BOND FINANCED DEFICIT SPENDING IN THE IM-IS CONTEXT: A SUGGESTED CLARIFICATION

By
DAVID A. LARSON, UNIVERSITY OF NEW ORLEANS
(Louisiana, U.S.A.)

The existing literature on the effect of fiscal policy on the LM equation is mis-leading[1]. This situation exists because it is not always made clear that a bond financed deficit does not necessarily lead per se to a leftward shift in LM. The purpose of this note is to clarify this point. We begin by detailing the properties of the particular LM-IS model which deals specifically with bond-financed deficit spending[2].

In the model, wealth (W) is comprised of the capital stock (K), the stock of money (M), and the bond stock (B). The resulting money demand equation is therefore functionally dependent on three variables: income, the interest rate, and wealth. The parameters of the first two variables are too well-known to merit further discussion. The wealth sensivity of money demand, in the LM-IS model, warrants, on the other hand, further detailing.

According to its proponents, the wealth effect on money demand occurs because of the time which is necessarily involved when savers actually switch from one kind of income yielding asset into another. One definition of this phenomenon is provided as follows:

> «The argument is that asset portfolios at any point in time would usually be observed to contain money balances which are the temporary manifestations of uncopleted shifts between other assets. That is, they constitute transactions balances in wealth portfolios, and the size of such portfolios would probably be related positively to total wealth[3]».

Accordingly, when the government issues bonds to cover a deficit, what this definition says is that savers need time to switch from other income yielding assets into these bonds. For example, the savers may now cash in insurance policies in order to obtain the presumably more attractive bonds. However, it is assumed for the money demand effect to occur, that this switching is not perfectly synchronized. Individuals presumably therefore move into money in the interim. Additionally, the

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1. In this context, see: *Readings in Money, National Income and Stabilization Policy* (4th ed.) by Teigen (éd.): McGraw-Hill, N.Y., N.Y. (1978): Specifically, pgs. 236-237.
2. *Ibid.* pgs. 279-285.
3. *Ibid.* pg. 67.

above definition also says that the larger the wealth stock, the bigger is the wealth ef-fect on the demand for money (possible scale economies are ignored). Following the logic of the argument, we may construct a representative numerical demand for money equation.

Let: (1) $W = K + M + B$

With: $K = 299,67 =$ capital stock

$M = 30 =$ money stock

$B = 0 =$ bond stock (initially)

Also, letW (2) $M_D = wW + y Y - rR$

with: $w ==$ wealth sensitivity of money demand $= .455$
(note: advocates state that $0 < w < 1$ (see: Silber (2))

$y =$ income sensitivity of money demand $= .8$

$r =$ interest sensitivity of demand $= -50$

Further, let the initial government equilibrium condition be:

(3) $G - T = \Lambda M + \Lambda B = 0$

with: $G =$ government purchases of goods and services

$T =$ tax revenues

$M =$ change in money stock

$B =$ change in bond stock

(note: K is constant by definition. We are in the economic short run. Changes in output (Y) are achieved by changing employment within the constraint of a fixed capital stock).

We now assume that government incurs a bond financed deficit. However, in order to generate the presumed leftward shift in LM, we must now detail the other properties of this particular LM-IS model as well. First, we assume that taxes are ex-ogenous. This means that once the government initiates a deficit, other things equal, the deficit must persist. Accordingly, we also now relax our assumption about the government being in equilibrium (in fact, given the properties of this model, ceteris paribus, the government is now cast into permanent disequilibrium).

Also, we include an investment equation which has investment depend only on the in-terest rate. Accordingly, under these assumptions concerning the goods market, a leftward shift in LM will happen. It occurs as follows.

The new government spending shifts the the IS curve rightward. However, the corresponding increase in the stock of bonds simultaneously increases the stock of wealth. Thus the demand for money increases. This means, given the supply of money, the LM curve shifts leftward. Furthermore, as long as the deficit persists, the LM curve will continue to shift leftward at the end of each subsequent budget period (as the bonds are refinanced). Accordingly, if the model parameters are selected ap-propriately, the leftward shift in LM may even culminate in a lowering of income relative to its initial level.

Nevertheless, this «result» actually rests on some particular properties of the overall model. For instance, exogenous taxes mean, other things equal, the deficit must persist. (However, we could, just as realistically, make taxes depend difectly on income). Also, by putting exogenous taxes together with investment responding only to the interest rate (as is done), some other atypical results occur. For example, if you raise taxes, in this model, investment increases beacuse the interest rate falls. But higher taxes mean income falls too (IS moves leftward and, given LM, income falls as does the interest rate). Thus, in this model, we have investment rising at the same time that income is falling. (To avoid this outcome, we usually make investment depend directly on income too). Furthermore, if we, alternatively, choose to make taxes respond to income, we no longer have to make the curious assumption about the government's equilibrium position. We no longer have to assume, in other words, that the government, within the context of the model, is in perpetual disequilibrium. In fact, we may now reinstate the standard methodological procedures of comparative statics (which is ordinarily the methodology of IS-LM analysis). That is, we can begin our analysis with the system in equilibrium. More specifically, we can start with the government having a balanced budget while, at the same time, the goods and money markets are simultaneously in equilibrium. We can then utilize fiscal policy and have the system move to a new equilibrium position where, once again, the government, the money market, and the goods market are all in equilibrium. The following numerical model illustrates this point.

The Model

$$C = 10 + .8Y_D (Y_D = Y - T)$$
$$T = -20 + .2Y$$
$$I = 16.18 + .3382Y - 10R$$
$$G = 0 \ (= \text{to begin})$$
$$M_D = .455 \ (329.67) + .8Y - 50R$$
$$\text{or, } M_D = 150 + .8Y - 50R$$
$$M\text{supply} = 30$$

The above model yields the following IS and LM equations, respectively.

$$(4) \quad R = 4.218 - .00218Y \quad (IS)$$
$$(5) \quad R = 2.4 + .016Y \quad (LM)$$

Setting LM equal to IS and solving yields the initial equilibrium values shown below in column 1 of Table I.

TABLE I

| variable	(1) original value	(2) $\Delta G = \Delta B = 10$ (IS′=LM) new value	(3) (2-1) change value	(4) $(\Delta G = \Delta B = 10)$ (IS′=LM′) change	(5) (4-2)
Y(=GNP)	100	155	55	150	-5
C	90	125.20	35.2	122	-3.20
I	10	19.8	9.8	18	-1.8
G	0	10	10	10	0
T	0	11	11	10	-1
Y_D	100	144	44	140	-4
S	10	18.8	8.8	18	-.8
(G-T)	0	-1	-1	0	+1
M_D	30	—	—	30	—
Msupply	30	—	—	30	—
R	4%	4.88%	.88%	4.89%	-.01%

As Table I (colum) shows, the income level, to begin with, is 100 while the corresponding interest rate is 4%. also, the government is in equilibrium (G-T = $\Delta M = \Delta B = 0$) while, at the same time, leakages ($\Sigma + T = 10$) wequal injections (I+G = 10) and money demand (30) equals money supply (30).

We now assume that government initiates a $10 bond financed deficit. Accordingly, the equilibrium level of income, after all processes are worked out, becomes $150 and the corresponding interest rate is 4.89% (column 4, Table I). Using the method of comparative statics, we may decompose the overall change in income into its component parts. First, we analyze only the effect of the change in government spending on the IS equation. (Then we subsequently analyze the effect on LM due to the corresponding increase in bonds). In terms of graph 1 below, the increase in government spending, by itself, moves us from point A to point B on the diagram. (Then the movement from point B to point C on the same diagram occurs because of the corresponding increase in the wealth stock).

with: IS = 4.218 - .00218Y
     IS′ = 5.218 - .00218Y
     LM = 2.4 + .016Y
     LM′ = 2.491 + .016Y

After the increase in government spending, the new IS equation is: R=5.218 —

Graph 1
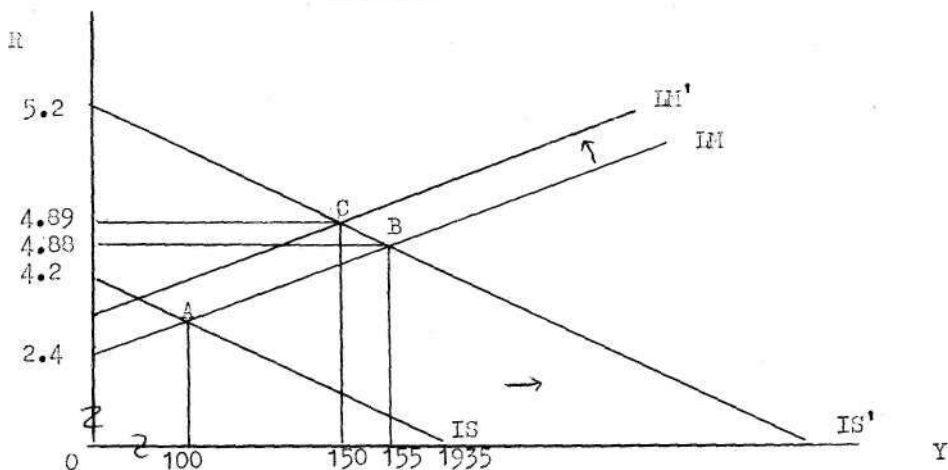
with: IS = 4.218 — .00218Y
        IS'= 5.218 — .00218Y
        LM = 2.4 + .016Y
        LM'= 2.491 + .016Y

.00218Y. As the above diagram shows, this means income changes to 155, while the interest rate moves to 4.88% (point B on the diagram). The resultant new equilibrium values for all the variables at this point are provided in column 2 of Table I. Moreover, Table I also lists the equilibrium values (and changes) which result when the LM equation is subsequently shifted in accordance with the increase in the stock of wealth ($\Delta B = 10$). On graph 1, this is the movement from point B to point C. (The new LM equation is: $R = 2.491 + .016Y$.).

As colum 4 of Table I shows, the new equilibrium values at graph point C are such that the system is once again in equilibrium. For leakages (S+T = 28) equal injections (I+G = 28) and money demand (30) equals money supply (30) while, at the same time, the government's equilibrium position is reestablished ($G_0 T = \Delta B = \Delta M = 0$) at point C on diagram 1. As colum 4 of Table I indicates, taxes are now $10 and are equal to the $10 of new government spending. That is, the government spending increase of $10, given the parameters of the model, has generated an equivalent amount of new tax receipts (= 10). And this result occurs after both the shift in the LM curve and the IS curve have been taken into account. At this point, we may go back and reconstruct the wealth effect so that we can infer what the final effect, in this model, on the LM equation will be.

To begin with, money demand is altered as follows:

(6) $M_D = 150 + .8Y - 50R$
(7) $M_D = .455 (339.67) + .8Y - 50R$
   $= M_D\cdot = 154.55 + .8Y - 50R$
        (The wealth stock is now $339.67 since $\Delta B = 10$).

Accordingly, the increase in money demand leads to the new LM equation of $R =$

2.491 + .016Y. This means LM shifts leftward graphically. (Additionally, it is believed that LM will shift leftward again at the end of subsequent budget periods. This results because, presumably, the continuing deficit necessitates periodic refinancing). However, as column 4 of Table I shows, the government has a balanced budget after both the spending and wealth effects are taken into account in this case.

Therefore, the bonds may now be redeemed at the end of the budget period (with the tax receipts automatically generated during the same period). This means that expect, ceteris paribus, that in the next period the LM curve will shift rightward (if anything) back to its original position since, at the end of this period, the government is back in equilibrium. In other words, the government, at this point, is in a position to retire the bonds (returning wealth to $329.67) if it so chooses. The important point is, that when we move from one equilibrium position to another, the LM curve does not necessarily permanently shift leftward. Furthermore, our particular comparative statics example is probably more representative of what is ordinarily implied by LM-IS analysis.

We do not typically assume taxes are simply exogenous. Nor do we ignore the relationship of income and investment. Moreover, we do not usually relegate one sector of the model to permanent disequilibrium (as is dome to the government by advocates of the money market wealth effect).

Further, once these phenomena are recognized, bond financed deficit spending does not automatically shift LM leftward. In this context, it is important to stress that it is the specific properties and assumptions about the nature of the goods-market relationships which actually lead to the conclusions about LM. As our example shows, it is not bond-financed deficit spending per se which produces the LM outcome. (In our case, the presumed permanent change in LM does not necessarily follow). Rather, the ultimate money market results, to reiterate, can simply reflect the properties and assumptions of the particular LM-IS model used to generate them. In this context, the wealth effect on LM, in other words, is nothing more than a special case.