## <u>The Economics of Government Budget Deficits</u>

{Read Artis, chapter 9}

## 1.  <u>The Basic Wealth-augmented Equation</u>

Recall the IS-LM equilibrium with the wealth effect incorporated in the consumption function and the money demand function:

Y*=

$$\frac{l}{hf + l[1 - c(1 - t)]}(c_0 - ct_0 + i_0 + \overline{G} + jW) -$$

$$\frac{f}{hf + l[1 - c(1 - t)]}gW + \frac{f}{hf + l[1 - c(1 - t)]}\overline{M}$$

We can now analyse the impact of the government budget or deficit financing on the economy. First we write Y* from the above in a more compact form:

$$Y^* = k_f (c_0 - ct_0 + i_o + \overline{G} + jW) - k_m gW + k_m \overline{M} \qquad \text{------ (1)}$$

where $k_f = \dfrac{l}{hf + l[1 - c(1 - t)]}$ , i.e. the fiscal multiplier; and

$$k_m = \frac{f}{hf + l[1 - c(1 - t)]} \text{ , i.e. the monetary multiplier.}$$

## 2.  <u>Government Bonds and Money as Wealth</u>

For the representative household, its "*outside*" wealth (W) consists of bonds and money:

W = B + M

$\triangle$ W = $\triangle$(B + M)

where B – value of bonds, M – outside Money, and $\triangle$ is the change operator

*Inside wealth*: is wealth that "washes out" so the aggregate change is zero, e.g. if deposits rise due to a result of both price increases and loans expansion by exactly the same amount, the ***net*** assets of the non-financial sector will remain the same in value.

*Outside wealth*: does not wash out, e.g. "helicopter money". The ***net*** assets of the non-financial sector will increase in value.

The government's budget deficit can be financed by issuing bonds or money:

$\therefore$ its budget financing equation is

   G – T = $\triangle$(B + M)

The practical meaning of this is that the government can pay by giving the enterprises or workers money or bonds. If it is money the enterprises and workers can spend it now. If it is bonds, they have to delay their consumption/investment from the present to the future; but they will get interest payments.

## 3. The Dynamics of Deficit Financing

If we start from an <u>equilibrium position, i.e. a balanced budget</u>, then

$\triangle$(B + M) = $\triangle$G – $\triangle$T

$\triangle$Bg + $\triangle$Mg = $\triangle$Wg = $\triangle$G – $\triangle$T

<u>assuming that the government is the only source of wealth</u>

Using the above compact equation (1), taking total differential:

$$\triangle Y = k_f \triangle \overline{G} + k_f j \triangle Wg - k_{mg} \triangle Wg + k_m \triangle \overline{M} g$$

Four elements of government deficit financed expenditure:

(i)   the direct expansionary effect of the increase in government spending on the IS, given the money supply and the LM ($k_f \triangle G$)

(ii)  the indirect expansionary effect of any increase in consumption associated with the increase in wealth arising from the budget deficit ($k_f jdWg$)

(iii) the indirect contractionary effect of any increase in the demand for money associated with the increase in wealth arising from the deficit ($k_{mg} \triangle Wg$)

(iv)  the indirect expansionary effect of any increase in the money supply associated with financing the budget deficit ($k_m dMg$)
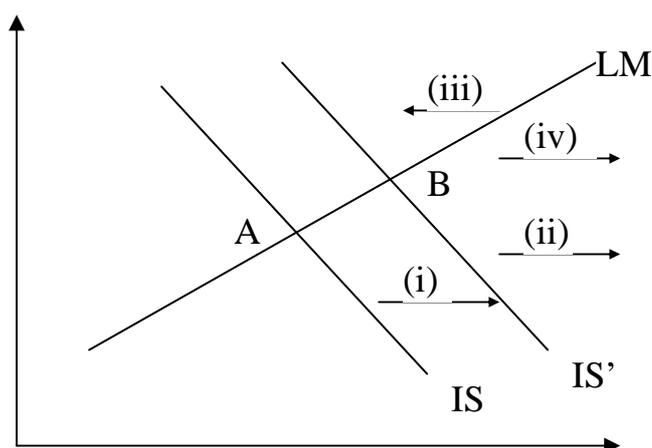


The resultant equilibrium point depends on all these forces.

In general, if the system is stable, a viable long-run equilibrium can be

attained only where wealth is no longer changing and where the wealth-associated terms (ii) – (iii) sum to zero, e.g. point B above.

Since a budget deficit or surplus implies that there is a change in wealth, <u>the final equilibrium must require a balanced budget to prevail</u>. If there is no discretionary intervention to create this condition, then it implies that income and output must adjust until such a balance is restored.



Budget Balance schedule shows a
positive slope because $T = t_0 + tY$
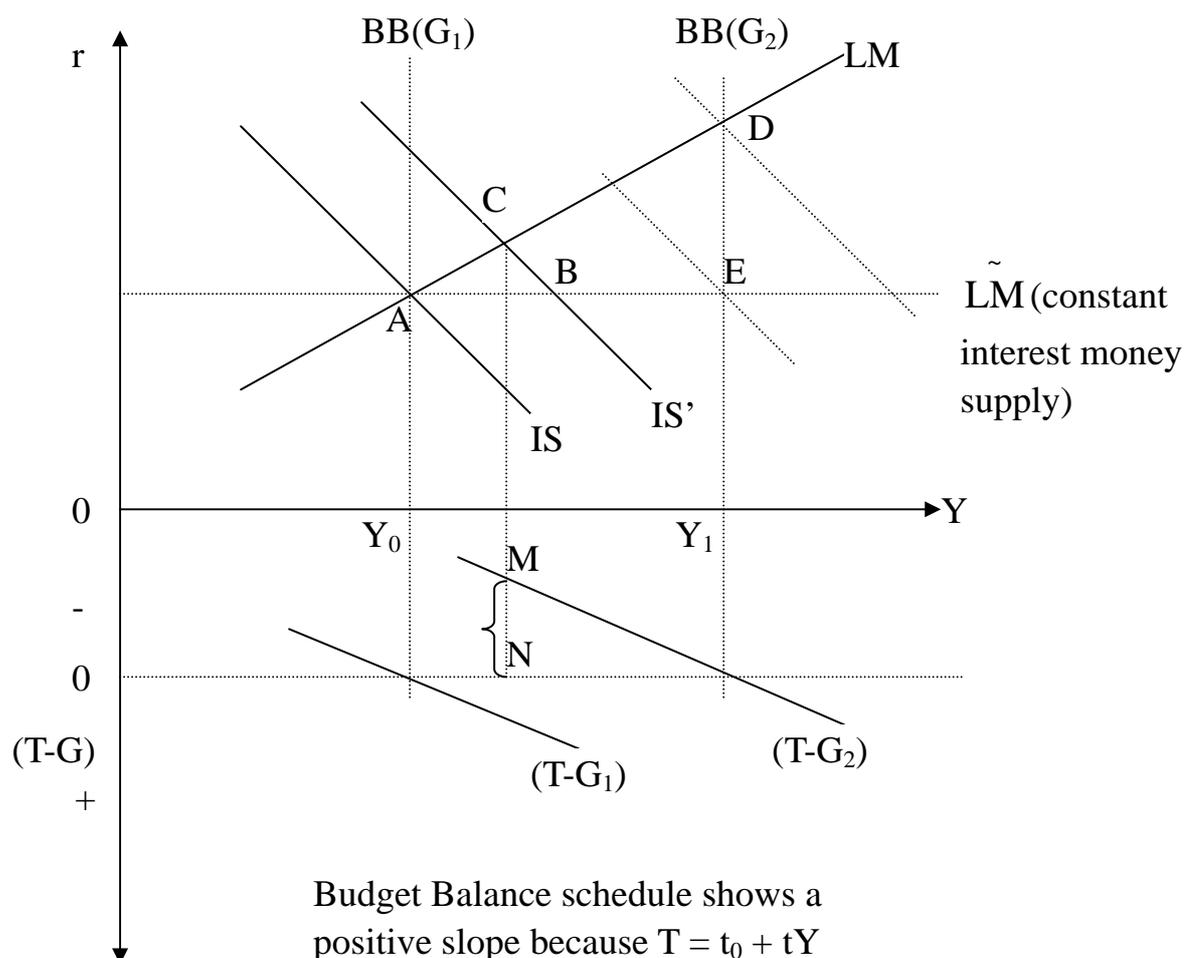
An increase in G shifts the Budget Balance schedule from $(T – G_1)$ to $(T – G_2)$. Now output equilibrium will be changed from $Y_0$ to $Y_1$.

So suppose $G\uparrow$ so that IS $\rightarrow$ IS' and then effects (ii), (iii) (iv) sum to zero, there will be then a deficit of MN. Equilibrium will not be restored unless IS and LM intersect at, say, D or E.

## 4. **Introducing interest and principal repayments**

The picture is more complicated if we take into account principal and interest payments of government bonds over time.

**Assume that the budget deficits are purely bond financed**, i.e., the government does not issue money in the process (so there is no effect (iv)).
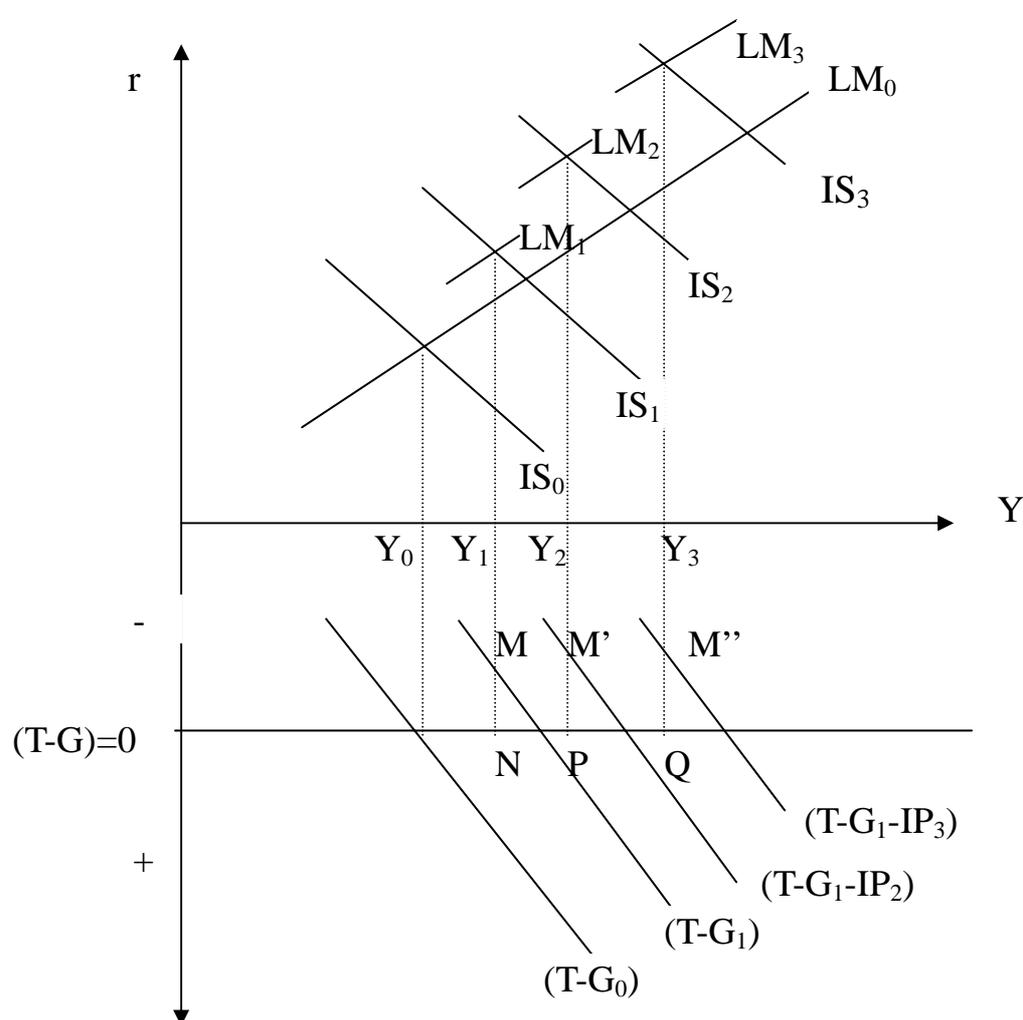


(1)     At $t = 1$,   $G_0 \rightarrow G_1$

        Supposed the deficit is <u>entirely bond-financed</u>: after all effects

        the S-R equilibrium of $IS_1 \times LM_1$; budget deficit = MN

(2)    At t = 2,   $G = G_1$

    Even with no further increase in planned government spending, the outlay of the government will have to include the increased level of spending ($G_1$) and interest payments and principal payments ($IP_2$). The government may have to <u>issue more bonds</u> to finance the deficit. There will be wealth effects: $IS_1 \rightarrow IS_2$, $LM_1 \rightarrow LM_2$, and $Y_1 \rightarrow Y_2$ (fortunately larger than $Y_1$). The deficit may then become $\dot{M}P$.

(3)    The process will go on to period t = 3: $IS_2 \rightarrow IS_3$, $LM_2 \rightarrow LM_3$, and $Y_2 \rightarrow Y_3$ with deficit M''Q etc. …. , until the budget deficit is closed.

**Condition for stability is: the deficit shrinks progressively in each period.**

|  | interest + principal payment |  | additional tax revenue |
|---|---|---|---|
| t+1 | $r(T - G_t)$ | $<$ | $\triangle Y \bullet$(tax-rate) |

where r annualizes <u>both</u> the interest and principal repayments. The additional tax revenue in each successive period must be greater than the principal and interest payments made in that period.

Principal and interest payments depend on

    (i) size of the bonds
       old/original + refinancing; and

    (ii) whether the interest rate is going up or down.

Changes in tax revenue (at a constant tax rate)* come from $\triangle Y$; and

$\triangle Y$ depends on the net wealth effect of further bond issues.

## 5. Instability and the Way Out

** If the overall effect (of (i) – (iv)) turns out to be negative, the system will be unstable because as $Y\downarrow T\downarrow \therefore (G - T)\uparrow$. More bonds need to be issued to finance the expanding deficit; but the contractionary effect (iii) arising from the added demand for money (net of any extra money supply) due to those additional government bonds will induce further output declines.

The <u>saving grace</u> is that the government may resort to a <u>very large increase in the money supply beyond that is needed for financing the budget deficit, but there may be serious inflationary consequences in the long run. Moreover, there may be misallocation of money and credit that result in low-efficiency or even non-productive investments</u>.

This is a situation that some of the developing countries found themselves locked into: output decline, rampant inflation, and chronic fiscal deficits, e.g. many in Latin America and Africa.

*If the government raises the tax rate, what would happen? What would happen to **the budget balance schedule**? And **the IS curve**?

# The Economics of Government Budget Deficits



Budget Balance schedule shows a
positive slope because $T = t_0 + tY$
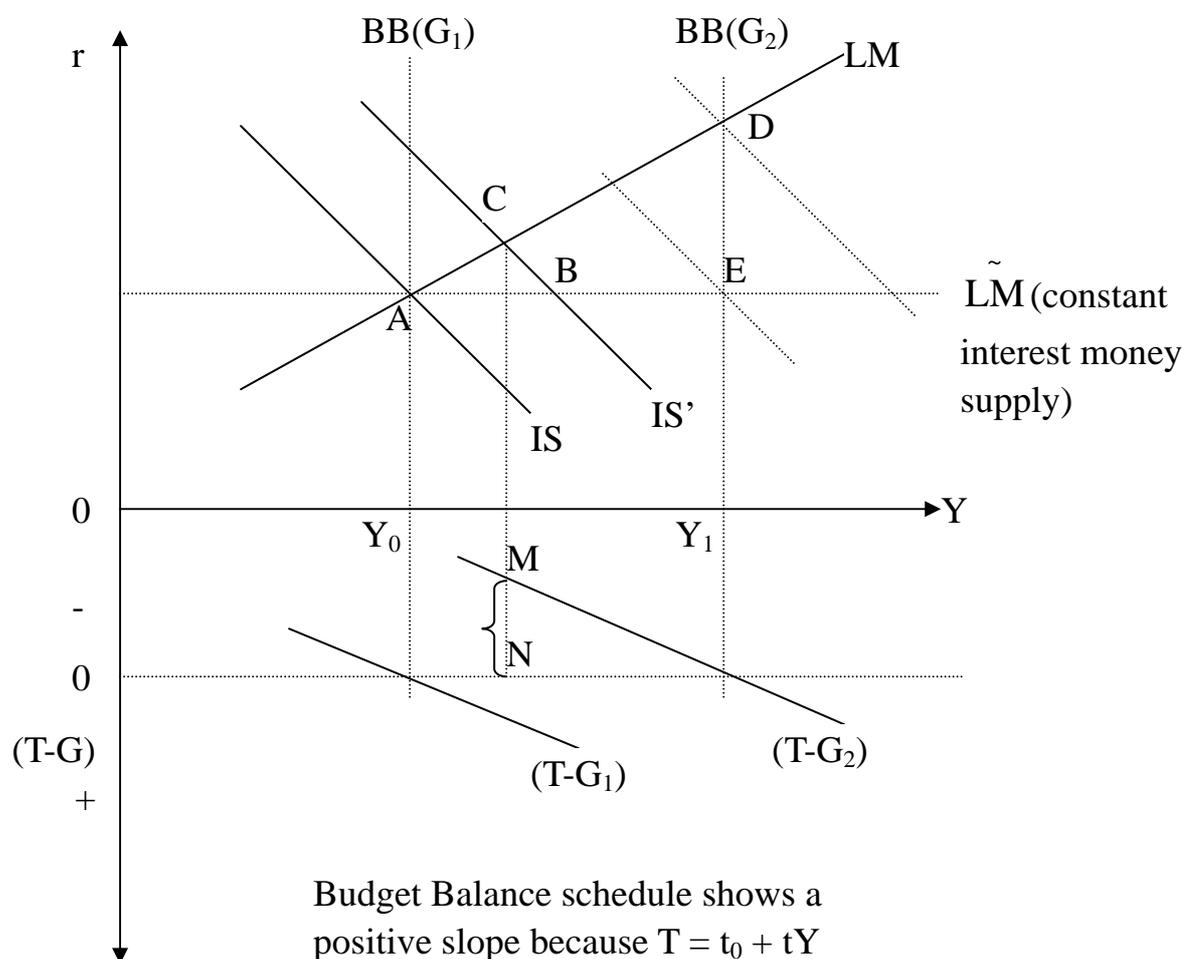
$$r = \frac{1}{f}(c_0 - ct_0 + i_0 + \overline{G} + jW) - \frac{1 - c(1-t)}{f}Y$$

$$Y = \frac{1}{1 - c(1-t)}(c_0 - ct_0 + i_0 + \overline{G} + j\frac{W}{P}) - \frac{f}{1 - c(1-t)}r$$

**(IS curve <u>with</u> wealth effect)**

What will be the effect of:
(1) a rise in the marginal tax rate?
(2) a rise in the marginal propensity to consume?