Default Risk, the Exchange Rate and Income Fluctuations in Emerging Economies

Cristina Arellano

Discussed by Urban Jermann
• Contribution: Study predictions of small open economy model with defaultable bonds (Eaton and Gersovitz 1981) and two goods

• Theoretical results: Conditions under which default incentives are stronger with low output of tradables and nontradables

• Quantitative findings Model vs Argentina:
  ⊕ Negative correlation interest rates and output
  ⊕ High volatility of real exchange rates
  ⊕ Negative correlation interest rates and real exchange rates
  ⊖ Interest rates not volatile enough
  ⊖ Current account not countercyclical
Model

Economy receives endowments $y \equiv (y^T, y^N)$, following Markov process. Agents maximize

$$E_0 \sum_{t=0}^{\infty} \beta^t u \left( c^T_t, c^N_t \right).$$

Benevolent government trades one-period bonds taking pricing function as given

$$q \left( B', y \right).$$

With risk neutral lenders, have in equilibrium that

$$q \left( B', y \right) = \frac{1 - \text{default-probability} \left( B', y \right)}{1 + r}.$$

Default is punished by temporary exclusion and direct output loss.
IID tradable endowments and autarchy punishment

Default incentives are stronger with low current output

With IID endowments, $q(B', y) = q(B')$

Default only if have to make a payment on the debt, $[B - q(B') B'] < 0$:

$$c^T = y^T + [B - q(B') B']$$

Default iff for all payments $\varepsilon \equiv -[B - q(B') B'] > 0$, we have

$$u(y^T) - u(y^T - \varepsilon) > \beta E\left(v^o(B')\right) - \beta E v^{autarchy}$$

Because of concavity: If somebody with $y^T*$ defaults, then somebody with $y^T < y^T*$ and same $B$, defaults too
Related result:

IID NONtradable endowments and autarchy punishment: Default incentives are stronger with low current output if

$$\frac{\partial u(.)}{\partial c^T \partial c^N} < 0$$

\[ \therefore \text{No such results for persistent endowments} \]
Why are interest rates not volatile enough, and risk premia so small?

- Default is a rare event

Strongest motivation for default is high debt. But lender knows that, demands a high premium. With high premium do not want to accumulate high debt.

- Output shocks do not have strong impact on relative incentives to default and to honor debt.
What determines \( \text{corr}(y_t, r_t^c) \)? \(-0.8626\) (Argentina 1993-2003)

Current output relative to default risk!

- IID shocks, only tradable output, \( B = 0 \):
  
  with low \( y^T \rightarrow \) decrease \( B \), increases default probability and increases \( r^c \)

- Persistent \( y^T \)

Model:

\[
\rho(y) = 0.4 : \quad \text{corr}(y_t, r_t^c) = -0.3562 \\
\rho(y) = 0.8 : \quad \text{corr}(y_t, r_t^c) = 0.1487
\]
Calibration of endowment process

- $\rho(y) = 0.4$ : "which is the autocorrelation coefficient in the aggregate output series for Argentina"

- "Shocks to tradable and nontradable output are assumed to be independent"
Calibration of endowment process

- $\rho(y) = 0.4$: "which is the autocorrelation coefficient in the aggregate output series for Argentina"

- "Shocks to tradable and nontradable output are assumed to be independent"

- Argentina 1993-2004Q1:

  \[ y_t^i = \rho^i y_{t-1}^i + \varepsilon_t^i, \]

  \[ \rho^N = 0.86 \]
  \[ \rho^T = 0.96 \]
  \[ \text{corr}(\varepsilon_t^N, \varepsilon_t^T) = 0.71 \]
Volatility of real exchange rates

- Real exchange rate equals consumer price index

\[ p^c = w^T + w^N p^N, \quad p^N = \left( \frac{1 - \omega}{\omega} \right) \left( \frac{c_T}{c_N} \right)^{1+\mu} \]

\[ std(\ln p^c) \approx \]

\[ w^N (1 + \mu) \sqrt{var(\ln c^T) + var(\ln c^N) - 2\text{cov}(\ln c^T, \ln c^N)} \]

\[ w^N (1 + \mu) \sqrt{2\text{var}(\ln c^i) \left( 1 - \rho(\ln c^T, \ln c^N) \right)} \]

\[ \sqrt{1 - 0.5} = 0.7 \]
\[ \sqrt{1 - 0.7} = 0.55 \]
Suggestions

- Focus on variances/covariances not most informative to study default:
  Event studies, and higher-order moments
More recent work along similar lines

- Mark Aguiar and Gita Gopinath (2004):
  Permanent output shocks: positively serially correlated growth rates

- Vivian Yue (2004):
  Bargaining over debt reduction at default: endogenous recovery rates