Q. Consider the standard IS-LM Model. If the economic agents have inflationary expectations ($\pi^e > 0$), then investment is responsive to real interest (r), i.e $I = I(r)$, $\frac{\partial I}{\partial r} < 0$. and the money demand is responsive to nominal interest (i), i.e $L = L(i, Y)$, $\frac{\partial L}{\partial i} < 0$, $\frac{\partial L}{\partial Y} > 0$

Analyze the impact of inflationary expectations on output & interest rates in the IS-LM Model.

[Relation b/w r & i : $r = i - \pi^e$].

Original IS-LM : ($\pi^e = 0$) ($r = i$)

IS : $Y = C(Y-T) + I(r) + G$.

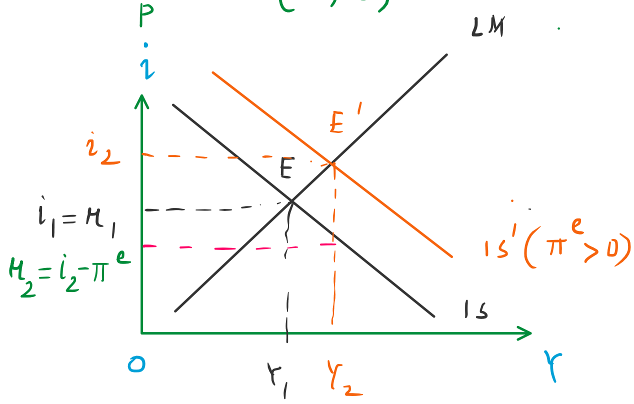
LM : $\frac{\bar{M}}{P} = L(Y, r)$

Modified IS-LM ($\pi^e > 0$).

$r = i - \pi^e \Rightarrow r < i$

IS : $Y = C(Y-T) + I(r) + G$.

LM : $\frac{\bar{M}}{P} = L(Y, i)$



3 variables: Y, r, i

IS : $Y = C(Y-T) + I(i - \pi^e) + G$.

LM : $\frac{\bar{M}}{P} = L(Y, i)$

$\pi^e > 0 \Rightarrow r = i - \pi^e \downarrow \Rightarrow I \uparrow \Rightarrow AD \uparrow \Rightarrow$ IS shift right.

$Y \uparrow$, $i \uparrow$, $r \downarrow$ $\Rightarrow$ Outcome of $\pi^e > 0$.

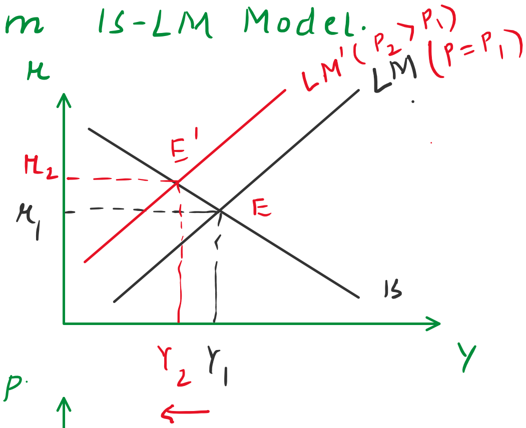
Derivation of the AD curve:

AD: Locus of (Y, P) constructed from IS-LM Model.

$LM'(P_2 > P_1)$ $LM(P = P_1)$

r

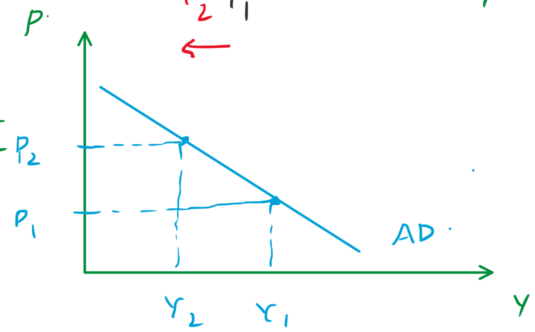
AD: Locus of (P, Y) constructed from IS-LM Model.



IS: $Y = C(Y-T) + I(r) + G$.

LM: $\dfrac{\bar{M}}{P} = L(Y, r)$

$P \uparrow \Rightarrow \left(\dfrac{\bar{M}}{P}\right) \downarrow \Rightarrow$ LM shift left.



IS: $[1 - c'(1-t)] \cdot Y + br = \bar{C} + \bar{I} + \bar{G}$

LM: $k \cdot Y - hr = \dfrac{\bar{M}}{P}$.

Find: $\dfrac{dP}{dY}$.

Diff: $[1 - c'(1-t)] \cdot dY + b \cdot dr = 0$ ---- (i)

$k \cdot dY - h \cdot dr = -\dfrac{M}{P^2} dP$ ---- (ii)

$$\frac{1}{h} \cdot \left[k \cdot dY + \frac{M}{P^2} \cdot dP \right] = dr.$$

Putting in (i): $[1 - c'(1-t)] \cdot dY + \dfrac{b}{h} \left[k \cdot dY + \dfrac{M}{P^2} \cdot dP \right] = 0$

$$\left[1 - c'(1-t) + b \cdot \frac{k}{h}\right] \cdot dY = -\frac{b}{h} \cdot \frac{M}{P^2} \cdot dP.$$

$$\left.\frac{dP}{dY}\right|_{AD} = -\frac{[1 - c'(1-t) + b \cdot k/h]}{\frac{b}{h} \cdot \frac{M}{P^2}} < 0.$$

AD - AS Model

Supply side:

Labour markets are characterized by wage rigidity ($W = \bar{W}$) due to presence of trade unions.

Let the production by $Y = Y(L, \bar{K})$, $Y_L > 0$, $Y_{LL} < 0$

Producers will choose the optimal amt of factor-inputs based on π-max.

$$\pi = P \cdot Y(L, \bar{K}) - \bar{W} \cdot L - r \cdot \bar{K}$$

$$\frac{\partial \pi}{\partial L} = 0 \Rightarrow P \cdot \frac{\partial Y}{\partial L} - \bar{W} = 0 \Rightarrow \boxed{P \cdot Y_L = \bar{W}} \Rightarrow$$ Optimization condition in the factor mkt.

Note: $P \cdot Y_L = \bar{W}$ $\Rightarrow$ opt L at every level of P.

$\Rightarrow$ Putting opt. L in prodn fn $\Rightarrow$ opt Y.

Locus of (P & Y) $\Rightarrow$ AS curve.

Prodn fn: $Y = Y(L, \bar{K})$, $Y_L > 0$, $Y_{LL} < 0$ ...... (i)

Opt condition: $Y_L = \frac{\bar{W}}{P}$ ...... (ii)

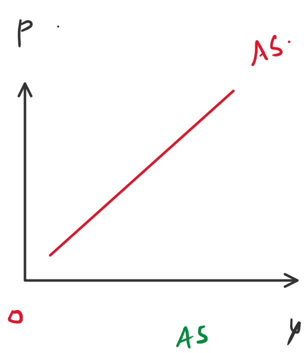
Variables: P, L, Y $\Rightarrow$ Find $\left.\frac{dP}{dY}\right|_{AS}$.

Diff: $dY = Y_L \cdot dL$ .... (i) $\Rightarrow dL = \frac{dY}{Y_L}$.

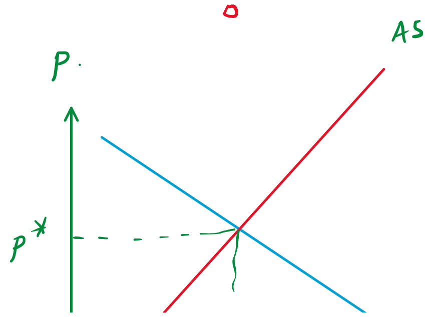
$$Y_{LL} \cdot dL = -\frac{\bar{W}}{P^2} \cdot dP \quad .... \text{(ii)}$$

Putting in (ii): $Y_{LL} \cdot \left(\frac{dY}{Y_L}\right) = -\frac{W}{P^2} \cdot dP$

$$\left.\frac{dP}{dY}\right|_{AS} = \frac{Y_{LL}/Y_L}{-W/P^2} > 0$$



Equillibrium in Macroeconomy:



Counter-recessionary macroeconomic policies:

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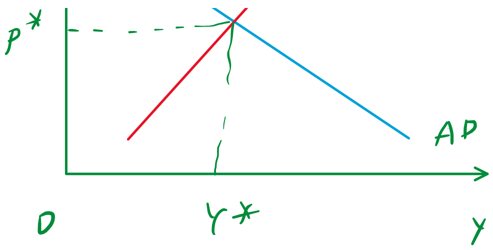


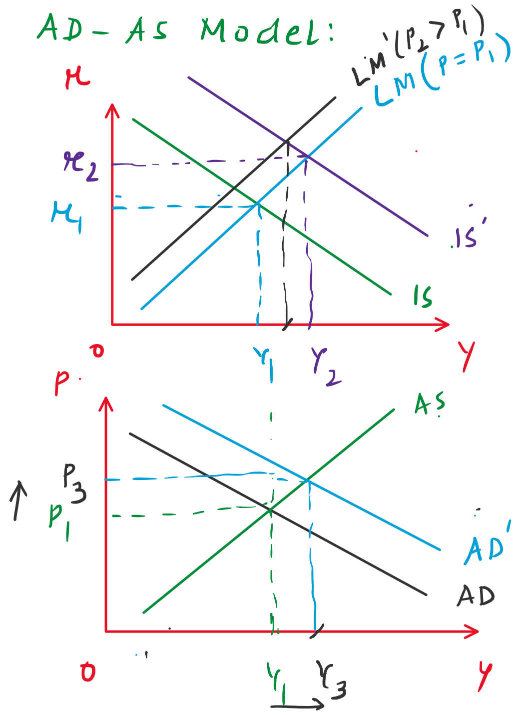
i) Fiscal Expansion (G↑)

G↑ ⇒ IS curve shift right ⇒ AD shift right.

ii) Monetary Expansion (M↑)

M↑ ⇒ LM shifts right ⇒ AD shifts right.

Compare Fiscal Expansion in IS-LM & AD-AS Model:



Govt increases exp by amt $dG > 0$.

G↑ ⇒ AD↑ ⇒ IS shifts rights.

Outcome: Y↑, r↑ [IS-LM Model].

But in AD-AS Model:

AD↑ ⇒ AD curve shifting right

P↑ ⇒ LM partly shifts left ⇒

Expansionary fiscal policy is partly crowded out, i.e output increases but lesser as compared to the IS-LM Model.

$$\therefore \left.\frac{dY}{dG}\right|_{IS-LM} > \left.\frac{dY}{dG}\right|_{AD-AS}.$$

$\therefore$ In general: $\left.\frac{dY}{dG}\right|_{SKM} > \left.\frac{dY}{dG}\right|_{IS-LM} > \left.\frac{dY}{dG}\right|_{AD-AS}$. — (*)