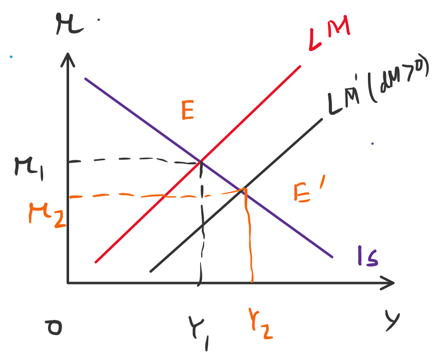
(ii) Expansionary Monetary Policy:

Central Bank raises the money supply $dM > 0$.



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

$$LM: \; k\cdot Y \uparrow - hr \downarrow = \frac{\bar{M}}{P} \uparrow$$

Variables: Y, r

Evaluate change in Y, r due to change in M.

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

$LM: \; k\cdot dY - h\cdot dr = \frac{dM}{P}$

$$\therefore \; dY = \frac{\begin{vmatrix} 0 & b \\ dM/P & -h \end{vmatrix}}{\begin{vmatrix} [1-c'(1-t)] & b \\ k & -h \end{vmatrix}} = \frac{-b\cdot dM/P}{-h[1-c'(1-t)] - b\cdot k}$$

$$\therefore \; dY = \frac{b\cdot dM/P}{h[1-c'(1-t)] + b\cdot k} \Rightarrow \frac{dY}{dM} = \frac{\left(b\cdot \frac{1}{P}\right)/h}{\left(h[1-c'(1-t)] + b\cdot k\right)/h}$$

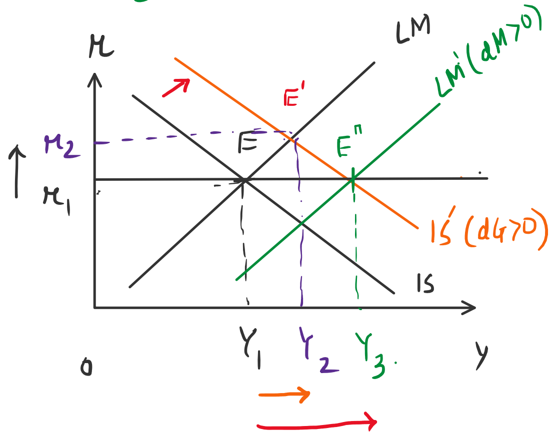
$$\boxed{\frac{dY}{dM} = \frac{\frac{b}{h}\cdot\frac{1}{P}}{[1-c'(1-t)] + b\cdot\frac{k}{h}}} \Rightarrow \text{Money supply multiplier.}$$

(**) Q. Consider the standard IS-LM framework where the govt wishes to proceed with fiscal expansion. Suppose the Central Bank follows an "accomodating monetary policy" i.e it raises money supply to eliminate changes in interest rate. Discuss the impact on output level.

changes in interest rate. Discuss the impact on output level and compute the govt exp multiplier. [Assume P=1.]

∴ We have $dG > 0$.

and an accomodating $dM > 0$.



Evaluate change in Y, r due to change in G, M:

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

$$LM: \quad k\cdot Y - hr = \bar{M}$$

Diff: IS:
$$\left.\begin{aligned} [1-c'(1-t)]\cdot dY + b\cdot dr &= dG \\ k\cdot dY - h\cdot dr &= dM \end{aligned}\right\} \rightarrow \text{Evaluate } \frac{dY}{dG} \text{ s.t } dr = 0.$$

$$dY = \frac{\begin{vmatrix} dG & b \\ dM & -h \end{vmatrix}}{\begin{vmatrix} [1-c'(1-t)] & b \\ k & -h \end{vmatrix}} \qquad dr = \frac{\begin{vmatrix} [1-c'(1-t)] & dG \\ k & dM \end{vmatrix}}{\begin{vmatrix} [1-c'(1-t)] & b \\ k & -h \end{vmatrix}}$$

$$\therefore dr = 0 \Rightarrow \begin{vmatrix} [1-c'(1-t)] & dG \\ k & dM \end{vmatrix} = 0$$

$$\Rightarrow dM\cdot[1-c'(1-t)] - k\cdot dG = 0.$$

$$\Rightarrow \boxed{dM\cdot[1-c'(1-t)] = k\cdot dG} \quad \text{---} (*)$$

Now
$$dY = \frac{-h\cdot dG - b\cdot dM}{[1-c'(1-t)](-h) - k\cdot b}$$

$$= \frac{(h\cdot dG + b\cdot dM)/h}{\ldots} = \frac{dG + \frac{b}{h}\cdot dM}{\ldots}$$

$$= \frac{(h \cdot dG + b \cdot dM)/h}{([1-c'(1-t)] \cdot h + k \cdot b) \cdot h} = \frac{dG + \frac{b}{h} \cdot dM}{[1-c'(1-t)] + b\left(\frac{k}{h}\right)}$$

$$= \frac{dG + \frac{b}{h} \cdot \frac{k \cdot dG}{[1-c'(1-t)]}}{[1-c'(1-t)] + b \cdot \frac{k}{h}} \quad \ldots [\text{from } (*)]$$

$$dY = \frac{\left[1 + \frac{b \cdot k}{h} \cdot \frac{1}{[1-c'(1-t)]}\right] \cdot dG}{[1-c'(1-t)] + b \cdot \frac{k}{h}}$$

$$dY = \frac{\left\{ \frac{\cancel{[1-c'(1-t)] + b \cdot k/h}}{[1-c'(1-t)]} \right\} \cdot dG}{\cancel{[1-c'(1-t)] + b \cdot (k/h)}}$$

SKM Multiplier

$$dY = \frac{1}{[1-c'(1-t)]} \cdot dG \Rightarrow \boxed{\frac{dY}{dG} = \frac{1}{1-c'(1-t)}}$$

Q. Consider the standard IS-LM model with $I(r) = \bar{I} - br$, $b > 0$ and an extended IS-LM model with $I(r,Y) = \bar{I} + iY - br$, $i, b > 0$. Compare the impact of expansionary monetary policy on the output level under the two scenarios.

Case I : $I = \bar{I} - br$,

IS: $Y = C + I + G$

$$Y = \bar{C} + c'(Y - t \cdot Y) + \bar{I} - br + \bar{G}$$

$$[1 - c' \cdot (1-t)]Y + br = \bar{A}$$

Case II : $I = \bar{I} - br + i \cdot Y$

IS: $Y = C + I + G$

$$Y = \bar{C} + c'(Y - t \cdot Y) + \bar{I} - br + i \cdot Y + \bar{G}$$

$$[1 - c'(1-t) - i] \cdot Y + b \cdot r = \bar{A}$$

$$[1-c'\cdot(1-t)]\,Y + br = \bar{A}$$

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

$$\left|\frac{dr}{dY}\right|_{IS} = \frac{[1-c'(1-t)]}{b}.$$

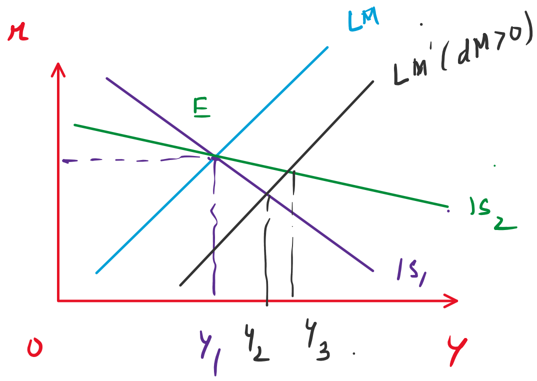
$$[1-c'(1-t)-i]\cdot Y + b\cdot r = \bar{A}$$

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

$$\left|\frac{dr}{dY}\right|_{IS} = \frac{[1-c'(1-t)-i]}{b}.$$

IS is flatter.

When $I = I(r, Y)$ impact on output is stronger.



HW.

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 : $r = i - \pi^e$].