The Possible Trinity: Optimal interest rate, exchange rate, and taxes on capital flows in a DSGE model for a Small Open Economy

Guillermo J. Escudé

March 10, 2017

Model modifications due to the detection by Jiang Xu (of Jilin University, China) of an algebraic mistake in the FOC for \( d \) in the case of a tax/subsidy scheme whereby \((1 + i_t^*)\phi_t^*\) incorrectly multiplies \(taxsub_t^{D_{t+1}}\) (Equation (15) in the text).

**Changes in model equations**  Form 2 (change in level):

Equation (15) in the text:

\[
\lambda_t \left(1 - taxsub_t^{D_{t}}\right) e_t \\
= \beta (1 + i_t^*) \phi_t^* E_t \left\{ \frac{\lambda_{t+1} e_{t+1}}{\pi_{t+1}} \left[ \varphi_D \left( \frac{e_{t} d_{t}}{Y_t}, \frac{e_{t} r_{t}}{Y_t} \right) - taxsub_t^{D_{t+1}} \right] \right\}
\]

should instead be:

\[
\lambda_t \left(1 - taxsub_t^{D_{t}}\right) e_t \\
= \beta E_t \left\{ \frac{\lambda_{t+1} e_{t+1}}{\pi_{t+1}} \left[ (1 + i_t^*) \phi_t^* \varphi_D \left( \frac{e_{t} d_{t}}{Y_t}, \frac{e_{t} r_{t}}{Y_t} \right) - taxsub_t^{D_{t+1}} \right] \right\}
\]

Equation (21) in the text:

\[
1 = \beta (1 + i_t^*) \phi_t^* E_t \left\{ \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \left( \varphi_D \left( \frac{\gamma_t^{D_{t}}}{\gamma_t^{R_{t}}}, \frac{\gamma_t^{R_{t}}}{\gamma_t^{D_{t}}} \right) - taxsub_t^{D_{t+1}} \right) \right\}. \]

should instead be:

\[
1 = \beta E_t \left\{ \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \left( (1 + i_t^*) \phi_t^* \varphi_D \left( \frac{\gamma_t^{D_{t}}}{\gamma_t^{R_{t}}}, \frac{\gamma_t^{R_{t}}}{\gamma_t^{D_{t}}} \right) - taxsub_t^{D_{t+1}} \right) \right\}. \]
The equation that follows:

\[ (1 + i_t) E_t \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \right) \]

should instead be:

\[ (1 + i_t^* \phi_t^* E_t \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \right) \left( \varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D \right) \].

The equation that follows:

\[ (1 + i_t) E_t \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \right) \]

should instead be:

\[ (1 + i_t^* \phi_t^* \left[ E_t \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \right) \left( (1 + i_t^*) \varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D \right) \right] \]

\[ + \text{Cov} \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}}, \varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D \right) \delta_{t+1} \] .

Equation (22) in the text:

\[ 1 + i_t = (1 + i_t^* \phi_t^* E_t \left( \frac{\lambda_{t+1}}{\lambda_t} \frac{1}{\pi_{t+1}} \right) \left( \varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D \right) \delta_{t+1} \]

should instead be:

\[ 1 + i_t = (1 + i_t^* \phi_t^* \left[ E_t \left( (1 + i_t^*) \varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D \right) \right] \left( 1 + \frac{\varphi_D (e_t d_t / Y_t, e_t r_t / Y_t) - \text{tax}_{i, t+1}^D}{1 - \text{tax}_{i, t+1}^D} \right) \delta_{t+1} \]

where in the second equality \( \varphi_D (.) \equiv 1 + \varphi_D (.) \) is used.

[This notation is no longer useful here]
Notice that an increase in $\text{taxsub}_t^D$ has the effect of increasing the domestic interest rate \((\text{ceteris paribus})\), while an expected increase in the next period has the opposite effect. Hence, if $\text{taxsub}_t^D$ increases initially and is subsequently expected to fall, both have the effect of increasing the domestic interest rate \((\text{ceteris paribus})\).

\[\text{[This remains valid].}\]

**Appendix B: The system of nonlinear equations**  Risk-adjusted uncovered interest parity

\[
1 + i_t = (1 + i_t^*)\phi_t^* E_t \left( \frac{\phi_t^D - \text{taxsub}_t^D}{1 - \text{taxsub}_t^D} \delta_{t+1} \right)
\]

or

\[
1 + i_t = (1 + i_t^*)\phi_t^* \left( \frac{\phi_t^D}{1 - \text{tax}_t^D} \right) E_t \delta_{t+1}
\]

should instead be:

\[
1 + i_t = E_t \left( (1 + i_t^*)\phi_t^* - \text{taxsub}_t^D \right) \frac{\delta_{t+1}}{1 - \text{taxsub}_t^D}
\]

or

\[
1 + i_t = (1 + i_t^*)\phi_t^* \left( \frac{\phi_t^D}{1 - \text{tax}_t^D} \right) E_t \delta_{t+1}
\]

**Conclusion**  This slight change in the specification of this variant of the model should have some effect on the numerical exercises. I am confident, however, that none of the conclusions of the paper are affected.