

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

Effect of Government Purchases and Tax Changes On the Budget Surplus

Tuesday

7

In order to know how changes in fiscal policy affect the budget, we first consider whether an increase in G must reduce the budget surplus. At first sight, this appears obvious, because increased government expenditure, from equation (24), are reflected in a reduced surplus or an increased deficit. On further thought, however, the increased government purchase will cause an increase in income and therefore increased tax collection. This raises the possibility that tax collection might increase by more than government purchases.

A brief calculation shows that the first guess is right: increased

Wednesday

8

government expenditure reduces budget surplus. From equation (22) we see that the change in income due to increased government purchases is equal to $\Delta Y_0 \equiv \alpha_G \cdot \Delta G$. A fraction of that increased income is collected in the form of taxes, so tax revenue increases by $t \alpha_G \Delta G$. The change in the budget surplus,

$$\Delta BS = \Delta TA - \Delta G$$

$$= t \alpha_G \Delta G - \Delta G$$

$$= \left[\frac{t - 1 + c - ct}{1 - c(1-t)} \right] \Delta G = \left[\frac{t}{1 - c(1-t)} - 1 \right] \Delta G \quad \left| \text{using (23)} \right|$$

$$= \frac{t(1-t) + c(1-t) - 1(1-t)}{(1-c)(1-t)} \cdot \Delta G = \frac{(1-c)(1-t) - 1}{1 - c(1-t)} \cdot \Delta G \quad (25)$$

which is unambiguously negative.

May 2019

$$\text{Tax multiplier} = \frac{-bY}{1-b+bt}$$

2019

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

$$\Delta BS = \Delta Y - \frac{bY}{1-b+bt} \Delta t = \frac{\Delta Y (1-b+bt) - b \Delta Y}{1-b+bt} = \Delta Y \left(\frac{1-b}{1-b+bt} \right)$$

Thursday

In the same way, we can consider the effects of an increase in the tax rate on the budget surplus. The increase in the tax rate will reduce the level of income. It might thus appear that an increase in the tax rate, keeping G constant, could reduce the budget surplus. In fact, an increase in the tax rate increases the BS, despite the reduction in income it causes.

Another important result of the budget is the balanced budget multiplier. Suppose government spending and taxes are raised in equal amounts and thus in the new equilibrium the budget surplus remains unchanged. But how much will output rise?

10

Friday

The answer is that for this special case the value of balanced budget multiplier is equal to one. So output rises by the increase in government spending and no more.

Full-Employment Budget Surplus:

So far we know that increases in taxes add to the surplus and that increases in government expenditure reduces the budget surplus. Increases in taxes have been shown to reduce the level of income; increase in government expenditure and transfers, to increase the level of income. It thus seems that the budget surplus is a convenient, simple measure of the overall effects of fiscal policy.

2019

JUNE

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

$$BS = tY - \bar{TR} - \bar{G}$$

~~24~~

24

May 2019

Saturday

11

on the economy. For instance, when the budget is in deficit, we would say that fiscal policy is expansionary, tending to increase GDP.

However, the BS by itself suffers from a serious defect as a measure of the direction of fiscal policy. The defect is that the surplus can change because of changes in autonomous ^{private} spending (as fig 4). Thus, an increase in the budget deficit does not necessarily mean that the government has changed its policy in an attempt to increase the level of income.

Since it is very important to know the way in which fiscal policy is being used to affect the level of income, we require

Sunday

12

some measure of policy that is independent of the particular position of the business cycle.

Such a measure is provided by the full employment budget surplus, denoted by BS^* . The full-employment budget surplus measures the budget surplus at the full-employment level of income or at potential output. Using Y^* to denote the full-employment level of income, we can write

$$BS^* = tY^* - \bar{G} - \bar{TR} \quad \dots (26)$$

To see the difference between the actual and the full-employment budgets, we subtract the actual BS in equation (24a) from the full-employment BS in equation (26) to obtain

$$BS^* - BS = t(Y^* - Y) \quad \dots (27)$$

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

13

Monday

The only difference arises from income tax collection. If output is below full employment, the full employment surplus exceeds actual surplus. Conversely, if $BS > BS^*$ $Y > Y^*$, then $BS > BS^*$. The difference between the actual and full-employment budget is the cyclical component of the budget. In a recession the cyclical component tends to show a deficit, and in a boom there may even be a surplus.

Two important things to consider to conclude this topic:

First, there is no certainty as to the true full-employment level of output. Various assumptions about the level of unemployment that corresponds to full-employment are

14

Tuesday

possible. The usual assumptions now are that full employment means an unemployment rate of about 5.5 percent, although there have been some estimates as high as 7%. So, estimates of the full-employment deficit or surplus will differ depending on the assumptions made about the economy at full employment.

Second, the high-employment surplus is not a perfect measure of the thrust of fiscal policy. There are several reasons:

A change in spending with a matching increase in taxes, leaving the deficit unchanged, will raise income. Expectations about future fiscal policy changes can affect current

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

income. In general, because fiscal policy involves the setting of a number of variables (the tax rate, transfers and govt. purchases), it is difficult to describe the thrust of fiscal policy perfectly with a single number. But the High-employment surplus is nevertheless a useful guide to the direction of fiscal policy.

Paradox of Thrift:

In an economy, if thriftiness increases i.e., if the saving propensity of each individual increases, it appears that aggregate saving will increase. But in the Keynesian model where saving and investment are both positive functions of income, the increase in individual saving leads to fall in aggregate saving. This phenomenon is known as the paradox of thrift.

Let us suppose saving function as $S = S(Y)$; $S' > 0$, and investment function is $I = I(Y)$; $I' > 0$ where $S' > I'$. Here, $mpc = \frac{dI}{dY} = I'$ and $mps > mpi$.

In equilibrium, $S(Y) = I(Y)$.

In fig below, e_1 is the initial equilibrium point where planned saving = planned investment. So, Ox_1 is the equilibrium national income. So the aggregate saving is OS_1 . Now if society's thriftiness increases, the saving curve shifts towards left which intersects

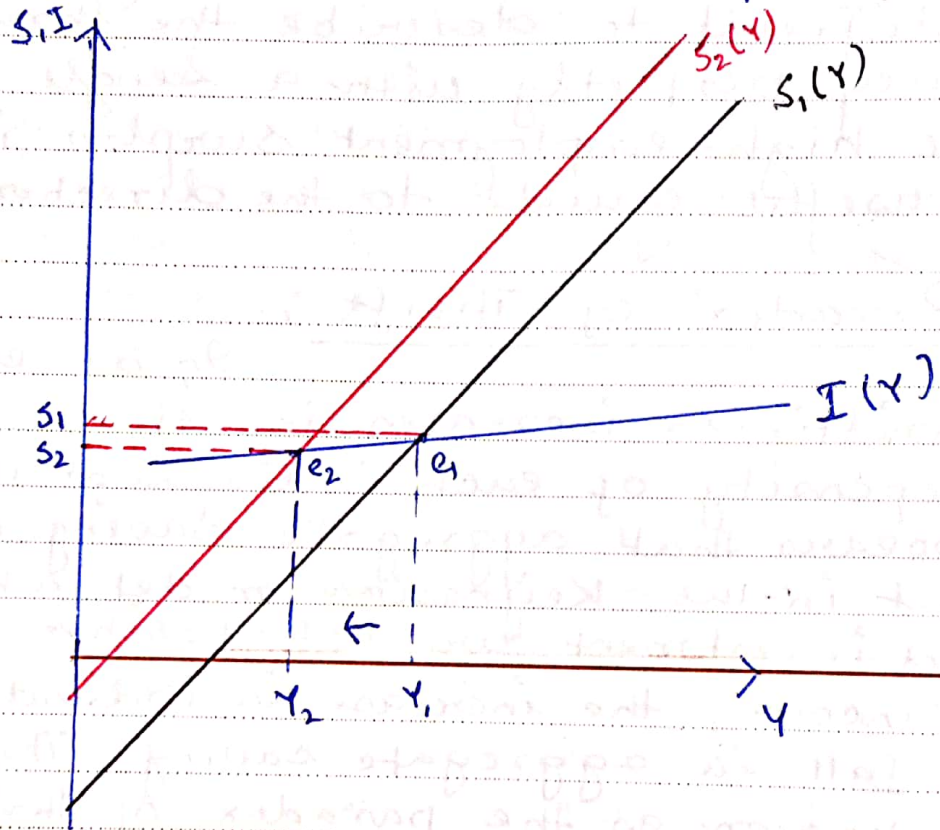
17

Friday

(27)

	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

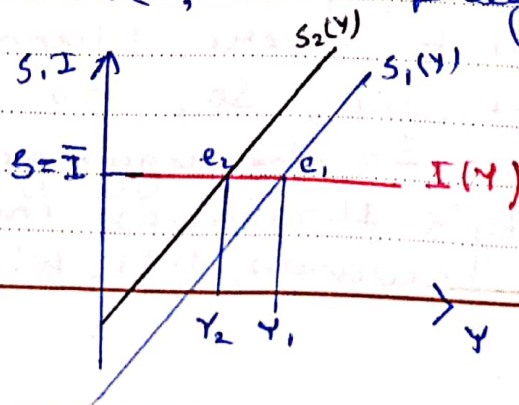
the investment curve at point e_2 , so that equilibrium income falls to OY_2 for which savings falls to OS_2 - This is the paradox of thrift.



18

Saturday

But if investment is taken as autonomous, increase in propensity to save keeps aggregate savings constant. In this case savings-investment equality occurs at the same level less than previous equilibrium income level. Being autonomous, investment does not fall with the fall in equilibrium income, so that aggregate saving does not fall.



S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

28

May 2019

Sunday

19

Thus in the Keynesian model increase in saving leads to fall in income so that aggregate saving falls or may remain constant (when investment expenditure is autonomous). In the Keynesian model, it is the investment that determines savings, not the other way round. In other words it is the demand that determines supply. As saving propensity increases, income falls for which investment falls, so that S-I equality occurs at less than the previous equilibrium income. So fall in aggregate investment leads to fall in aggregate saving, which explains the paradox.

Monday

20

Suppose Consumption function is $C = 100 + 0.75Y$. Investment is $50 + 0.2Y$. If mpc decreases to 0.5, what should be the impact on equilibrium income and aggregate savings. Does it explain the paradox of thrift?

Solution:

$$C = 100 + 0.75Y$$

$$mpc = c' = 0.75$$

$$\therefore S = Y - C$$

$$= Y - 100 - 0.75Y$$

$$= 0.25Y - 100 \rightarrow \text{Saving function}$$

Now, putting $S = I$, we can write

$$0.25Y - 100 = 50 + 0.2Y$$

$$\therefore 0.05Y = 150$$

$$\therefore Y = \frac{150 \times 100}{5} = 3000 = \text{Eq}^m \text{ income}$$

May 2019

21

Tuesday

29

2019

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Putting, $y = 3000$, in the savings function,

$$S = 0.25y - 100$$

$$= 0.25 \times 3000 - 100$$

$$= 750 - 100 = 650$$

Now, when mpc decreases to 0.50, the consumption function is $C = 100 + 0.5Y$ and so the saving function is $S = Y - C = Y - 100 - 0.5Y = 0.5Y - 100$. In equilibrium,

$$S = I$$

$$a, 0.5Y - 100 = 50 + 0.2Y$$

$$a, 0.3Y = 150$$

$$a, Y = 500 \Rightarrow \text{new eq}^m \text{ income}$$

$$\therefore S = 0.5 \times 500 - 100 = 150 = \text{New eq}^n \text{ saving}$$

22

Wednesday

Therefore, this example shows that when mpc falls, mps rises, which leads to fall in equilibrium income and aggregate savings. This explains the paradox of thrift.

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

(30)

May 2019

Thursday

23

MultipliersA. Lump - Sum Tax :

In a closed economy with government the NG Account Identity is

$$Y = a + b(Y - \bar{t}) + \bar{I} + \bar{G} \quad \dots (1)$$

By total derivative, we get

$$dy = da + bdy - bdt + dI + dG \quad \dots (2)$$

We know that $da = 0$, $dt = 0$ and $dG = 0$

$$\therefore dy = bdy + dI$$

$$\therefore dy(1-b) = dI$$

$$\therefore \frac{dy}{dI} = \frac{1}{1-b} > 1 \quad [\because 0 < b < 1] \Rightarrow \text{Investment multiplier}$$

Again assume,

$$da = 0, dt = 0, dI = 0$$

so from equation (2), $dy = bdy + dG$

$$\therefore dy(1-b) = dG$$

$$\therefore \frac{dy}{dG} = \frac{1}{1-b}$$

Friday

24

Government expenditure multiplier

exceeds unity, since $0 < mpc < 1$. So in case of lump-sum tax investment multiplier and government expenditure multiplier are the same.

Now assume, $da = 0$, $dI = 0$, $dG = 0$, then

$$dy = bdy - bdt$$

$$\therefore dy(1-b) = -bdt$$

$$\therefore \frac{dy}{dt} = \frac{-b}{1-b} < 0; \quad (0 < b < 1) \Rightarrow \text{Tax multiplier is negative}$$

As t increases, disposable income falls $\Rightarrow c$ falls

$\Rightarrow AD$ falls $\Rightarrow Y$ falls. Similarly, as t falls,

$(Y - t)$ rises $\Rightarrow c$ increases $\Rightarrow AD$ increases $\Rightarrow Y$

increases $\Rightarrow \frac{dy}{dt} < 0$.

May 2019

25

Saturday

31

2019

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Thus fall in tax rate leads to rise in income in the economy for which tax rate multiplier is negative.

Balanced Budget Multiplier:

When government expenditure is entirely financed by tax revenue then budget is said to be balanced, i.e., when $dG = dt$, budget is balanced. But when $dG > dt$, budget is said to be in surplus and when $dG < dt$, budget is in deficit.

$$\therefore dy = da + b(dy - dt) + dI + dG$$

We assume $da = 0$, $dI = 0$ and $dG = dt$ because increase in government expenditure is entirely financed by tax collection.

$$\therefore dy = bdy - bdt + dG$$

$$\therefore dy(1-b) = -bdt + dG \quad (\because dG = dt)$$

$$\therefore dy(1-b) = dG(1-b)$$

$$\therefore \frac{dy}{dG} = 1 \Rightarrow \text{Balanced Budget Multiplier}$$

$\therefore \frac{dy}{dG} = dG (= dt)$. So value of BBM is unity.

It is to be noted that as G increases $\Rightarrow y$ increases so $\frac{dy}{dG} > 0$ and as t increases $\Rightarrow y$ falls so $\frac{dy}{dt} < 0$

but how $\frac{dy}{dG} > 0$ when $dG = dt$?

This is because increase in G has two effects on income - direct effect ($\because G$ is a component of AD) and indirect multiplier chain effects.

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

i.e., $dy = dG + c^1 dG + c^2 dG + c^3 dG + \dots$ (A)

But increase in 't' has only indirect chain effects as 't' increases, firstly it reduces the disposable income, then it has effect on income via decrease in consumption expenditure, i.e., impact on income for dt is

$$dy = -c^1 dt - c^2 dt - c^3 dt - \dots$$

$$= -c^1 dG - c^2 dG - c^3 dG - \dots \quad (B) \quad (dG = dt)$$

So net effect on equilibrium national income is obtained following results of (A) and (B)

$$dy = dG + c^1 dG + c^2 dG + c^3 dG + \dots - c^1 dG - c^2 dG - c^3 dG - \dots \quad (dt = dG)$$

$$\therefore dy = dG$$

Thus indirect chain effects of increase in G and of increase in 't' cancel out each other. So only for the direct effect of G , the equilibrium income 'y' rises by dy .

$\therefore \frac{dy}{dG} = 1 > 0 \Rightarrow$ So BBM is positive and its value is unity in case of lump-sum tax

B. Proportional Tax :

Here, $T = ty$, $0 < t < 1$, Where 't' is the tax rate.

So, the equation for equilibrium condition is given by,

$$Y = C(Y_d) + \bar{I} + \bar{G}$$

$$\therefore Y = C(Y - tY) + \bar{I} + \bar{G} \quad (\text{Since } Y_d = Y - tY)$$

29

Wednesday

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

Now, let us take the consumption f^h as

$$C = a + bY_d, \text{ where, } 0 < b < 1; a > 0$$

So, from equilibrium condition,

$$Y = a + b(Y - tY) + \bar{I} + \bar{G}$$

$$\text{or, } Y = a + bY - btY + \bar{I} + \bar{G}$$

$$\therefore Y [1 - b(1 - t)] = a + \bar{I} + \bar{G}$$

$\Rightarrow Y = \frac{a + \bar{I} + \bar{G}}{1 - b(1 - t)}$ is the equilibrium level of income in case of a proportional income tax case.

30

Thursday

Numerical Example: Suppose an economy is described by the following equations:

$C = 50 + 0.8Y_d$, $I = 60$, $G = 50$, $T = 50$. All the terms have usual meaning and all figures are in crores of rupees. i) What is the equilibrium level of income? ii) Suppose government spending increases by Rs 30 crores, what will be effect of this on eq^m Y ? iii) Find out tax multiplier and also the BOM. iv) Suppose $T = T + tY = 50 + 0.20Y$. Find out the equilibrium value of Y .

Solⁿ: (i) In eq^m, $Y = C + I + G$

$$\text{Here, } C = 50 + 0.8Y_d$$

$$= 50 + 0.8(Y - 50)$$

S	M	T	W	T	F	S
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

$$\begin{aligned} \text{or, } Y &= 50 + 0.8(Y - 50) + 60 + 50 \\ &= 160 + 0.8Y - 40 \\ &= 120 + 0.8Y \end{aligned}$$

$$\therefore, Y - 0.8Y = 120$$

$$\therefore, 0.2Y = 120$$

$$\therefore Y = 600$$

$\therefore$ the equilibrium NI is Rs. 600 crores.

ii) If Government spending increases by Rs 30 crores = ΔG

$$\text{We know, } \frac{\Delta Y}{\Delta G} = \frac{1}{1 - mpc} = \frac{1}{1 - 0.8} = 5 \Rightarrow \text{Govt. expd. multiplier}$$

$$\therefore \Delta Y = 5 \times \Delta G$$

$$= \text{Rs } (5 \times 30) = \text{Rs } 150 \text{ crores}$$

$\therefore$ The NI will increase by Rs 150 crores.

iii) Tax multiplier,

$$\frac{\Delta Y}{\Delta t} = \frac{-mpc}{1 - mpc} = \frac{-0.8}{1 - 0.8} = -4.$$

$$BBM = \frac{1}{1 - b} - \frac{b}{1 - b} = 5 - 4 = 1$$

iv) When $T = 50 + 0.20Y$, we have proportional tax system in which case the equilibrium NI is given by

$$Y = \frac{a + \bar{I} + \bar{G}}{1 - b(1 - t)}$$

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

$$\begin{aligned}
 C &= 50 + 0.8 Y_d \\
 &= 50 + 0.8 (Y - 50 - 0.20 Y) \\
 &= 50 + 0.8 Y - 40 - 0.16 Y \\
 &= 10 + 0.64 Y
 \end{aligned}$$

So here $a = 10$, $b(1-t) = 0.64$

$$\begin{aligned}
 \therefore Y &= \frac{a + \bar{I} + \bar{G}}{1 - b(1-t)} \\
 &= \frac{10 + 60 + 50}{1 - 0.64} = \frac{120}{0.36} = 333
 \end{aligned}$$

2

Sunday

So equilibrium NI = Rs 333 crores.

Multipliers in case of Proportional Tax System:

A. Investment Multiplier:

$$Y = a + bY - bY + \bar{I} + \bar{G}$$

By total derivative of the equation,

$$\begin{aligned}
 dy &= da + bdy - b(dy + dI + dG) \dots \\
 dy &= da + bdy - bdy - b dI + dI + dG \dots \textcircled{A}
 \end{aligned}$$

Assuming $da = 0$; $dG = 0$; $dt = 0$

$$\Rightarrow dy = bdy - bdy + dI$$

$$\therefore dy [1 - b(1-t)] = dI$$

$$\therefore \frac{dy}{dI} = \frac{1}{1 - b(1-t)}$$

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

It is the investment expenditure multiplier, in case of proportional income tax, where

$$\frac{dy}{dI} > 0 \quad [b > 0, t > 0]$$

$$1 - b < 1 - b + bt$$

$$\therefore \frac{1}{1-b} > \frac{1}{1-b+bt}$$

$$\therefore \left. \frac{dy}{dI} \right|_{\text{lump-sum tax}} > \left. \frac{dy}{dI} \right|_{\text{proportional tax}}$$

Thus the value of investment multiplier reduces in case of proportional tax than the case of lump-sum tax. In case of **Tuesday** **4**

lump-sum tax, tax rate is fixed. So it does not affect income. But in case of proportional tax system as income increases Y increases so that disposable income decreases for which consumption falls which reduces income to some extent. Here tax acts as a leakage in the multiplier process, So, value of investment multiplier reduces.

Govt. Expenditure Multiplier:

Assuming, $da = 0$; $ds = 0$; $dt = 0$

From equation (A),

$$dy = b dy - bt dy + dG$$

$$\therefore dy [1 - b(1-t)] = dG$$

$$\therefore \frac{dy}{dG} = \frac{1}{1-b(1-t)} \rightarrow \text{govt. expenditure multiplier}$$

S	M	T	W	T	F	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			



It is the investment expenditure multiplier, in case of proportional income tax, where

$$\frac{dy}{dI} > 0 \quad [b > 0, t > 0]$$

$$1 - b < 1 - b + bt$$

$$\therefore \frac{1}{1-b} > \frac{1}{1-b+bt}$$

$$\therefore \left. \frac{dy}{dI} \right|_{\text{lump-sum tax}} > \left. \frac{dy}{dI} \right|_{\text{proportional tax}}$$

Thus the value of investment multiplier reduces in case of proportional tax than the case of lump-sum tax. In case of lump-sum tax, tax rate is fixed.

Tuesday



So it does not affect income. But in case of proportional tax system as income increases Y increases so that disposable income decreases for which consumption falls which reduces income to some extent. Here tax acts as a leakage in the multiplier process, so, value of investment multiplier reduces.

Govt. Expenditure Multiplier:

Assuming, $da = 0$; $dI = 0$; $dt = 0$

From equation (A),

$$dy = b dy - bt dy + dG$$

$$a, \quad dy [1 - b(1-t)] = dG$$

$$\therefore \frac{dy}{dG} = \frac{1}{1-b(1-t)} \rightarrow \text{govt. expenditure multiplier}$$



S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Where $\frac{dy}{dG} > 0$

Tax Multiplier:

Assuming, $da = 0$; $dG = 0$; $dI = 0$

$$dy = bdy - b \cdot t \cdot dy - by \cdot dt$$

$$a, \quad dy(1 - b + bt) = -by \cdot dt$$

$$b, \quad \frac{dy}{dt} = \frac{-by}{1 - b + bt} < 0, \text{ Since } b < 1, \quad 0 < t < 1, \text{ thus}$$

Under proportional tax system, the tax multiplier is negative.



Thursday

Balanced Budget Multiplier:

Now, let $dG = dt$ and also assume $da = 0$, $dI = 0$.

$$\therefore dy = bdy - b \cdot t \cdot dy - by \cdot dt + dG$$

$$\therefore dy = bdy - b \cdot t \cdot dy - by \cdot dG + dG$$

$$\therefore dy [1 - b(1 - t)] = dG (1 - by) \quad (\because dG = dt)$$

$$\therefore \frac{dy}{dG} = \frac{1 - by}{1 - b(1 - t)} \Rightarrow \text{BBM}$$

$\therefore$ The value of BBM is not unity in case of proportional income tax.

S	M	T	W	T	F	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Numerical Example:

Suppose the Consumption function is $C = 50 + 0.75 Y_d$. If investment and govt. expd. are ₹100 each and tax rate is 10%. then find equilibrium national income and consumption. Find also the value of tax multiplier.

Solⁿ: $C = 50 + 0.75 Y_d$ $\therefore a = 50$, Autonomous Consumption

$$\frac{dc}{dy_d} = 0.75 \Rightarrow mpc = b$$

and $I = G = ₹100$, $t = 10\%$.

$$\therefore Y = \frac{a + I + G}{1 - b(1 - t)} = \text{equilibrium NG}$$

Saturday

8

$$= \frac{50 + 100 + 100}{1 - 0.75(1 - 0.1)} = \frac{250}{1 - 0.675} = \frac{250}{0.325}$$

$$= ₹ 769.23 \text{ (approx)} = eq^m \text{ NG.}$$

$$C = 50 + 0.75 (Y - Y_t)$$

$$= 50 + 0.75 (769.23 - 769.23 \times 0.1)$$

$$= 50 + 0.75 (769.23 - 76.923)$$

$$= 50 + 0.75 \times 692.307 = ₹ 569.23$$

and tax multiplier $\Rightarrow \frac{dy}{dt} = \frac{-by}{1 - b(1 - t)}$

$$\therefore \frac{dy}{dt} = - \frac{0.75 \times 769.23}{1 - 0.75(1-0.1)} = - \frac{576.92}{0.325}$$

Thus increase in tax rate by Rs 1 reduces eq^m income by ₹ 1775.14.

Numerical Example :

$$C = 10 + 0.8 Y_d, T = -40 + 0.25 Y, I = 35,$$

$$G = 15. \text{ a) Find out the eq}^m \text{ income.}$$

b) Suppose Y is to be raised to a value 280, what are the different policies which may be used to achieve this? Find out the effects on C and deficit in the budget under each of the policies.

10

Monday

Solⁿ: $Y_d = Y - T = Y + 40 - 0.25 Y$
 $= 40 + 0.75 Y$

In eq^m, $Y = C + I + G$

$$\therefore Y = 10 + 0.8 (40 + 0.75 Y) + 35 + 15$$

$$\therefore Y = 10 + 32 + 0.6 Y + 50$$

$$\therefore 0.4 Y = 92$$

$$\therefore Y = \frac{92}{0.4} = \frac{92 \times 10}{4} = 230$$

$\therefore$ Equilibrium NG is ₹ 230 crores.

b) If Y is raised to ₹ 280 crores, then required change in NG will be, $\Delta Y = 280 - 230 = ₹ 50 \text{ crore}$. This rise in NG may occur due to rise in investment (di), rise in govt. expenditure (dg) or by decrease in tax rate (dt).

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

$$\begin{aligned} \text{Since, } C &= 10 + 0.8 Y_d \\ &= 10 + 0.8 \times (40 + 0.75 \times Y) \\ &= 42 + 0.6 Y \end{aligned}$$

$$\Delta C = 0.6 \times \Delta Y = 0.6 \times 50 = 30 \text{ crores.}$$

∴ The amount of increase in consumption due to Rs 50 crores increase in income.

Budget deficit: $G - T$

$$\therefore \Delta BD = \Delta G - \Delta T$$

As G rises, income rises as well. So that tax revenue (T) also increases since $T = tY$.

∴ BD may increase or decrease or remain constant. When investment increases income increases by multiplier process, so that tax revenue also rises, which results fall in BD, given G . When tax rate falls, income rises via rise in consumption expenditure so that tax revenue also increases. This leads to a fall in BD.

June 2019

13

Thursday

Questions on
SKM:

2019

MAY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

1. What are the basic differences between Keynesian and Classical schools of economics?

2. Why output fluctuates around its trend growth path (potential output)?

3. What is potential output?

4. In the Keynesian model, "Spending determines output and income, but output and income also determine spending." Explain.

5. Define aggregate demand and ~~equilibrium~~.

~~How does~~ Explain the mechanism by which

14 ^{Friday} the equilibrium is restored back if
(i) $Y > AD$ or (ii) $Y < AD$ or what role is played by change in inventory in NI determination?

6. State the characteristics of the following consumptionⁿ f^n . $C = \bar{C} + cY_d$
Graph the consumption function.

7. Find out savings function from the consumptionⁿ f^n of $C = \$20 + 0.90Y_d$. Explain the components of the savings f^n .

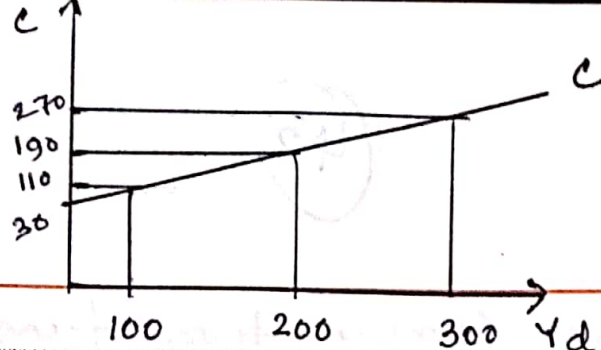
8. a) Construct an equation from the consumptionⁿ and disposable income relationship from below.

b) Which components of this equation represent exogenous consumptionⁿ and endogenous consumptionⁿ?

2019

JULY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			



June 2019

Saturday

15

9. Plot the consumption function $C = 50 + 0.6 Y_d$ and derive the corresponding savings function.
10. Suppose X consumes all his income at every level of income. Draw this consumption and savings function. What are his MPC and MPS?
11. "Along the consumption function income changes more than consumption." Why? What does this say about the MPC and MPS?
12. Explain diagrammatically (mathematically) the determination of equilibrium level of output.
13. Explain the equilibrium level of output with the help of savings and investment f_n . Show this equilibrium is stable.
14. Define multiplier. Find out the investment multiplier when govt. purchase, tax and net exports are constant.
15. Find out govt. purchase multiplier and tax multiplier. Explain why govt. purchase multiplier is positive but tax rate multiplier is negative.
16. If consumption function of an economy is $C = 200 + 0.4 Y$ and if investment expenditure increases from ₹ 200 crores to ₹ 250 crores, what would be the impact on eq^m National Income?

Sunday

16

June 2019

43

2019

MAY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

17

Monday

16. Suppose the consumption function is $C = 100 + 0.75Y$, what would be the value of investment multiplier? If investment expenditure rises by ₹100 crores, what would be the impact on eq^m income?

17. Find out equilibrium NG in a closed economy with govt. in case of lump-sum tax. If $C = 100 + 0.8Y_d$, where lump-sum tax, $\bar{T} = ₹20$ and if autonomous investment and govt. expenditure are ₹200 each, find out eq^m NG.

18. What is Balanced Budget Multiplier? What is its value is unity in case of lump-sum tax?

18

Tuesday

19. Derive eq^m NG in case of proportional tax. If consumption fn is $C = 100 + 0.2Y_d$, investment and govt. exp are ₹500 crores each and if tax fn is $T = 0.1Y$, find out eq^m income. What happens to the eq^m income if investment rises by ₹200 crores?

20. Find out the value of investment multiplier in proportional tax system. How does it differ from the value, in case of lump-sum tax system and why?

21. Derive the values of government expenditure and tax multipliers in proportional tax case.
Explain the sign.

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

22. Derive BBM in case of proportional tax system. Why the value is not unity in this case.

23. Suppose the consumption fn is $C = 100 + 0.8 Y_d$. If investment and govt. expenditure are 2200 crores each and if tax rate is 10%, find eq^m - NS.

21. Why do we call mechanisms such as proportional income taxes and the welfare system automatic stabilizers? Explain how ^{and why} proportional income tax affects fluctuations in output.

22. What is the full-employment budget surplus? Why might it be a more useful measure ^{Thursday 20} than the actual (unadjusted) budget surplus?

23. 'An increase in propensity to save leads to a fall in aggregate savings.' - Discuss the statement in the context of Keynesian model.

24. What is 'Paradox of Thrift'? What assumptions are required regarding saving and investment functions to explain it? Is it valid if investment expenditure is taken as autonomous?

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

21

Friday

(45)

25. Suppose the consumptionⁿ C is given by $C = 100 + 0.8Y$, whereas investment is given by $I = 50$.

- What is the eq^m level of income?
- What is the level of saving in eq^m?
- If output is at the level of 800, what will be the level of involuntary inventory accumulation?
- If I rises to 100, what will be the effect on the eq^m income?
- What is the value of multiplier, d , here?
- Draw a diagram indicating the equilibria in both parts a and d.

22

Saturday

26. Suppose an economy is described by the following function:

$$C = 50 + 0.8Y$$

$$\bar{I} = 70$$

$$\bar{G} = 200$$

$$\bar{TR} = 100$$

$$t = 0.20$$

- Calculate the equilibrium level of income and the multiplier in this model.
- Calculate the budget surplus.
- Suppose t increases to 0.25. What is the new equilibrium income? The new multiplier?
- Calculate the change in BS. Would you expect the change in the surplus to be more or less if $c = 0.9$ rather than 0.8?

S	M	T	W	T	F	S
1	2	3	4	5	6	
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

(46)

June 2019

Sunday

23

e) Can you explain why the multiplier is 1 when $t=1$?

27. Suppose an economy is operating in equilibrium, with $Y_0 = 1000$. If the govt. undertakes a fiscal change whereby the tax rate t , increases by 0.05 and govt. spending increases by 50, will the budget surplus go up or down? Why?

28. Suppose the govt. decides to reduce transfer payments (such as welfare) but to increase the govt. purchase of goods and services by an equal amount. That is, $\Delta G = -\Delta TR$

a) Would you expect eq^m income to rise or fall as a result of this change? Why?

Monday

24

Check your answer with the following numerical example: Suppose that, initially, $c = 0.8$, $t = 0.25$ and $Y_0 = 600$. Now let $\Delta G = 10$ and $\Delta TR = -10$

b) Find the change in eq^m income, ΔY_0 .

c) What is the change in budget surplus, ΔBS ? Why has BS changed?