Errata for the paper *Inflation and speculation in a dynamic macroeconomic model*

The purpose of this note is to correct a few mistakes in [1], most importantly the conditions for stability of the equilibria defined in equations (27)-(29) in the paper.

First observe that, in the displayed equation immediately before equation (40), the second condition should be $-K_0K4 < K_1K_2$ (as opposed to the reverse inequality presented in the paper). This follows from the Routh-Hurwitz criterion applied to the coefficient of the X term in the polynomial immediately following equation (39), namely

$$K_0K_4 + K_1K_2 > 0 \Leftrightarrow -K_0K_4 - K_1K_2 < 0. \tag{1}$$

Similarly, the Routh-Hurwitz criterion states that

$$-(K_0 + K_4)(K_0K_4 + K_1K_2) > K_1K_2K_5, \tag{2}$$

that is, there is a minus sign missing in the left-hand side of the inequality provided in the paper.

More importantly, the first line on page 294 should read "if $K_3 < \eta_p\xi\bar{b}_1$", instead of the reversed inequality as stated. This is because, if the polynomial

$$-(K_4 - X)(K_2K_1 - X(K_0 - X)) \tag{3}$$

satisfies the Routh-Hurwitz criterion, then so does the polynomial

$$-(K_4 - X)(K_2K_1 - X(K_0 - X)) - C, \tag{4}$$

where C is a positive constant. Setting $C = -rK_1K_2(K_3 - \eta_p\xi\bar{b}_1)$ and reversing the sign of the equations above, we see that, if

$$(K_4 - X)(K_2K_1 - X(K_0 - X)) \tag{5}$$

has roots with negative real parts (because the polynomial with the opposite sign satisfies the Routh-Hurwitz criterion and therefore has roots with negative real parts), then so does the polynomial

$$(K_4 - X)(K_2K_1 - X(K_0 - X)) + C = (K_4 - X)(K_2K_1 - X(K_0 - X)) - rK_1K_2(K_3 - \eta_p\xi\bar{b}_1), \tag{6}$$

which is the characteristic polynomial of interest in equation (39) of the paper. But $C > 0$ is equivalent to $K_3 < \eta_p\xi\bar{b}_1$.

As a consequence, equation (40) in the paper needs to be replaced with

$$r\left(1 + \kappa(\overline{\pi}_1)\left(\frac{\bar{b}_1}{\nu} - 1\right)\right) < r\eta_p\xi\bar{b}_1 \quad \text{and} \quad r\left(1 + \kappa(\overline{\pi}_1)\left(\frac{\bar{b}_1}{\nu} - 1\right)\right) < \alpha + \beta + i(\overline{\omega}_1). \tag{7}$$

When applied to the original Keen model described in Section 2 of the paper, the condition above becomes

$$r\left(1 + \kappa(\overline{\pi}_1)\left(\frac{\bar{b}_1}{\nu} - 1\right)\right) < 0 \quad \text{and} \quad r\left(1 + \kappa(\overline{\pi}_1)\left(\frac{\bar{b}_1}{\nu} - 1\right)\right) < \alpha + \beta. \tag{8}$$

This is because the original Keen model in equation (14) of the paper is the special case of the Keen model with inflation in equation (26) when $\eta_p = 0$. We can then see that, whenever $\alpha+\beta > 0$ (as is assumed in the paper), this condition reduces to

$$r\left(1+\kappa(\overline{\pi}_1)\left(\frac{\overline{b}_1}{\nu}-1\right)\right) < 0, \tag{9}$$

which is equivalent to the stability condition in equation (59) of [2].

Finally, we observe that the Jacobian matrix in equation (43) of the paper is **not** in fact lower triangular, since $K_1' = \overline{\omega}_3\Phi'(0)$, so the conditions in equation (44) are only valid in the special case when $\Phi'(0) = 0$ (which is **not** assumed in the paper).

References

[1] M. R. Grasselli and A. Nguyen Huu, "Inflation and speculation in a dynamic macroeconomic model," *Journal of Risk and Financial Management*, vol. 8, no. 3, pp. 285–310, 2015.

[2] M. R. Grasselli and B. Costa Lima, "An analysis of the Keen model for credit expansion, asset price bubbles and financial fragility," *Mathematics and Financial Economics*, vol. 6, no. 3, pp. 191–210, 2012.