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

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Robert Kollmann, Université Libre de Bruxelles & CEPR
Contact: robert_kollmann@yahoo.com, www.robertkollmann.com

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

⇒ A 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

\[ u_{i,t}(C_{i,t},J_{i,t}) = \frac{1}{1-\sigma} \left[ \left( \frac{C_{i,t}}{J_{i,t}} \right)^{1-\sigma} \right] \]

σ > 0, σ ≠ 0

● Recursive EZW intertemporal preferences:

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

σ: 1/IES intertemporal elasticity of substitution (IES)
γ: coefficient of risk aversion (CRA)
NB When γ = σ: time-separable utility

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

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

Efficient risk sharing

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

Standard assumption: γ > σ = 1/IES (preference for early resolution of uncertainty)

● Unexpected 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 time-life 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 (γ)

<table>
<thead>
<tr>
<th>Flexible wage</th>
<th>Predetermined wage</th>
<th>Data</th>
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<tbody>
<tr>
<td></td>
<td>KPR</td>
<td>GHH</td>
</tr>
<tr>
<td></td>
<td>γ=1/IES</td>
<td>γ=50</td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Standard deviations (%)</td>
<td></td>
<td></td>
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<tr>
<td>GDP</td>
<td>0.82</td>
<td>0.85</td>
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<tr>
<td>Standard deviations relative to GDP</td>
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<tr>
<td>C</td>
<td>0.22</td>
<td>0.25</td>
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<tr>
<td>Labor</td>
<td>0.61</td>
<td>0.63</td>
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<tr>
<td>RER</td>
<td>0.37</td>
<td>1.51</td>
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</tbody>
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Cross-country correlations

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| | | | | | | |

Hansen-Jagannathan bound

0.002 0.257 0.002 0.225 0.257 0.225

 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)