Economic Policy Effectiveness in Hicksian Analysis: A Note

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In a recent issue of this Journal *Tavlas* (1980) compares two versions of an IS-LM model with upward-sloping IS curves (*Cebula* 1976, *Silber/Burrows* 1971, 1974) with regard to their stability properties. According to *Tavlas* the respective stability conditions of both models entail differing policy implications which he sums up in two propositions (p. 259). For the sake of convenience they are repeated here:

Proposition 1: If the *IS* curve slopes upward because all the propensities to spend with respect to income sum to more than unity *(Silber/Burrows)*, then the less the interest-sensitive is the demand for money, the sooner does the system react to exogenous policy shocks. In the event where the *IS* curve slopes upward due to a positive association of investment and consumption to the interest rate *(Cebula)*, the more interest elastic is the demand for money the faster the system reacts to exogenous shocks.

Proposition 2: In a *Silber/Burrows* framework, the stability range of the system reaches its maximum value as the interest elasticity of the demand for money approaches zero. In a *Cebula* framework, however, the system attains its maximum stability range as the interest elasticity of the demand for money approaches minus infinity.

The stability analysis and hence both propositions are based on the assumption (p. 255): "... that the monetary sector adjusts instantaneously[3] to external shocks so that the LM equation is always satisfied during the process of adjustment from one equilibrium to another" and according to fn. 3 (p. 255): "It should be noted that this assumption does not affect the stability conditions of the system in any way, ...".

In the following it is shown that this is not true and as a corollary that especially the first parts of both propositions are wrong.

Using the same notation as *Tavlas* the linear adjustment-process in both models may be described more generally as:

$$(1) \qquad \frac{dY}{dt} = k\,[I\,(Y, i) + C\,(Y, i) - Y]$$

(2) $$\frac{di}{dt} = m\,[L\,(Y, i) - Mo] \qquad m, k = \text{const.} > 0$$

Tavlas assumes: $k = 1$, $L\,(Y, i) = Mo$ and hence in his analysis m is unspecified (or infinite). Defining Y^*, i^* as the equilibrium values of Y and i respectively and $y \equiv Y - Y^*$, $z \equiv i - i^*$ as deviations from these equilibrium values the system (1) - (2) can be put into a linear and homogeneous form by taking linear approximations in the neighbourhood of equilibrium (*Taylor's* theorem):

(3) $$\frac{dy}{dt} = k\,(I_Y + C_Y - 1)\,y + k\,(I_i + C_i)\,z$$

(4) $$\frac{dz}{dt} = mL_Y y + mL_i z$$

The system (3) - (4) has a stable equilibrium if the characteristic roots of the matrix

$$A = \begin{pmatrix} k\,(I_Y + C_Y - 1) & k\,(I_i + C_i) \\ mL_Y & mL_i \end{pmatrix}$$

have negative real parts. According to the *Ruth-Hurwitz* theorem this is the case, iff $Det\,(A) > 0$ *and* $Tr\,(A) < 0$, i.e. iff

(5) $$(I_Y + C_Y - 1)\,L_i - (I_i + C_i)\,L_Y > 0$$

and

(6) $$k\,(I_Y + C_Y - 1) + mL_i < 0$$

The following restrictions are imposed on the system:

Cebula: $I_Y + C_Y - 1 < 0$; $I_i, C_i > 0$; $L_Y > 0$; $L_i \leq 0$.

Silber/Burrows: $I_Y + C_Y - 1 > 0$; $I_i, C_i < 0$; $L_Y > 0$; $L_i \leq 0$.

Interesting enough, with these specifications the *Cebula* model is always stabel if only (5) is satisfied, because (6) is negative for all values of $-\infty \leq L_i \leq 0$ but this is not true within the model of *Silber/Burrows;* this is the point which *Tavlas* missed. As L_i approaches zero, (6) becomes positive and hence the equilibrium in a *Silber/Burrows* framework is in this case unstable for the generalized adjustment-process (1) - (2) with $k, m > 0$.

Furthermore, assuming stability in the *Silber/Burrows* model, from (6) the range of L_i *is* (if (5) is satisfied): $-\infty \leq L_i < -\frac{k}{m}(I_Y + C_Y - 1)$.

Consequently, as L_i approaches $-\frac{k}{m}(I_Y + C_Y - 1)$, the left-hand side of (5) becomes more positive but the left-hand side of (6) becomes simultaneously less negative and hence nothing can be said about the system's reactions to policy changes. Therefore only for the special case $m = 0$ the first parts of *Tavlas'* two propositions are correct.

One last point must be mentioned. From (5) and (6) it follows that stability in the *Silber/Burrows* model is only guaranteed, if

$$|(I_Y + C_Y - 1)\, L_i| < |(I_i + C_i)\, L_Y| \ , \quad \text{i.e.} \quad \text{if}$$

$$\frac{k}{m}(I_Y + C_Y - 1)^2 < |(I_i + C_i)\, L_Y|$$

is satisfied. Hence for all values of $L_i < -\frac{k}{m}(I_Y + C_Y - 1)$ the equilibrium in this model is likely to be a saddle point if the disequilibrium adjustment-process on the commodity market is fast compared with the process in the monetary sector (great values of k/m).

References

Burrows, Paul: The Upward Sloping IS Curve and the Control of Income and the Balance of Payments, in: Journal of Finance, Vol. 29, 1974, 955 - 961. — *Cebula,* Richard J.: A Brief Note an Economic Policy Effectiveness, in: Southern Economic Journal, Vol. 43, 1976/77, 1174 - 1176. — *Silber,* William L.: Monetary Policy Effectiveness: The Case of a Positively Sloped IS Curve, in: Journal of Finance, Vol. 26, 1971, 1077 - 1082. — *Tavlas,* George S.: Economic Policy Effectiveness in Hicksian Analysis: An Extension, in: Kredit und Kapital, 13. Jahrg., Heft 2, 1980, 252 - 262.