THE SIMPLE ARITHMETIC OF FISCAL POLICY IN A DEPRESSED ECONOMY: A STRIPPED-DOWN FORMULATION

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With:

• a transitory expansion of government purchases $\Delta G$;
• a real government borrowing rate $r$;
• a multiplier $\mu$;
• a ‘hysteresis’ parameter $\eta$;
• a ‘hysteresis shadow’ decay parameter $\phi$; and
• a drag on the economy from raising a dollar of extra taxes $\xi$.

At a real discount rate of $r$, the effect of transitory fiscal expansion on the infinite-horizon burden of financing the government is:

$$\Delta B = \Delta G \left( 1 - \tau \mu - \frac{\tau \mu \eta}{r + \rho} \right)$$

For $\mu=1.5$, $\tau=0.33$, and for $r$ for credit-worthy sovereigns of zero, expansionary fiscal policy is self-financing as long as:

$$\frac{\eta}{\rho} > 1$$

For a non-zero sovereign real interest rate $r$, the requirement for expansionary fiscal policy to be self-financing is:

$$\frac{\eta}{r + \rho} > 1$$

The effect of expansionary policy on the present value of output is:

$$\Delta W = \Delta G \left[ \mu \left( 1 + \frac{\eta}{r + \rho} \right) - \xi \left( 1 - \tau \mu - \frac{\tau \mu \eta}{r + \rho} \right) \right]$$

For $\mu=1.5$, $\tau=0.33$, and $r=0$, the present value of the difference in output is positive as long as:

$$\xi > \frac{3 (\rho + \eta)}{(\rho - \eta)}$$

Note that $\xi=3$ is the top of the Laffer Curve.
I. A transitory expansion of government purchases $\Delta G$ has four effects on production: (a) a boost to current-year output determined by the multiplier $\mu$ equal to $+\mu \Delta G$; (b) a boost to next-year output, determined by the economy’s degree of “hysteresis” $\eta$ equal to $+\eta \mu \Delta G$; (c) subsequent decay of the hysteresis shadow cast on potential output aggregate supply at a rate $\rho$; and (d) the drag on the economy from the extra taxes needed to finance the initial government purchases. At a real discount rate of $r$, the present value of the first three effects is:

$$\Delta W = \mu \Delta G \left( 1 + \frac{\eta}{r + \rho} \right)$$

II. A transitory expansion of government purchases $\Delta G$ has four effects on the government budget: (a) a boost to this-year government purchases equal to $+\Delta G$; (b) a boost to this-year tax collections via the Keynesian boost to this-year output equal to $-\tau \mu \Delta G$; (c) a boost to next-year tax collections via “hysteresis” equal to $-\tau \eta \mu \Delta G$; and (d) thereafter—as hysteresis effects are persistent but not permanent—continued increased tax collections from the hysteresis shadow decaying at a rate $\rho$. At a real discount rate of $r$, the change in infinite-horizon burden of financing the government is:

$$\Delta B = \Delta G \left( (1 - \tau \mu) - \frac{\tau \mu \eta}{r + \rho} \right)$$

III. For a multiplier $\mu=1.5$, for a marginal tax share $\tau=0.33$, and for a real interest rate $r$ for credit-worthy sovereigns that is zero, an increase in government purchases reduces the present value of the burden of financing the government as long as:

$$\frac{\eta}{\rho} > 1$$
For a credit-worthy sovereign real interest rate of zero, a multiplier $\mu=1.5$, and a marginal tax share $\tau=0.3$, expansionary fiscal policy is self financing as long as the hysteresis parameter $\eta$ is greater than the speed of decay of the hysteresis effect.\footnote{That is not a high hurdle to surmount.} For a non-zero sovereign real interest rate, the requirement for expansionary fiscal policy to be self-financing is:

$$\frac{\eta}{r + \rho} > 1$$

IV. Now return to (I) and add to (I) the implications of (III), with a deadweight loss to output from raising a dollar of tax revenue $\xi$:

$$\Delta W = \Delta G \left[ \mu \left(1 + \frac{\eta}{r + \rho}\right) - \xi \left(1 - \tau \mu - \frac{\tau \mu \eta}{r + \rho}\right) \right]$$

For a multiplier $\mu=1.5$, a marginal tax share $\tau=0.33$, a real interest rate $r$ for credit-worthy sovereigns of zero, the present value of the total net effect on present and future output is thus positive as long as:

$$\xi > \frac{3}{\rho - \eta} \left(\frac{\rho + \eta}{\rho - \eta}\right)$$

Note that $\xi=3$ is the top of the Laffer Curve: the requirement for expansionary fiscal policy to be a good deal are thus considerably weaker than the requirement for tax increases to actually raise revenue.