Explaining International Business Synchronization: Recursive Preferences and the Terms of Trade Channel

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Abstract

Business cycles of advanced economies are synchronized. Standard models cannot explain this.
This paper: simple two-country model with high endogenous business cycle correlation
Key ingredients: recursive intertemporal preferences (Epstein-Zin-Weil) and muted wealth effect on labor supply (GHH preferences and demand-determined employment under rigid wages)
Key mechanism: recursive preferences magnify terms-of-trade response to country-specific shocks

⇒ Productivity increase in a given country triggers a strong improvement on foreign terms of trade
⇒ Increase in foreign labor demand
⇒ With muted labor wealth effect, foreign hours & GDP ↑
⇒ Domestic and foreign GDP are synchronized in model!

Endogenous international shock transmission

Not plausible that world business cycle is solely driven by common (world-wide) shocks: demand & supply shocks are LESS correlated across countries than GDP.
E.g., GDP is more correlated internationally than GDP!
Corr. across US & agg. of 13 other OECD countries: TFP: 0.13, GDP: 0.45 (quarterly growth rates)
⇒ Internat. BIZ CYCLE SYNCHRONIZATION MUST PARTLY BE ENDOGENOUS: SYNCHRONIZED DOMESTIC & FOREIGN RESPONSES TO COUNTRY-SPECIFIC SHOCKS
Problem: existing models do NOT generate strong endogenous international shock transmission.
MODEL HERE GENERATES STRONG INTERNATIONAL TRANSMISSION OF TFP SHOCKS, DUE TO STRONG TERMS-OF-TRADE CHANNEL

The model

Simple two-country (Home, Foreign) structure:
⇒ 2 traded goods, local spending bias
⇒ Each country produces 1 traded good (from K & L)
⇒ Complete financial markets
⇒ Exogenous persistent TFP shocks

Period utility

\[ u_i(t) = \frac{1}{1-\sigma} [w_i(n_i) - (1-\beta) E_{t+1} [U_{i+1}]]^{1-\sigma} \quad \sigma > 0, \quad \sigma \neq 0 \]

Recursive EZW intertemporal preferences:

\[ U_{i,t} = \left( 1 - \beta \right) \left[ (1-\sigma)[w_i(n_i) - \beta E_{t+1} [U_{i+1}]]^{1/(1-\sigma)} \right]^{1/(1-\sigma)} \]

\[ \sigma: 1/1\text{IES} \text{ intertemporal elasticity of substitution (IES)} \]
\[ \gamma: \text{coefficient of risk aversion (CRA)} \]
NB When \( \gamma = \sigma \): time-separable utility

Intertemporal marginal rate of substitution (IMRS) depends on future life-time utility

\[ \rho_{i,t+1} = \beta \frac{\partial u_i(t+1)}{\partial C_{i,t+1}} \frac{U_{i,t+1}}{\partial U_i(t)} \left( E_{t+1} [U_{i+1}]]^{1/(1-\sigma)} \right)^{\sigma-\gamma} \]

Efficient risk sharing

\[ \rho_{H,t+1} / \rho_{F,t+1} = RER_{t+1} / RER \]

Standard assumption: \( \gamma > \sigma = 1/\text{IES} \) (preference for early resolution of uncertainty)
⇒ Unpredicted RISE in future life-time utility LOWERS IMRS: Consumption & life-time utility are ‘substitutes’
⇒ Positive TFP shock in country H:
⇒ Relative consumption of country H ↑
⇒ Relative life-time utility of country H ↑
⇒ RER of country H depreciates strongly
⇒ Relative price of good H ↓
⇒ Terms of trade of country H worsen,
⇒ Terms of trade of country F improve

Foreign terms of trade improvement RAISES foreign marginal product of capital & labor, in final good units
⇒ Foreign Investment and labor demand ↑

Quantitative results

Predicted moments: Flexible wage vs. Rigid wage
Role of: KPR/GHH utility: risk aversion (\( \gamma \))

<table>
<thead>
<tr>
<th>Flexible wage</th>
<th>Predetermined wage</th>
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<tbody>
<tr>
<td>KPR</td>
<td>GHH</td>
</tr>
<tr>
<td>( \gamma = 1/\text{IES} )</td>
<td>( \gamma = 50 )</td>
</tr>
<tr>
<td>Standard deviations (%)</td>
<td>82.0</td>
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<tr>
<td>Standard deviations relative to GDP</td>
<td>C</td>
</tr>
<tr>
<td>Labor</td>
<td>61.0</td>
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<tr>
<td>RER</td>
<td>37.0</td>
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<tr>
<td>Cross-country correlations</td>
<td>GDP</td>
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<tr>
<td>C</td>
<td>0.13</td>
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<tr>
<td>I</td>
<td>19.0</td>
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<tr>
<td>Labor</td>
<td>38.0</td>
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<tr>
<td>Hansen-Jagannathan bound</td>
<td>0.002</td>
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</tbody>
</table>

HJ bound=std(1/IMRS)/E(1/IMRS); Sharpe-ratio=E(Rix)/std(Rix); SRHJ; Rix: excess return; historical SR equity; 0.22

Conclusion

⇒ Paper has developed simple DSGE model that solves the ‘international correlation puzzle’:
⇒ Country-specific productivity shocks generate sizable cross-country correlations of GDP, investment, Labor.
⇒ Real exchange rate is volatile
⇒ Key ingredients (BOTH are needed!)
⇒ recursive intertemporal preferences (⇒volatile RER)
⇒ weak wealth effect on labor supply (⇒positive international shock transmission, via t.o.t. channel)