(ii) $\delta Y = K_{T_I} \times \delta T_I$

$$= -\frac{-1}{1-b} \times \delta T_I = -\frac{1}{0.4} \times 100$$

$$= -2.5 \times 100 = -\text{Rs. } 250 \text{ crore}$$

If on the basis of the above derivations the implication is drawn that the government should resort more to indirect taxes in order to wipe out the inflationary gap. This will lead to a very paradoxical situation as such taxes are inflationary by their very nature. It is dangerous to rely exclusively upon indirect taxation. The effective control upon inflation, in fact, requires a judicious blend of both direct and indirect taxes.

3. BALANCED BUDGET MULTIPLIER

We have examined so far the different methods through which the government in a country can bring about changes in the equilibrium level of income. A government can exert a decisive impact on the level of economic activity through expenditure on current purchases, transfers and investment. However, most of the governments remained bound by the traditional principles of laissez faire and the balanced budgets uptil 1930's. The spectre of inflation had horrified the classical writers so thoroughly that they always refrained from suggesting a budget deficit even during the periods of unemployment and depression. Brooman quotes a nineteenth century British Chancellor of Exchequer in this context. He persisted that the budget is "an animal that needs a surplus."[2] Two main arguments against the budget deficit were the fear of inflation and the increased debt burden. The argument based on inflationary dangers presumes a state of full employment and is untenable when there is unemployment or depression. The second argument concerning debt burden has some relevance, if the deficit is financed by external borrowings. When the deficit is financed by internal borrowing, it is worth incurring if an increase in output is likely to be more than the amount of interest payments. The payment of principal amount does not involve excessive money burden, since it represents simply a transfer between the members of the same community. There is no doubt that the budget deficits have an expansionary effect upon the economy but for many years the controversy has been raging about the expansionary effect of a balanced budget. If, in an attempt to balance the budget, the additional public spending is matched with an equivalent amount of tax, the inference may be drawn that the overall effect upon income will be neutral. However, the balanced-budget theorem has underlined the multiplier effect of a balanced budget upon the level of income.[3]

The theorem in its simplest form gives the conclusion that the expansionary effect of a balanced budget upon income is exactly equal to the amount of additional government spending or the additional tax. Alternatively it implies that *balanced budget multiplier is equal to unity*. The theorem is based on the following *assumptions* :

(i) The private investment and government expenditure are autonomously given.

(ii) The changes in government spending and taxes do not make any impact upon the distribution of income in the community.

(iii) The government expenditure refers to the current purchases of commodities and services and does not include the transfer payments.

[illegible]

Substituting (ii), (iii) and (iv) in (i), we get

$$Y = C$$

$$Y = C_a + bY - \overline{T} + \overline{I} \quad ...(v)$$

or $$Y - bY = C_a - \overline{T} + \overline{G} \quad ...(vi)$$

or $$Y(1-b) = C_a - \overline{T} + \overline{G} \quad ...(vii)$$

$$Y = \frac{C_a - \overline{T} + \overline{G}}{1-b} \quad ...(viii)$$

Now we suppose that the government, in order to balance the budget, increases the expenditure by (δG) and there is, at the same time, an equivalent increase in tax ($\delta T = \delta G$). Let us denote both by δG.

$$C = C_a + b(Y - \delta G) \quad ...(ix)$$

This relation is based on the assumption that consumption is a function of the disposable income ($Y - \delta G$).

$$I = \overline{I} \quad ...(x)$$

$$G = \overline{G} + \delta G \quad ...(xi)$$

[illegible]

Subtracting (viii) from (xv)

$$Y_B - Y = \frac{\delta G(1-b)}{(1-b)} \quad ...(xvi)$$

$$\Delta Y = \frac{1-b}{1-b}\delta G \quad ...(xvii)$$

Since $\Delta Y = K_B \cdot \delta G$

$$\therefore K_B = \frac{1-b}{1-b} = 1$$

K_B is the balanced budget multiplier which is a ratio of a change in income to a change in government expenditure (or change in taxes), when the budget is balanced.

Hence the balanced budget multiplier is equal to unity and an additional expenditure of Rs. 50 crore, matched with an additional taxation of Rs. 50 crore to keep the budget balanced, will cause the income to expand also by Rs. 50 crore.

The effect of a balanced budget upon the level of income can also be understood through the fact that the net increment in income after a balanced budget is determined by the variations in income due to government expenditure multiplier (K_G) and the direct tax multiplier (K_{TD}). Given the change in tax and public spending as equal to δG and the marginal propensities to consume of tax payers and suppliers of goods and services to the government as equal, the income flows can be shown as :

Increase in income due to government spending

$= \delta G\,(1 + b + b^2 + b^3 + ...)$

Decline in income due to taxation (δT)

$= \delta T\,(- b - b^2 - b^3 - .....)$

Net change in income $= \delta G$ $\quad (\because \delta G = \delta T)$

When the net change in income is equal to additional government spending (or direct taxation), it means that the balanced budget multiplier is equal to unity. This may be illustrated in another way also.

$$K_B = K_G + K_{TD}$$

$$K_B = \frac{1}{1-b} - \frac{b}{1-b} = \frac{1-b}{1-b} = 1$$

The effect of equivalent changes in government spending and taxes can also be illustrated through Fig. 4. We suppose that $\delta G = \delta T$ = Rs. 50 crore and b = 0.6. The increase in government spending by Rs. 50 crore will increase (I+G) function to (I+G+δG) but (S+T) function will rise not by Rs. 50 crore but by a little less *i.e.* $b(\delta T) = 0.6 \times 50$ = Rs. 30 crore.

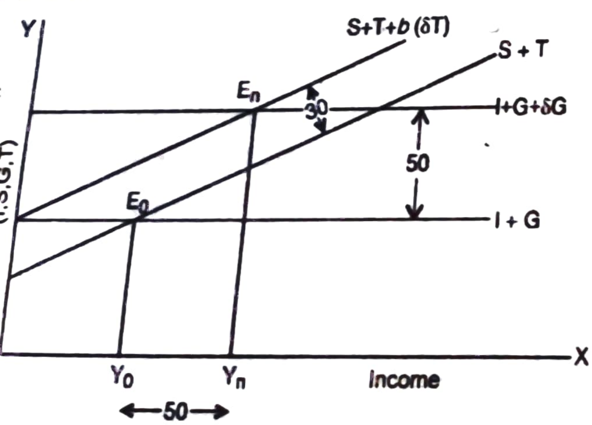

Fig. 4

The autonomous (I+G) function intersects (S+T) function at E_0 to determine Y_0 level of income. When the government expenditure is increased by Rs. 50 crore and it is matched by an equivalent increase in tax, the investment and government expenditure function is (I+G+δG) indicating a vertical distance of Rs. 50 crore between (I+G+δG) and (I+G). But (S+T) function increases not by Rs. 50 crores but by $b(\delta T)$ = Rs. 30 crores. The intersection between (I+G+δG) and (S+T+$b\delta$T) determines the final equilibrium position E_n and the level of income Y_n such that the gap between equal Y_n and Y_0 is of the magnitude of Rs. 50 crore. Thus K_B, being equal to unity, the income has changed exactly equal to the increment in government spending and additonal tax.

II. Balanced Budget Multiplier with Proportional Taxation

In the above analysis, the taxes were assumed to be autonomous of income or these were regarded as the *lumpsum* taxes. But the tax revenues may vary directly with the changes in income as it happens in case of the proportional or progressive taxes.

An *induced tax function* can be written as

$$T = T_0 + tY \qquad ...(xviii)$$

Here T_0 is the amount of autonomous tax and t is the proportion of income that is taxed or the average or marginal propensity to tax that is assumed to remain constant considering that the tax is proportional.

$$Y = C + I + G \qquad ...(xix)$$

$$C = C_0 + bY_d$$

$$C = C_0 + b(Y - T) \qquad ...(xx)$$

Substituting (*xviii*) into (*xx*)

$$C = C_0 + b\,(Y - T_0 - tY) \qquad ...(xxi)$$

$$I = \overline{I} \qquad ...(xxii)$$

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$G = \overline{G}$

Substituting equations in equation (*xix*)

$Y = C_0 + bY - bT_0 -$

or $Y - bY + btY = C_0$

or $Y\,(1 - b + bt) = C_0$

$Y = \frac{C_0 +}{}$

If the governme expenditure by δG and of tax (δT) in order to the increased equi expressed as

$Y_n = \frac{C_0 + \overline{I} + \overline{G}}{}$

Subtracting (x

$Y_n - Y = \frac{\delta\overline{G} - b\delta}{1-b+}$

$\delta Y = \frac{\delta\overline{G}(1-b}{1-b+b}$

$\delta Y = \frac{1-b}{(1-b)+}$

$= \frac{1}{1+\frac{bt}{1-}}$

$\therefore K_B = \frac{1}{1+}$

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$$G = \overline{G} \quad ...(xiii)$$

Substituting equations (*xxi*), (*xxii*) and (*xxiii*) in equation (*xix*)

$$Y = C_0 + bY - bT_0 - btY + \overline{I} + \overline{G} \quad ...(xxiv)$$

or $Y - bY + btY = C_0 + \overline{I} + \overline{G} - bT_0$

or $Y(1 - b + bt) = C_0 + \overline{I} + \overline{G} - bT_0$

$$Y = \frac{C_0 + \overline{I} + \overline{G} - bT_0}{1-b+bt} \quad ...(xxv)$$

If the government increases the public expenditure by δG and there is an equal amount of tax (δT) in order to keep the budget balanced, the increased equilibrium income can be expressed as

$$Y_n = \frac{C_0 + \overline{I} + \overline{G} - bT_0 + \delta\overline{G} - b\delta T}{1-b+bt} \quad ...(xxvi)$$

Subtracting (*xxv*) from (*xxvi*), we have

$$Y_n - Y = \frac{\delta\overline{G} - b\delta\overline{G}}{1-b+bt} \quad [\because \delta T = \delta G] \quad ...(xxvii)$$

$$\delta Y = \frac{\delta\overline{G}(1-b)}{1-b+bt} \quad ..(xxviii)$$

$$\delta Y = \frac{1-b}{(1-b)+bt}\,\delta\overline{G} \quad ...(xxix)$$

$$= \frac{1}{1+\frac{bt}{1-b}}$$

$$\therefore K_B = \frac{1}{1+\frac{bt}{1-b}} \quad ...(xxx)$$

In this situation, given b and t as the positive constant fractions, the denominator $\left[1+\frac{bt}{1-b}\right] > 1$ = 0·6 and t = 0·30 and δG = Rs. 50 crore, the equilibrium income will increase by

$$\delta Y = K_B . \delta G.$$

$$= \frac{1}{1+\frac{bt}{1-b}}.\,\delta G = \frac{1}{1+\frac{0.6\times0.30}{1-0.6}} \times 50$$

$$= \frac{1}{1+\frac{0.18}{0.40}}\times 50 = \frac{1}{\frac{0.58}{0.40}}\times 50$$

$$= \frac{0.40}{0.58} \times 50 = 0.69 \times 50$$

= Rs. 34.50 crore.

If the government follows a policy of *progressive taxation* and t increases along with an increase in income, bt will become still larger and the denominator $1 + \frac{bt}{1-b}$ being larger than what its magnitude was in case of proportional taxation, the balanced budget multiplier (K_B) will be still smaller. But any way, so long as b and t are positive, K_B will be positive and greater than zero and will have some expansionary effect upon income.

III. Balanced Budget Multiplier with Induced Investment

In the study of balanced budget multiplier, we have followed so far the assumption that the private investment is autonomous in character. If the *investment function is induced* and taxes are autonomous of income, the magnitude of the balanced budget multiplier will be greater than unity and an increment in government spending will have a multiple effect upon the level of income. K_B under the above assumptions can be derived in the following way :

$$Y = C + I + G \quad ....(xxxi$$

$$C = C_0 + bY \quad ...(xxxi$$