Keynesian economics

- A closed economy has three uses for the goods and services it produces. These three components of GDP are expressed in the national income accounts identity:

$$Y = C + I + G.$$

- **Consumption Function:** We assume that the level of consumption depends directly on the level of disposable income. A higher level of disposable income leads to greater consumption.
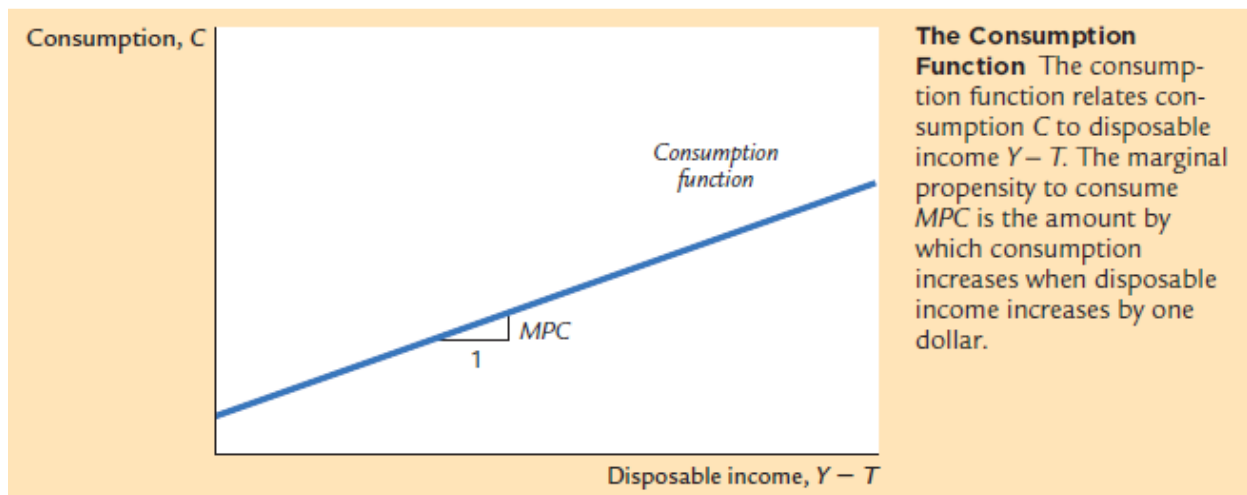
  Thus,

$$C = C(Y - T)$$

- This equation states that consumption is a function of disposable income. The relationship between consumption and disposable income is called the **consumption function.**


$$C = A + BY$$

- The **marginal propensity to consume (MPC =B)** is the amount by which consumption changes when disposable income increases by one dollar. The *MPC* is between zero and one: an extra dollar of income increases consumption, but by less than one dollar. Thus, if households obtain an extra dollar of income, they save a portion of it. For example, if the *MPC* is 0.7, then households spend 70 cents of each additional dollar of disposable income on consumer goods and services and save 30 cents.

- The below figure illustrates the consumption function. The slope of the consumption function tells us how much consumption increases when disposable income increases by one dollar. That is, the slope of the consumption function is the *MPC*.

Consumption, C

Consumption function

MPC

1

Disposable income, Y − T

The Consumption Function The consumption function relates consumption C to disposable income Y − T. The marginal propensity to consume MPC is the amount by which consumption increases when disposable income increases by one dollar.

- **Saving Function:** $C = A + BY$ and $Y = C + S$

  Thus, $S = -A + (1-B)Y$; $MPS = (1-B)$

- The **marginal propensity to save (*MPS*)** is the amount by which saving changes when disposable income increases by one dollar. The *MPS* is between zero and one: an extra dollar of income increases saving, but by less than one dollar.
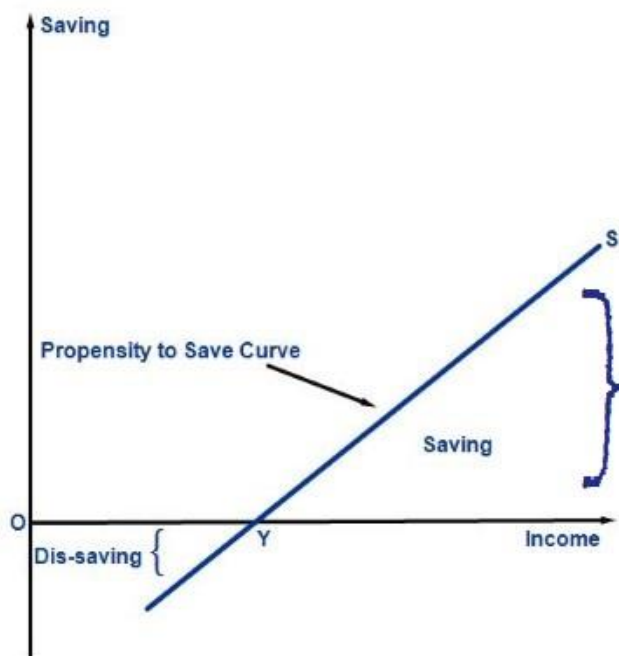
➢ The Keynesian cross:

- In *The General Theory* Keynes proposed that an economy's total income was, in the short run, determined largely by the spending plans of households, businesses, and government.

- The more people want to spend, the more goods and services firms can sell. The more firms can sell, the more output they will choose to produce and the more workers they will choose to hire.

- ==Keynes believed that the problem during recessions and depressions was inadequate spending.==

- Planned Expenditure: *Actual expenditure* is the amount households, firms, and the government spend on goods and services, and as we have seen earlier, it equals the economy's gross domestic product (GDP). *Planned expenditure* is the amount households, firms, and the government would like to spend on goods and services.

- ==Why would actual expenditure ever differ from planned expenditure?== The answer is that firms might engage in unplanned inventory investment because their sales do not meet their expectations. When firms sell less of their product than they planned, their stock of inventories automatically rises; conversely, when firms sell more than planned, their stock of inventories falls. Because these unplanned changes in inventory are counted as investment spending by firms, actual expenditure can be either above or below planned expenditure.

- Now consider the determinants of planned expenditure. Assuming that the economy is closed, so that net exports are zero, we write planned expenditure *PE* as the sum of consumption *C,* planned investment *I,* and government purchases *G:*

$$PE = C + I + G.$$

- To this equation, we add the consumption function

$$C = C(Y \text{ - } T).$$

This equation states that consumption depends on disposable income (Y - T), which is total income Y minus taxes T. To keep things simple, for now we take planned investment as exogenously fixed:
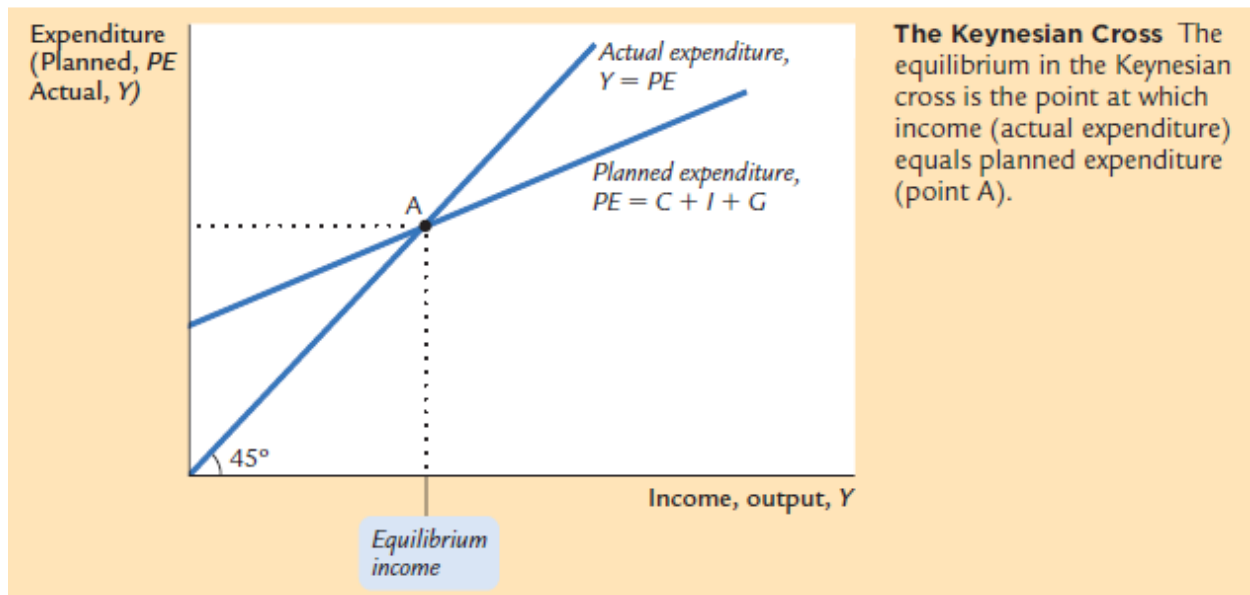
$$I = I^*.$$

Finally, we also assume that, the levels of government purchases and taxes are fixed:

$$G = G^*,$$
$$T = T^*.$$

- Combining these five equations, we obtain

$$PE = C(Y \text{ - } T^*) + I^* + G^*.$$

Expenditure (Planned, PE Actual, Y)

Actual expenditure, $Y = PE$

Planned expenditure, $PE = C + I + G$

A

45°

Income, output, Y

Equilibrium income

The Keynesian Cross The equilibrium in the Keynesian cross is the point at which income (actual expenditure) equals planned expenditure (point A).

- This line slopes upward because higher income leads to higher consumption and thus higher planned expenditure. The slope of this line is the marginal propensity to consume, *MPC:* it shows how much planned expenditure

increases when income rises by $1. <mark>This planned-expenditure function is the first piece of the model called the Keynesian cross.</mark>
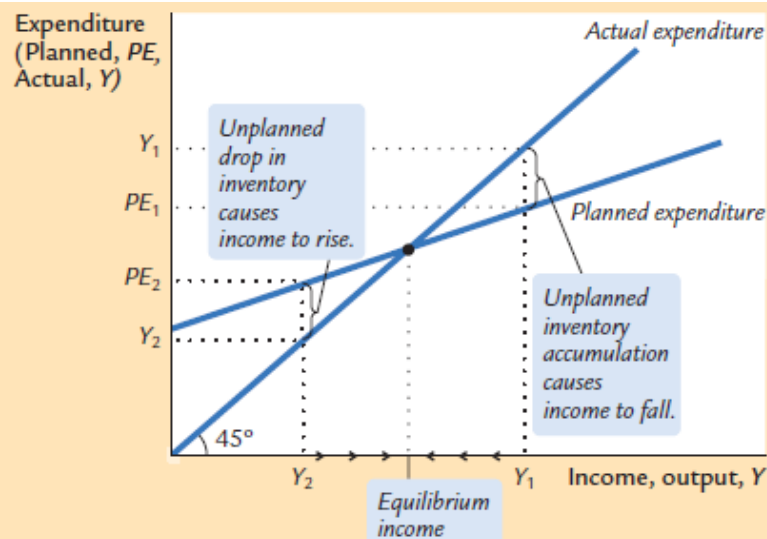
- The Economy in Equilibrium: The next piece of the Keynesian cross is the assumption that the economy is in equilibrium when actual expenditure equals planned expenditure. This assumption is based on the idea that when people's plans have been realized, they have no reason to change what they are doing.

- Recalling that Y as GDP equals not only total income but also total actual expenditure on goods and services, we can write this equilibrium condition as

$$\text{Actual Expenditure} = \text{Planned Expenditure}$$
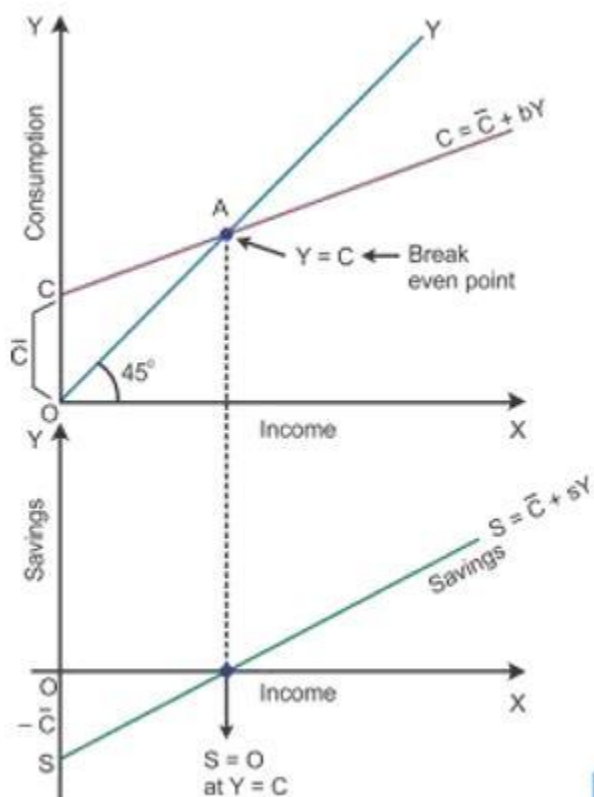$$Y = PE.$$

<mark>The 45-degree line in Above Figure plots the points where this condition holds.</mark>

- With the addition of the planned-expenditure function, this diagram becomes the Keynesian cross. The equilibrium of this economy is at point A, where the planned-expenditure function crosses the 45-degree line.

- <mark>How does the economy get to equilibrium?</mark> In this model, inventories play an important role in the adjustment process. Whenever an economy is not in equilibrium, firms experience unplanned changes in inventories, and this induces them to change production levels. Changes in production in turn influence total income and expenditure, moving the economy toward equilibrium.
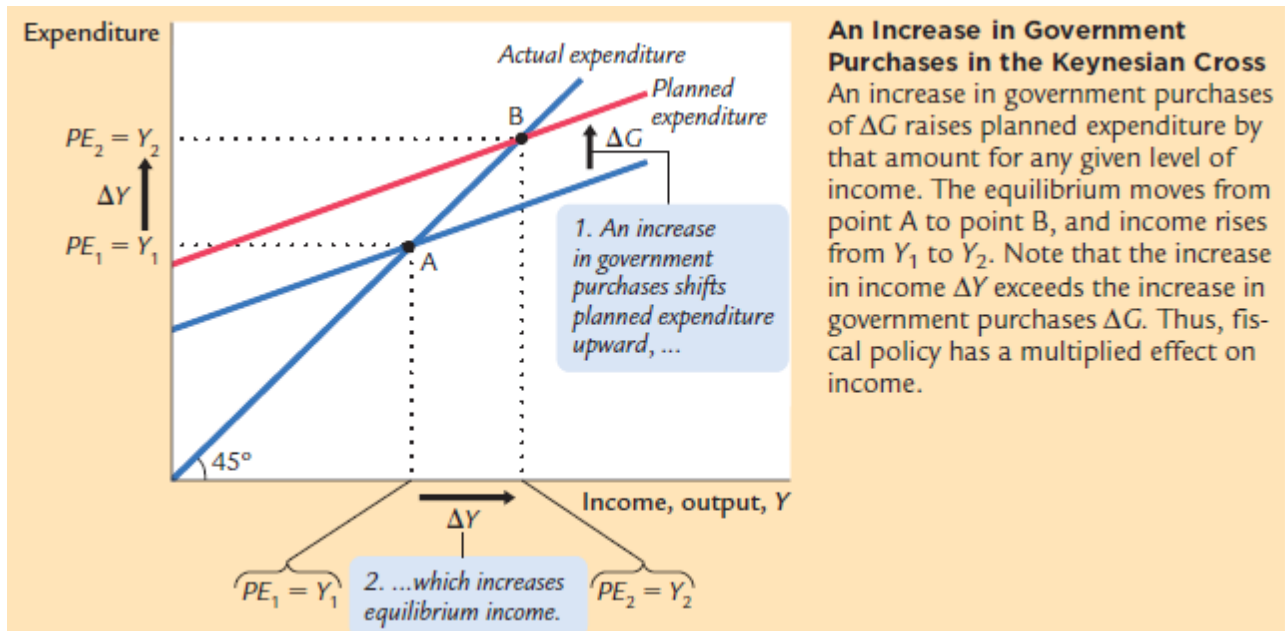
Expenditure (Planned, PE, Actual, Y)

Actual expenditure

Y_1
Unplanned drop in inventory causes income to rise.

PE_1
Planned expenditure

PE_2

Y_2
Unplanned inventory accumulation causes income to fall.

45°

Y_2 Y_1 Income, output, Y

Equilibrium income

The Adjustment to Equilibrium in the Keynesian Cross If firms are producing at level Y_1, then planned expenditure PE_1 falls short of production, and firms accumulate inventories. This inventory accumulation induces firms to decrease production. Similarly, if firms are producing at level Y_2, then planned expenditure PE_2 exceeds production, and firms run down their inventories. This fall in inventories induces firms to increase production. In both cases, the firms' decisions drive the economy toward equilibrium.

Y

Consumption

$C = \bar{C} + bY$

A

$Y = C \leftarrow$ Break even point

$\bar{C}$

45°

O
Y   Income   X

Savings

$S = \bar{C} + sY$

Savings

$-\bar{C}$

Income   X

$S = O$
at $Y = C$

- **Concept of Multiplier:**
  - Government Purchases Multiplier: If government purchases rise by ΔG, then the planned-expenditure schedule shifts upward by ΔG.

An Increase in Government Purchases in the Keynesian Cross An increase in government purchases of ΔG raises planned expenditure by that amount for any given level of income. The equilibrium moves from point A to point B, and income rises from Y_1 to Y_2. Note that the increase in income ΔY exceeds the increase in government purchases ΔG. Thus, fiscal policy has a multiplied effect on income.

- This graph shows that an increase in government purchases leads to an even greater increase in income. That is, ΔY is larger than ΔG. The ratio $\Delta Y/\Delta G$ is called the **government-purchases multiplier;** it tells us how much income rises in response to a $1 increase in government purchases.

- An implication of the Keynesian cross is that the government-purchases multiplier is larger than 1. The reason is that, according to the consumption function $C = C(Y - T)$, higher income causes higher consumption. When an increase in government purchases raises income, it also raises consumption, which further raises income, which further raises consumption, and so on. Therefore, in this model, an increase in government purchases causes a greater increase in income.

- **How big is the multiplier?** To answer this question, we trace through each step of the change in income. The process begins when expenditure rises by ΔG, which implies that income rises by ΔG as well. This increase in income in turn raises consumption by $MPC \times \Delta G$, where MPC is the marginal propensity to consume. This increase in consumption raises expenditure and income once again. This second increase in income of $MPC \times \Delta G$ again raises consumption, this time by $MPC \times (MPC \times \Delta G)$, which again raises expenditure and income, and so on. This feedback from consumption to income to consumption continues indefinitely. The total effect on income is

  Initial Change in Government Purchases $= \Delta G$

  First Change in Consumption $= MPC \times \Delta G$

  Second Change in Consumption $= MPC^2 \times \Delta G$

  Third Change in Consumption $= MPC^3 \times \Delta G$

  . .

  . .

  . .

  $\Delta Y = (1 + MPC + MPC^2 + MPC^3 + \ldots) \Delta G.$

- The government-purchases multiplier is

  $\Delta Y / \Delta G = 1 + MPC + MPC^2 + MPC^3 + \ldots$

  $\Delta Y / \Delta G = 1/(1 - MPC).$

- For example, if the marginal propensity to consume is 0.6, the multiplier is

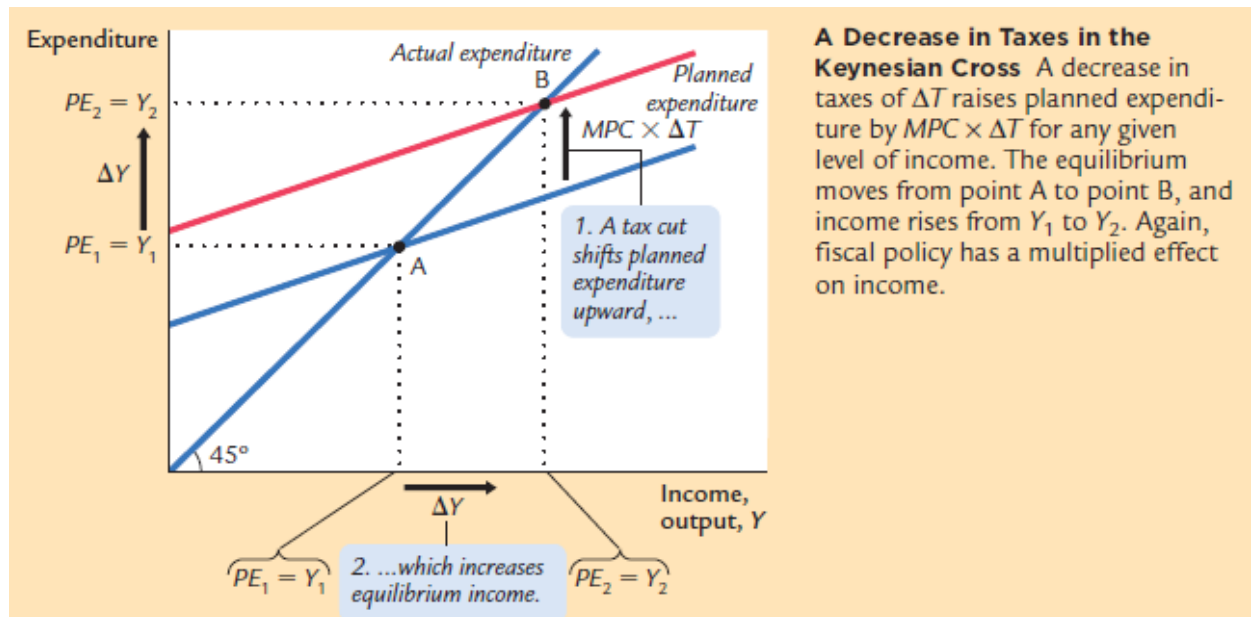 $\Delta Y / \Delta G = 1 + 0.6 + 0.62 + 0.63 + \ldots$

  $= 1/(1 - 0.6)$

  $= 2.5.$

- In this case, a \$1.00 increase in government purchases raises equilibrium income by \$2.50.

- **Tax Multiplier:** Consider now how changes in taxes affect equilibrium income.

- A decrease in taxes of ΔT immediately raises disposable income $Y - T$ by ΔT and, therefore, increases consumption by $MPC \times \Delta T$. For any given level of income Y, planned expenditure is now higher.

A Decrease in Taxes in the Keynesian Cross A decrease in taxes of ΔT raises planned expenditure by $MPC \times \Delta T$ for any given level of income. The equilibrium moves from point A to point B, and income rises from Y_1 to Y_2. Again, fiscal policy has a multiplied effect on income.

- As Figure shows, the planned-expenditure schedule shifts upward by $MPC \times \Delta T$.

- The equilibrium of the economy moves from point A to point B. Just as an increase in government purchases has a multiplied effect on income, so does a decrease in taxes. As before, the initial change in expenditure, now $MPC \times \Delta T$, is multiplied by $1/(1 - MPC)$. The overall effect on income of the change in taxes is

  $\Delta Y / \Delta T = -MPC/ (1 - MPC)$.

  This expression is the **tax multiplier,** the amount income changes in response to a $1 change in taxes. (The negative sign indicates that income moves in the opposite direction from taxes.)

- For example, if the marginal propensity to consume is 0.6, then the tax multiplier is

  $\Delta Y/\Delta T = -0.6/(1 - 0.6) = -1.5.$

  In this example, a $1.00 cut in taxes raises equilibrium income by $1.50.