Simple Keynesian Model

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The Prelude….

- Great Depression of 1930
- USA and other many countries are suffered from low income, high unemployment.
- Many economist questioned the validity of Classical Economic Theory
- Classical Economic Theory seemed incapable of explaining the Depression.
- According to Classical Theory National Income/GDP only depends only on factor supplies and available technology.
- At this juncture economists believed that a new model is necessary.

John Maynard Keynes

- At this juncture, in 1936, Keynes published the book *The General Theory of Employment, Interest and Money*.
- An alternative model is provided to Classical Theory.
- According to Keynes, Demand is responsible for low income and high unemployment.
- This is just the opposite of Classical Theory which makes supply as responsible for income.

Simple Keynesian Model (SKM)

- It is also termed as Keynesian cross.
- The basic idea is as follows:
- People spend more for goods and services => more production => firms will hire more labour => more income => more demand.
- So the inadequate spending /lack of demand is responsible for depression.
- Expenditure on goods and services is the key.
- Here we start with simple closed economy with government.
- Two terms we will focus: *Planned Expenditure & Actual Expenditure*

Planned Expenditure

- Planned expenditure means the amount consumers, firms and the govt are willing to spend.
- So we can write planned expenditure (PE) as:
- PE = C+ I + G where
- C = C (Y_d); C$'$>0; or C = C (Y – T) where T = Tax , Y=Income and Y_d= Disposable Income.
- Investment (I) and Govt expenditure (G) are both autonomous means investment and govt expenditure do not depends on any other variable.
- $I = \bar{I}$ and $G = \bar{G}$

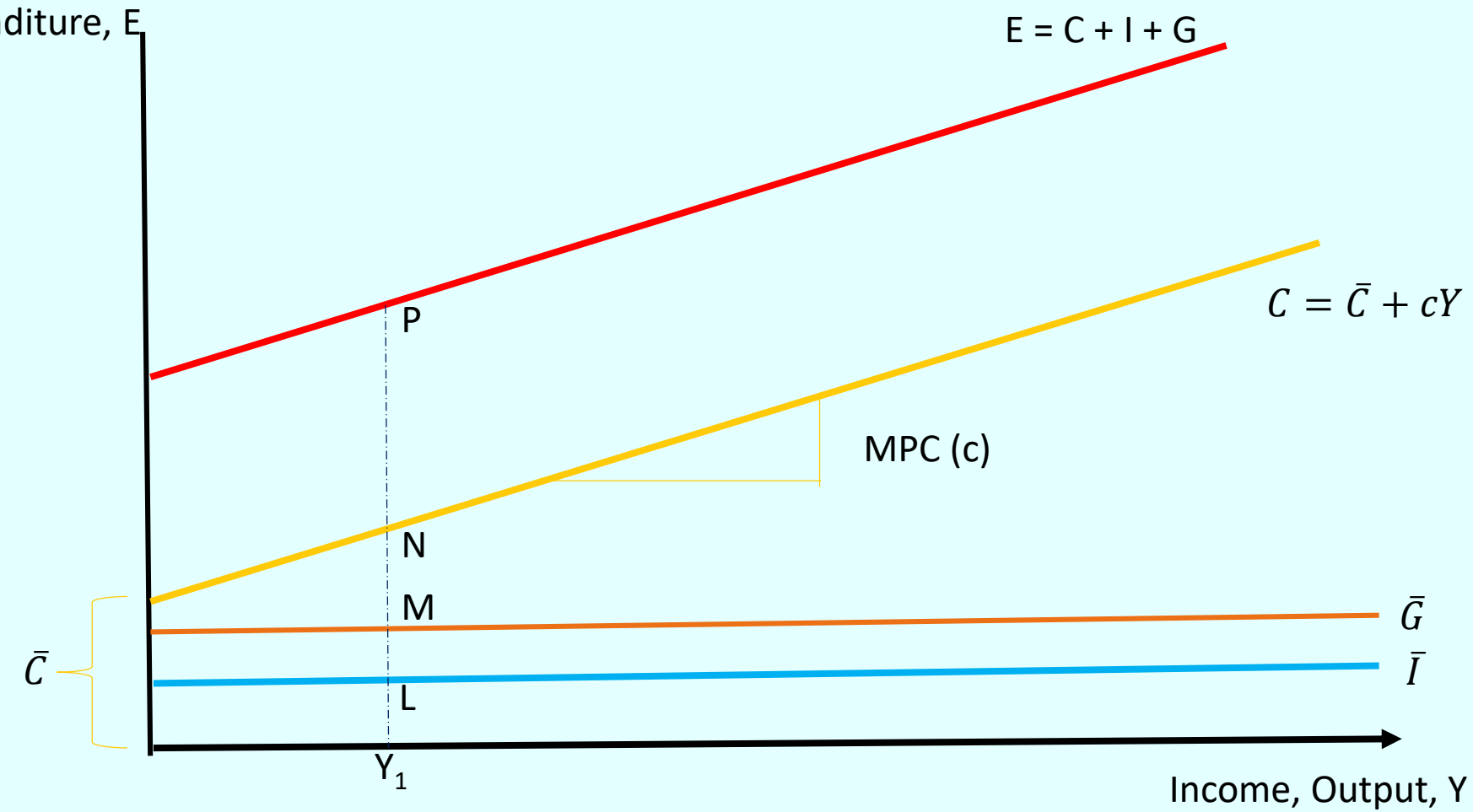
Consumption Function

- Consumption depends on Disposable Income positively means if disposable income increases consumption will increase.
- But increase in consumption is less than that of income.
- That means people are not consuming all of his income and it depends on his propensity to consume.
- If income increases by one unit then a fraction of that income will be consumed and that is Marginal propensity to consume (MPC).
- MPC < 1
- MPC is actually the slope of Consumption function. 0< MPC <1

Consumption Function

- Consumption positively depends on disposable income.
- But there is a question: whether there is no consumption if there is no income?
- The answer is: if there is no income, consumption is there and that is out of wealth which we termed as Autonomous Consumption.
- If we assume a linear consumption function then we can write:
- $C = \bar{C}$ + c (Y – T); $\bar{C}$= Autonomous Consumption and c = MPC means 0< c < 1.
- So PE = $\bar{C}$+ c (Y-T) + $\bar{I}$ + $\bar{G}$

The Diagram

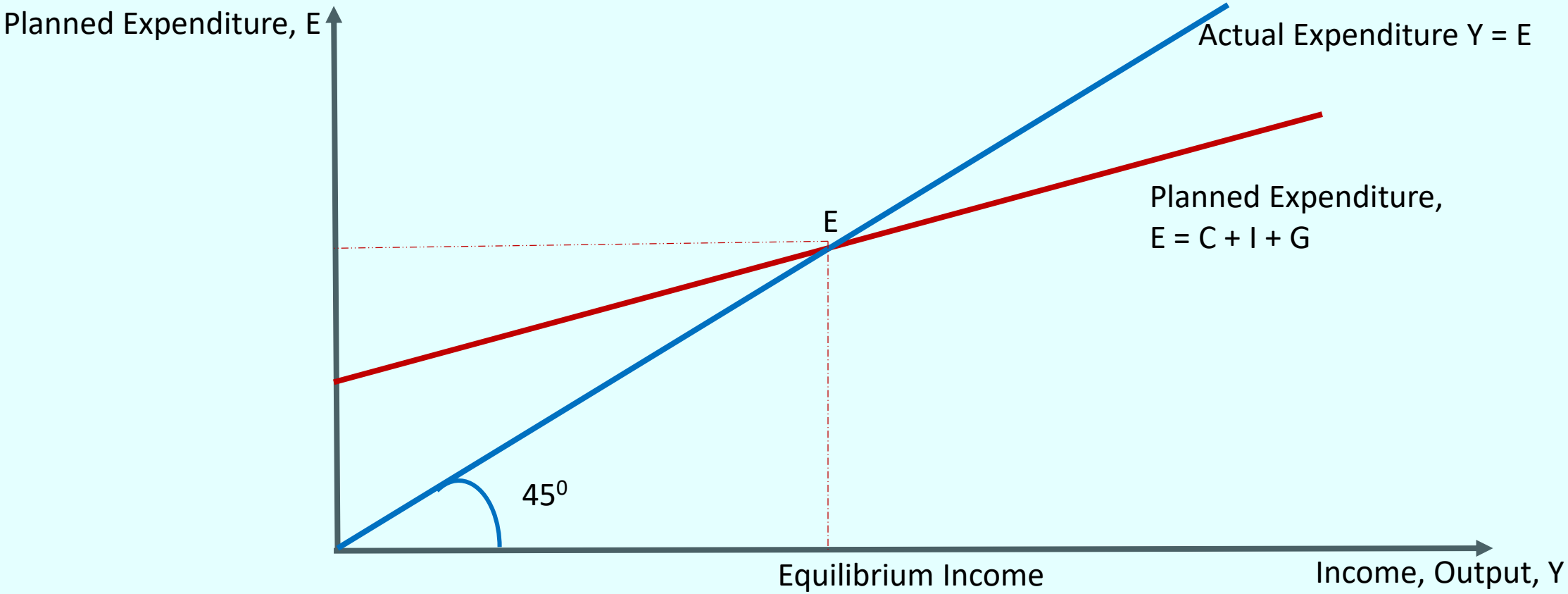


At Y_1 planned Investment is Y_1L amount, planned Govt Expenditure is Y_1M amount and planned consumption is Y_1N. So total planned expd (E = C+I+G) is $Y_1P = Y_1N + Y_1L + Y_1M$. It is termed as Vertical Summation

Actual Expenditure

- Actual expenditure is the GDP which is actually produced
- So Actual Expenditure is the GDP (Y)
- AE = Y
- Now equilibrium occurs when actual expenditure is equal to Planned Expenditure. AE = Y = PE
- If that holds then the planned expenditure is realized.
- So the equilibrium condition is E = Y
- To get we have to draw a 45^0 line in the following diagram.
- On this line all points indicate AE = PE or Y = E

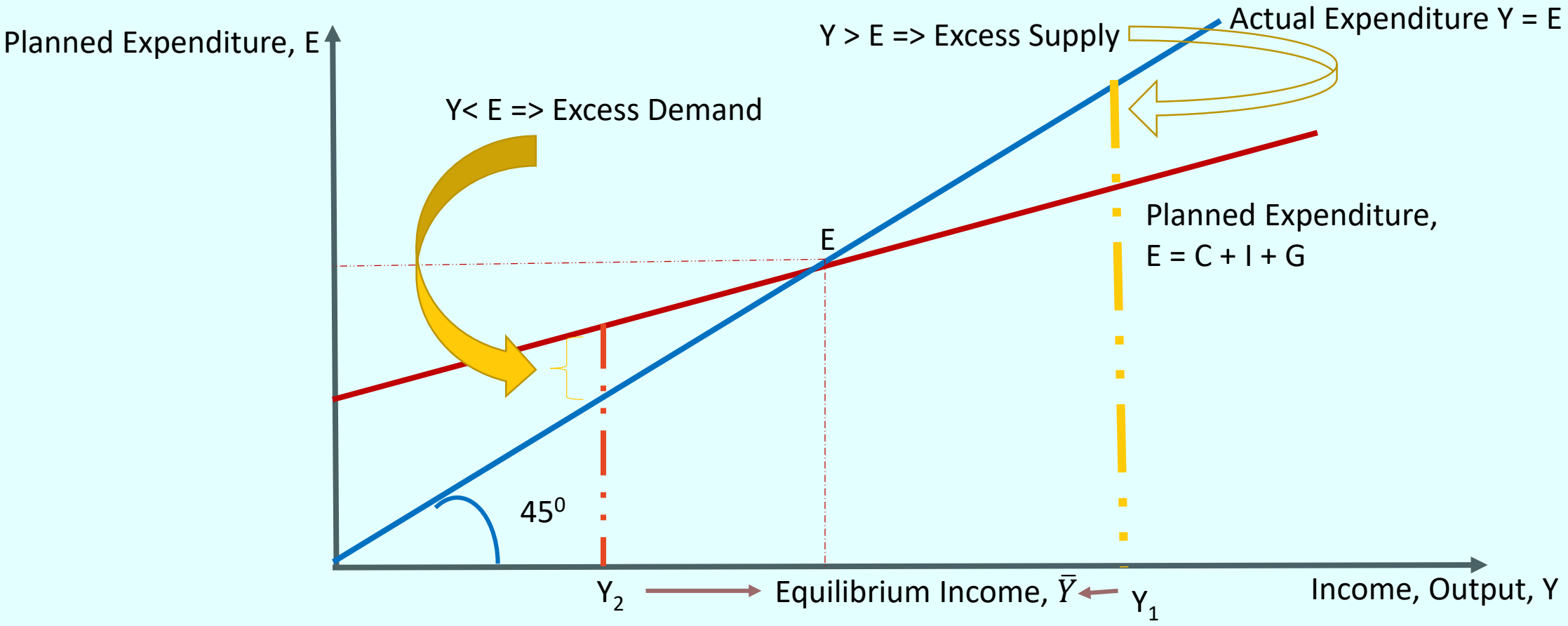
Keynesian Cross



Derivation of Equlibrium

- Let assume that at $\bar{Y}$ AE = PE
- $\bar{Y} = c\,(\bar{Y} - T) + \bar{I} + \bar{G}$
- Using linear consumption function:
- $\bar{Y} = \bar{C} + c\,(\bar{Y} - T) + \bar{I} + \bar{G}$
- $(1 - c)\bar{Y} = \bar{C} - cT + \bar{I} + \bar{G}$
- $\boldsymbol{\bar{Y} = \frac{\bar{C} - cT + \bar{I} + \bar{G}}{(1-c)}}$ As 0<c<1 means (1 – c) > 0
- Now we will check the stability of equilibrium

Stability of Equilibrium



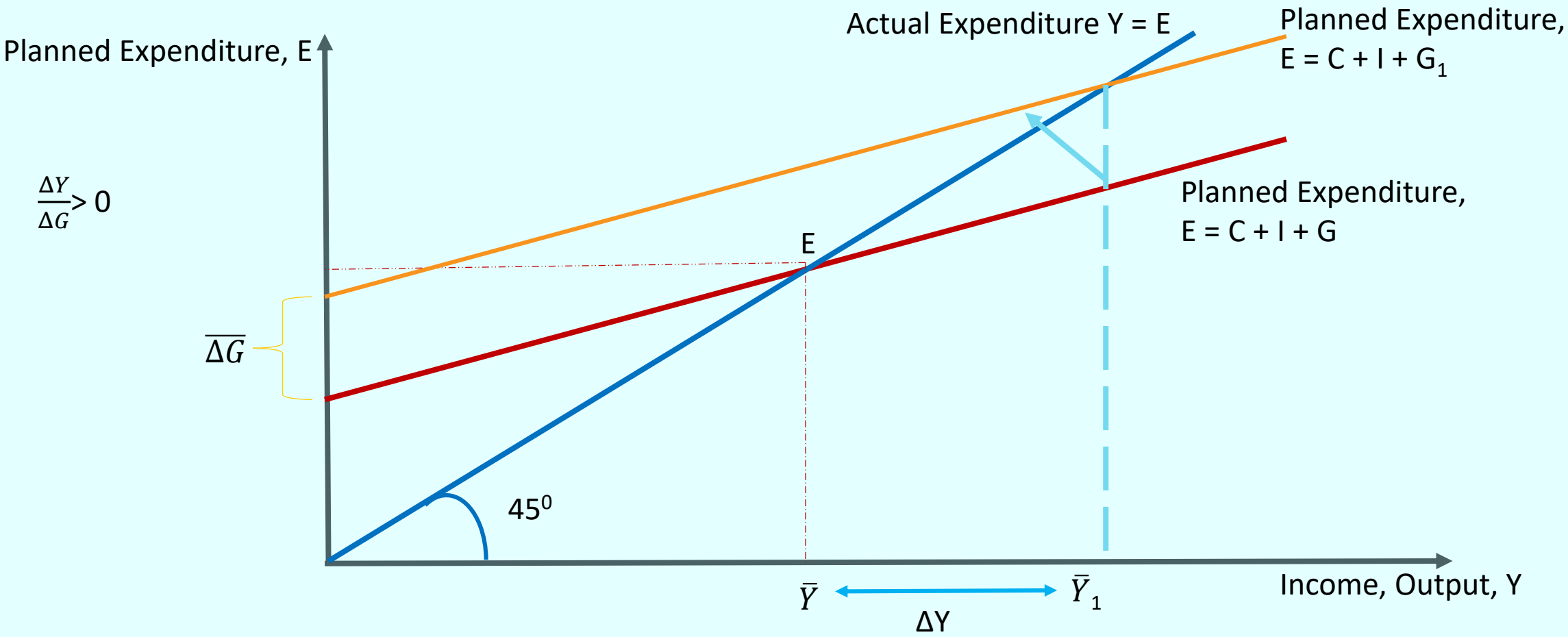
Stability of Equilibrium

- At Y_1, Actual Expenditure > Planned Expenditure => excess supply
- That leads the producers to accumulate this excess amount output as inventory. That is unwarranted inventory.
- So in the next time the producers will produce less than Y_1. and that will continue till it reaches to equilibrium income.
- The opposite will happen at Y_2 here $Y < E$ => excess demand.
- So next time the producer will increase their production and it will continue till it reaches to equilibrium income.

Change in Income

- Income can change if planned expenditure changes.
- Now planned expenditure can be increased if Govt Expenditure or Investment increases. Same will happen if Tax reduced.
- Lets try with increase in G to G_1.
- So PE will be increased by the same amount that $\Delta G = G_1 - G$
- So Planned Expenditure line will shift upward.
- We will get a new equilibrium

Keynesian Cross



Process of Multiplication

- As G increases Y increases as Y = C + I +G
- $\Delta G = \Delta Y$, Y increases by the same amount as G increases immediately.
- Now as Y increases consumption will increase by $c\Delta G$. (c=MPC)
- So new demand will increase by $c\Delta G$. So output as well as income will increase by $c\Delta G$.
- Consumption will increase by c. $c\Delta G = c^2\Delta G$.
- In the next step output/income will increase by $c^2\Delta G$ and consumption will increase by $c.c^2\Delta G = c^3\Delta G$.
- The process will continue infinitely.

Process of Multiplication

- $\Delta Y = \Delta G + c\Delta G + c^2 G + c^3 \Delta G + c^4 \Delta G + \cdots \ldots \ldots$
- $\Delta Y = \Delta G(1 + c + c^2 + c^3 + c^4 + \ldots \ldots \ldots)$
- $\Delta Y = \Delta G \frac{1}{1-c}$
- As 0<c<1 so (1-c)<1
- $\frac{1}{1-c}$ is the Multiplier.
- Numerical Example: Let G increases by Rs. 100 and c= 0.8, then Y increases by how much?
- $\Delta Y = \frac{1}{1-0.8} 100 = 500$

Derivation of Multiplier

- The equilibrium condition is given by:
- $\bar{Y} = \bar{C} + c(\bar{Y} - T) + \bar{I} + \bar{G}$
- If Govt expenditure changes, then differentiating the above equation with respect to G, we get
- $\frac{d\bar{Y}}{dG} = \frac{d\bar{C}}{dG} + c\left(\frac{d\bar{Y}}{dG} - \frac{dT}{dG}\right) + \frac{d\bar{I}}{dG} + \frac{dG}{dG}$ (Here G = $\bar{G}$)
- As $\bar{C}, T \; and \; \bar{I}$ are fixed and not depend on govt expenditure so
- $\frac{d\bar{C}}{dG} = 0, \frac{dT}{dG} = 0 \; and \; \frac{d\bar{I}}{dG} = 0$ so $\frac{dY}{dG} = \frac{1}{1-c}$>0
- dY = $\frac{1}{1-c} \; dG$ This is termed as Govt Expenditure Multiplier.

Investment and Tax Multiplier

- The derivation of Investment multiplier is same as of govt expd multiplier.
- The Tax Multiplier:
- $\frac{dY}{dT} = \frac{d\bar{C}}{dT} + c\left(\frac{dY}{dT} - \frac{dT}{dT}\right) + \frac{d\bar{I}}{dT} + \frac{d\bar{G}}{dT}$
- $\frac{dY}{dT} = 0 + c\left(\frac{dY}{dT} - 1\right) + 0 + 0$
- $\frac{dY}{dT}(1 - c) = -c$
- $\frac{dY}{dT} = \frac{-c}{(1-c)} < 0$ => If tax increases then Y falls and vice versa.

Policy Prescription

- If govt expenditure increases Y increases and if Tax falls Y increases.
- Now the question is which is good policy for a country like India.
- Hint: Tax cut will raise the income through increased consumption where as Govt Expenditure will be more targeted. In India a very low percentage of people is within the tax net.
- Two questions for Internal Assesment:
- 1. Derive the Investment Multiplier
- 2. Within Govt Expenditure Multiplier and Tax Cut Multiplier which one is best for India.