Cycles in models of monetary and fiscal stabilization policies

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We will present analysis of a six dimensional Keynes/Minsky type model of monetary and fiscal stabilization policies. Model describes dynamics in six variables: d (private debt-capital ratio), y (output-capital ratio), π^e (expected rate of prises inflation), ρ (nominal rate of interest of government bond), ν (government expenditure-capital ratio), and b (government bond-capital ratio).

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\begin{aligned}
\dot{d} &= a\left(\frac{\kappa}{1+e^q}\right)^2 - s_f[\beta y - (\rho + i_1 d)d] - \left[\frac{\kappa}{1+e^q} + \epsilon(y-\bar{y}) + \pi^e\right]d \\
&\equiv F_1(d, y, \pi^e, \rho), \\
\dot{y} &= \alpha\Bigg\{(1-s_1)[(1-s_f\beta-\tau_1)y + T_0] + (1-s_2)(\rho + i_1 d)d + (1-s_3)\rho b \\
&\qquad + a\,\frac{\kappa}{1+e^q} + \nu - y\Bigg\} \equiv \alpha F_2(d, y, \pi^e, \rho, \nu, b), \\
\dot{\pi}^e &= \gamma[\xi(\bar{\pi} - \pi^e) + (1-\xi)\epsilon(y-\bar{y})] \equiv F_3(y, \pi^e), \\
\dot{\rho} &= \beta_1(\pi^e - \bar{\pi}) + (\beta_1\epsilon + \beta_2)(y - \bar{y}) \equiv F_4(y, \pi^e), \\
\dot{\nu} &= \sigma[\theta(\bar{y} - y) + (1-\theta)(\bar{b} - b)] \equiv F_5(y, b), \\
\dot{b} &= \nu - \tau(y) - [\epsilon(y-\bar{y}) + \pi^e + g(\beta y, \rho - \pi^e, d)]\psi(\rho)y - \psi'(\rho)yF_4(y, \pi^e) \\
&\qquad - \psi(\rho)\alpha F_2(d, y, \pi^e, \rho, \nu, b) + [\rho - \epsilon(y-\bar{y}) - \pi^e - g(\beta y, \rho - \pi^e, d)]b.
\end{aligned}
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References

[1] Asada, T. (2012), Modeling Financial Instability. Intervention : European Journal of Economics and Economic Policies, Vol. 9, No. 2, pp. 215–232.

[2] Asada, T. (2014), Mathematical Modeling of Financial Instability and Macroeconomic Stabilization Policies. Dieci, R., X. Z. He and C. Hommes (eds.) Nonlinear Economic Dynamics and Financial Modelling: Essays in Honour of Carl Chiarella, Switzerland, Springer,pp. 41–63.

[3] Bibikov, Yu. N. (1979), Local Theory of Nonlinear Analytic Ordinary Differential Equations, Berlin, Springer.