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External shocks and debt accumulation
in a small open economy

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Abstract

This paper analyzes the borrowing behavior of a small open economy of a Less Developed Country (LDC) that relies heavily on imports for its capital formation and faces an upward sloping supply function of foreign loans, in an environment where decision makers face uncertainty about the longevity of external shocks. First, a dynamic general equilibrium model is developed which replicates fairly well the business cycle properties of the LDC data. Second, it is shown that uncertainty concerning the longevity of shocks (a relevant type of uncertainty, especially for LDCs) generates forecast errors that are autocorrelated in a way that is similar to Bayesian learning in the "peso problem." This autocorrelated forecast errors can generate substantial debt accumulation. Third, it is shown that the assumption of an upward sloping supply function of foreign loans, which is a more realistic assumption for LDCs than the usual perfectly elastic one, offers an alternative to the Uzawa-type utility function for the analysis of asset accumulation in the small open economy framework.
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Nomenclature

W	Expected lifetime utility.
U_t'	Marginal utility of the composite good at time t.
β	Discounting factor, $0 < \beta < 1$.
cm_t	Consumption of the imported good.
ch_t	Consumption of the domestic good.
im_t	Import content of investment.
ih_t	Domestic content of investment.
$1/\phi$	Share of domestic investment inputs in gross national investment.
$1/\eta$	Share of foreign investment inputs in gross national investment.
i_t	Gross national investment.
δ	Capital depreciation rate.
l_t	Labor input in the production of the domestic good.
y_t	Output of the domestic good.
ξ_t	Productivity shock.
ρ	Persistence parameter of the AR(1) process for ξ_t.
yx_t	Export quantity.
k_{t+1}	Stock of capital next period.
b_{t+1}	Stock of foreign debt next period.
r_t	Domestic real interest.
px_t	Terms of trade (import good is the numeraire).
rw_t	World real interest rate.
pxp_t, pxt_t	Permanent and transitory components of terms of trade.
rwp_t, rwt_t	Permanent and transitory components of the world interest rate.
$\overline{px}, \overline{rw}$	Unconditional means of terms of trade and world interest rate.
s_t	Spread over the world interest rate which is a function of the debt level.
π	Determines the slope of the spread.
θ	Adjustment cost parameter.
z_t	4×1 vector containing the permanent and transitory components of terms of trade and world interest rate.
Σ	4×4 conditional variance-covariance matrix of z_t.
A	4×4 coefficient matrix of the AR(1) process describing the permanent and transitory components of terms of trade and world interest rate.
ε_t	4×1 vector of innovations to the permanent and transitory components of terms of trade and world interest rate.
V_ε	Variance–covariance matrix of ε_t.
$\sigma_{pxp}, \sigma_{pxt}$	Standard deviation of the permanent and transitory components of px_t.
$\sigma_{rwp}, \sigma_{rwt}$	Standard deviation of the permanent and transitory components of rw_t.
σ_e	Standard deviation of the productivity shock.