Relative inflation, change in real exchange rate & nominal exchange rate

$$e = \frac{P}{P_{for}} e_{nom} \Rightarrow \frac{\Delta e_{nom}}{e_{nom}} \approx \frac{\Delta e}{e} + \pi_{for} - \pi$$ (interpretation $e=0, e=c$?)

Absolute PPP : $e = 1$; $P e_{nom} = P_{for}$

eg : Assume Yen / USD = 100 (1 USD gets you 100 yen)

If Yen depreciates by 1% every year, what does 1 USD gets you now, in 1 year, in t years ?

Now : 100 yen

In 1 year : 100×0.99

In t years : $100 \times 0.99^{t-1}$