World Financial Cycles

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Motivation

Emerging market economies

- low cross-country GDP growth correlation (17%)
- high cross-country sovereign credit spread correlation (52%)
- historical sovereign credit losses $<<$ historical average credit spreads
- high sovereign credit spread vol

Canonical models cannot address those facts

- most early sovereign default models feature risk-neutral creditors
- more recent sovereign default models feature non-trivial investor SDF but cannot hit quantitatively the numbers above

Solution proposed in this paper

- Creditors with long-run risk consumption process and EZ preferences
- Small open economy's GDP with long run risk highly correlated with creditor country

Model Summary

Small Open Economy – "Southern Country" i

- Endowment $Y_{i,t}$ with long run risk

$$d \log Y_{i,t} = (\mu + x_{i,t})\, dt + \sigma_i dZ_{i,t}$$
$$dx_{i,t} = -\lambda_x x_{i,t} dt + \sigma_{i,x} dZ_{i,x,t}$$

- E-Z Preferences
- Decisions: financing and default policies

Foreign Creditors – the "North"

- Endowment/consumption C_t with long run risk

$$d \log C_t = (\mu + x_t)\, dt + \sigma dZ_t$$
$$dx_t = -\lambda_x x_t dt + \sigma_x dZ_{x,t}$$

- E-Z Preferences
- World risk-free rate $r(x_t)$ and risk-prices $\pi(x_t)$ and $\pi_x(x_t)$

Markov Perfect Equilibrium

Work in Progress: General Equilibrium

Key Results

Second moments consistent with the data

- (Low) GDP growth correlation between North and South
- (High) credit spread vol
- (High) cross-country spread correlation

Decomposition – shutting down South long run risk

- $\downarrow$ in avg credit spreads, $\uparrow$ in ergodic default rate
- 65% decrease in cross-country spread correlations

Decomposition – shutting down North long run risk

- $\uparrow$ in avg credit spreads, $\uparrow$ in ergodic default rate
- only small decrease in cross-country spread correlations
- but cannot match North equity market's asset pricing moments

Side note – what about:

- long run risk in both North and South
- corr $\left(dZ_{x,t}, dZ_{i,x,t}\right) = 0$

Comment 1: Where to find long-run risk in the data?

Key model ingredient

- Long-run risk in *both* creditor and debtor countries' GDP processes
- Positive correlation between long-run risk shocks $dZ_{i,x,t}$ and $dZ_{x,t}$

How to detect long-run risk

- If it is in the data, then let's estimate!
- Insight from Hansen, Heaton & Li (2008): persistence of long run risk shock (in US consumption data) estimated with low level of accuracy

Disciplining model parameters

- Currently: focus on first and second moments of credit spreads
- What about sovereign debt returns?
- EM countries considered "symmetric" in the model
  - In the data, heterogeneous debt-to-income, GDP growth mean and vol...
  - Use cross-sectional moments in the data to discipline model?

Comment 2: Is it about risk-free rates or risk-prices?

Sources of spread co-movement: risk free rates or risk-prices?

This paper: mostly about movements in risk-free rates

- Assuming creditor country with IES = 1:

$$r(x_t) = \delta + \mu - \left(\gamma - \frac{1}{2}\right)\sigma^2 + x_t \qquad \pi(x_t) = \gamma\sigma \qquad \pi_x(x_t) = \frac{(\gamma - 1)\sigma_x}{\delta + \lambda_x}$$

- At odds with most of the asset pricing literature, which focuses on movements in risk-prices since risk-free rates have low volatility
- Implication: $\downarrow$ in r_t associated with $\uparrow$ in spreads and sovereign defaults

What about stochastic volatility (IES = 1) ?

$$r(x_t, s_t) = \delta + \mu - \left(\gamma - \frac{1}{2}\right)\sigma^2 s_t + x_t$$

$$\pi(x_t, s_t) = \gamma\sigma\sqrt{s_t} \qquad \pi_x(x_t, s_t) = v_x\sigma_x\sqrt{s_t} \qquad \pi_s(x_t, s_t) = v_s\sigma_s\sqrt{s_t}$$

Now, scope for both risk-free rates and risk-prices to have a role

Comment 2: Is it about risk-free rates or risk-prices?

Tricky question

- Quantity moments not really informative
- Issuance policy (assuming risk-neutral small open economy)

$$I_{i,t} = \frac{\delta_i - (r_t + rp_{i,t})}{-\frac{\partial \ln D}{\partial F_i}}$$

- $\uparrow$ in risk-free rates or risk-prices: $\uparrow$ in bond issuances

Informative data moments

- Expected excess returns on sovereign bond in current model setup

$$rp_{i,t} := \frac{1}{dt}\mathbb{E}_t\left[dR_{i,t} - r_t dt\right] = \underbrace{\frac{\partial \ln D}{\partial x_i}\sigma_{x,i}}_{\text{risk qty}} \cdot \underbrace{\pi_x}_{\text{risk px}}$$

- time-varying conditional sovereign debt risk-premia in the data?

Comment 3: Contribution

Differences with existing literature: Borri & Verdelhan (2011), Lizarazo (2013), Arellano & Bai (2014), Tourre (2017), Bocola & Dovis (2019)

- What moments in the data can this paper target, which the previous literature did not hit?
- What mechanism allows it?

Role of southern countries' E-Z preferences?

- Is it really needed?
- With $\gamma = 10$, stdev $\left(dY_{i,t}/Y_{i,t}\right) = 4.2\%$ and since usually stdev $\left(dY_{i,t}/Y_{i,t}\right) <$ stdev $\left(dC_{i,t}/C_{i,t}\right)$, $\gamma\sigma_C > 40\%$

Conclusion

Long run risk and sovereign debt

- Find direct evidence of this in the data!
- Use other moments in the data – for instant, sovereign debt returns!

Promising directions for the paper

- Implication of equilibrium EM consumption on marginal utility process, EM shadow risk-free rates and EM shadow risk-prices
- Explore GE version of the model and contrast with SOE