Trade costs, Asset Markets Frictions and Risk Sharing: A joint test

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The objective

Propose a new test of international risk sharing.
New elements

- Transport costs
- Do not use international price data
- Multilateral setting

A general 2 country setting

$$\sum \beta^t u(c_t), \qquad \sum \beta^t u(c_t^*)$$

$$\begin{aligned} A_t &= a_t + \tau a_t^*, \qquad B_t = \tau b_t + b_t^* \\ c_t &= G(a_t, b_t), \qquad c_t^* = G^*(a_t^*, b_t^*), \end{aligned}$$

An allocation satisfies complete international risk sharing if it is on the Pareto frontier, given the physical constraints, i.e. if there exists numbers λ, λ^* such that

$$\begin{aligned} \lambda u'(c_t)\tau G_a &\geq \lambda^* G^*_{a^*} u'(c_t^*), = \text{ if } a^* > 0 \\ \lambda u'(c_t) G_b &\leq \lambda^* \tau G^*_{b^*} u'(c_t^*) = \text{ if } b > 0 \end{aligned}$$

for every date and every state.

The role of transport costs, I

One good, CRRA utility

$$G(a,b) = G^*(a,b) = a + b$$

if $\tau = 1$ (no transport costs) risk sharing involves

$$\frac{\lambda}{\lambda^*}\left(\frac{c_t}{c_t^*}\right)^\sigma = 1$$

i.e. log consumptions perfectly correlated across countries. It fails miserably

The role of transport costs, II

Testing international risk sharing involves testing whether

$$\frac{1}{\tau} \leq \frac{\lambda}{\lambda^*}\left(\frac{c_t}{c_t^*}\right)^{\sigma} \leq \tau$$

if $\tau > 1$ (positive transport costs) risk sharing is harder to reject!

- In a multilateral setting it shows that transport costs among different pairs of countries are important in testing risk sharing.

The role of international prices

Two goods, CRRA utility,$\tau = 1$
From

$$\lambda G_a c_t^{-\sigma} = \lambda^* G^*_{a^*} c_t^{*-\sigma}$$

we get

$$\frac{\lambda}{\lambda^*}\frac{G_a}{G^*_{a^*}} = \left(\frac{c_t}{c^*_t}\right)^{\sigma}$$

What is $\frac{G_a}{G^*_{a^*}}$? It is the marginal rate of transformation, through a, between c and c^*, which is the real exchange rate (i.e. the price of a unit of foreign consumption in terms of domestic consumption) also equal to $\frac{G^*_{b^*}}{G_b}$.
Risk sharing in this setting implies that log relative consumption and log real exchange rates should be perfectly correlated

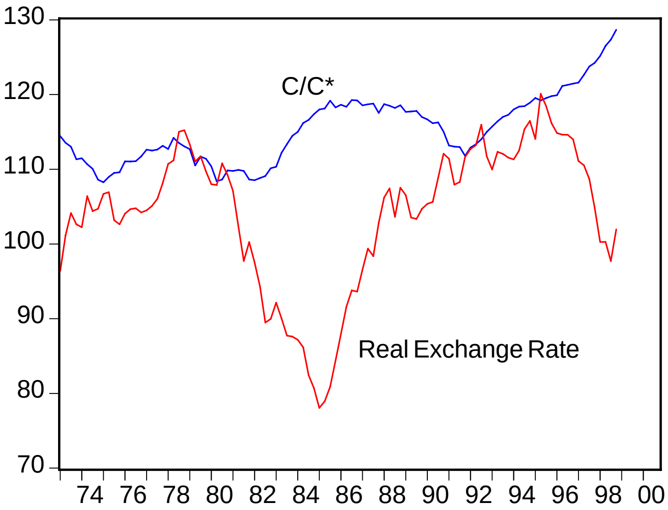
A test using real exchange rate data

Look at

$$corr(e, \frac{c_t}{c_t^*})$$

in the data. Backus and Smith have shown that in developed countries it fails miserably.

Real exchange rate and consumption ratio (US/RoW)



An alternative test

If assume a specific functional form for G (for example $G(a,b) = a^{\omega}b^{1-\omega}, G(a^*,b^*) = a^{*(1-\omega)}b^{*\omega}$) then real exchange rate, in the model,

$$e_M = K\frac{A - a^*}{b} = K\frac{\text{Domestic absorption}}{\text{Imports}}$$

regardless of assumption on financial markets
Assumes that e is mismeasured and use e_M instead, in this case the risk sharing test boils down to

$$corr(\frac{A - a^*}{b}, \frac{c_t}{c_t^*})$$

Note it does not use prices but transfers

The punchline

The paper argues that if you do a similar exercise international multilateral risk sharing becomes harder to reject.

- This implies (and the paper discusses this) that real exchange rate implied by the theory and real exchange rate in the data do not match.
- Risk-sharing is consistent with quantities but not with (observed) prices. This is interesting but shifts the attention on prices.

Risk sharing and prices

Two ways of obtaining high risk sharing:

- Change theory to make it consistent with prices (Cochrane et al.)
- Here change price data to make them consistent with theory