Discussion of Coeurdacier, Kollmann & Martin: *International Portfolios, Capital Accumulation and Foreign Asset Dynamics*

Mathias Hoffmann, University of Zurich

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The Model

- Standard 2x2 setup. Specialization in production.
- Consumption and final investment good are CES bundles of the home and foreign goods
- 4 assets: home and foreign bonds, home and foreign equity
- 4 shocks: home and foreign TFP and home and foreign news about investment opportunities.
- Number of shocks = number of (linearly independent) assets –> markets complete to first order

A major advance

- Full characterization of the dynamics of country portfolios in a two country DSGE model with production using the Devereux-Sutherland method.
- En passant suggests solution to a couple of important puzzling empirical regularities
  - ...the acyclical behaviour of the terms of trade
  - ...countercyclical net exports
- The Helpman-Razin-Cole-Obstfeld ToT mechanism is key in allocating risk in this economy

A key relation

Market completeness implies that the Backus-Smith relation holds between home and foreign marginal utility:

$$-\sigma\left(\widehat{C_{Ht}}-\widehat{C_{Ft}}\right)=\widehat{RER}_t=(2a-1)\widehat{q}_t$$

This relation gives us 'efficient' idiosyncratic consumption movements:

- Marginal utilities should equalize up to differences in local purchasing power!
- Here: only source of that difference is home bias in consumption ($a > 1/2$)

Implications for portfolio diversification

- Choose portfolio such that idiosyncratic movements in marginal utility are eliminated.
- ... well, not all of them. Only inefficient ones. High local prices should still imply high local marginal utility (low consumption) and vice versa.
- Hence, optimal portfolio choice should seek to maximise exposure to terms of trade risk ($\widehat{q}$) and to minimize exposure to everything orthogonal to $\widehat{q}$.

How to do that?

- Bonds (in different currencies) are a natural instrument to buy exposure to ToT risk: lend in home currency ($b_{11}, b_{22} > 0$) and borrow in foreign currency.
- This transfers resources to the foreign country when foreign prices (and home output are high) and vice versa. The ensuing income stream perfectly hedges $\widehat{q}$.
- Note: this seems the opposite of what industrialised countries are doing. They are short in their own currency and long in foreign currency!
- Having the bond instrument for buying exposure to $\widehat{q}$, then allows to dedicate the equity part of the portfolio to diversifying away any components of income unrelated to $\widehat{q}$

How do the optimal portfolios look like?

Coupling the risk sharing condition with the budget constraints gives:

$$(1-\Lambda)(1-\frac{1}{\sigma})(2a-1)\widehat{q_t} = (1-\kappa)\widehat{\omega_t l_t} + (2S-1)(\kappa-\Lambda)\widehat{d_t} + 2b\widehat{q_t}$$

Regressing on $\widehat{q_t}$ and substracting the fitted values $\mu_{wl} q_t$ and $\mu_d q_t$ from this relation implies:

$$0 = (1-\kappa)\varepsilon_t^{wl} + (2S-1)(\kappa-\Lambda)\varepsilon_t^d$$

Taking the covariance with ε_t^d and rearranging leads to

$$S - \frac{1}{2} = -\frac{1}{2}\frac{(1-\kappa)cov(\varepsilon_t^{wl}, \varepsilon_t^d)}{(\kappa-\Lambda)var(\varepsilon_t^d)}$$

Hence Home Bias requires a negative correlation between labour and dividend income components *orthogonal to* $\widehat{q_t}$!

Implications for the structure of dividend and labor income risk

- Baxter-Jermann argued that human capital risk deepens the home bias puzzle: correlation between labour income and dividend income is positive in the data. Hence, home capital is a particularly bad hedge against labour income risk!
- Coeurdacier-Kollmann-Martin: what matters is the correlation between those components of labour income and dividends that is orthogonal to terms of trade risk.

$$cov\left(\widehat{\omega_t l_t}, \widehat{d_t}\right) = cov(\varepsilon_t^{wl}, \varepsilon_t^d) + \mu_{wl}\mu_d var\left(\widehat{q}_t\right)$$

where

$$\widehat{\omega_t l_t} = \mu_{wl}\widehat{q}_t + \varepsilon_t^{wl} \text{ and } \widehat{d}_t = \mu_d \widehat{q}_t + \varepsilon_t^d$$

- CKM show that though $cov\left(\widehat{\omega_t l_t}, \widehat{d_t}\right) > 0$ it is still $cov(\varepsilon_t^{wl}, \varepsilon_t^d) < 0$ in the data. For a theoretical model to match this fact, we therefore need $\mu_{wl}\mu_d var\left(\widehat{q}_t\right)$ large enough.

How to make the conditional covariance large?

How to make $\mu_{wl}\mu_{d}var\left(\widehat{q}_{t}\right)$ large?

- Drive $var\left(\widehat{q}_{t}\right)$ up. *Question: does the model* $var\left(\widehat{q}_{t}\right)$ *match the data?*
- Make $cov\left(\widehat{\omega_{t}l_{t}},\widehat{d}_{t}\right)$ low. But not much leeway against the data where it is close to one.
- Make $\mu_{wl}\times\mu_{d}$ large and positive.

- Note that making bond portfolios more realistic points in the direction of making $\mu_{wl} \times \mu_d$ large:

Consider again the projection of the RS-condition on $\widehat{q}_t$:

$$(1-\Lambda)(1-\frac{1}{\sigma})(2a-1)\widehat{q}_t = (1-\kappa)\mu_{wl}\widehat{q}_t + (2S-1)(\kappa-\Lambda)\mu_d\widehat{q}_t + 2b\widehat{q}_t$$

so that

$$b = \frac{1}{2}\left[(1-\Lambda)(1-\frac{1}{\sigma})(2a-1) - \gamma\right]$$

with

$$\gamma = (1-\kappa)\mu_{wl} + (2S-1)(\kappa-\Lambda)\mu_d$$

With μ_{wl}, μ_d high, could actually make b negative.
Currently, model rather works through the first two channels.

The role of investment technology (news) shocks in generating home bias

- News shock increases home price through effect on investment. Effectively a demand shock.
- This Increases correlation of labour income with $\widehat{q}_t$ and therefore, μ_{wl}.
- Helps drive the unconditional correlation $cov\left(\widehat{\omega_t l_t}, \widehat{d}_t\right)$ down from unity (in the model, possibly too much) because it affects the labour share. (Recall: firms finance investment from retained earnings).
- As an additional shocks with near zero correlation with TFP, 'news' increases the volatility of $\widehat{q}_t$.

Additional Issues

- CKM might over-rationalize HB:
  - In CKM, HB has nothing to do with financial frictions. So financial integration is not likely to remove HB! But HB *has* come down and seems associated with better international risk sharing. Maybe not much further to go?
  - HB puzzle typically pertains also to public equity. HB in CKM is in ownership of the entire capital stock. Given that $>1/2$ of the capital stock are in small, owner-run businesses (and therefore 'home-biased' anyway), might still expect the public equity base to be much better diversified than it actually is!
- 'Redistributive' effect of investment technology shocks generated by assuming that investment is financed from retained earnings. This is key for getting the covariance (net of $\widehat{q}$) between labor income and dividends right. Is it an innocuous assumption?

Additional Issues (cont'd)

- Do actual equity portfolios line up with predicted ones? Would like to see an econometric implementation of

$$S - \frac{1}{2} = -\frac{1}{2}\frac{(1-\kappa)cov(\varepsilon_t^{wl}, \varepsilon_t^d)}{(\kappa - \Lambda)var(\varepsilon_t^d)}$$

  How much would the covariance term do, how much $(1-\kappa)/(\kappa-\Lambda)$?
- Model generates anticyclical *NX*. Since $CA = 0 = NX + NFI$ to first order, *NFI* must be procyclical. This seems at odds with the data. Decline in HB seems associated with increasingly anticylical behaviour also of *NFI*. What is the relative role of valuation effects and net factor income flows in allocating risk?
- International correlations? Can you match them? (Investment maybe a fairer test than consumption)

Additional Issues (cont'd)

- Dynamic predictions:
  - Would we be nice to have IRs for portfolio weights etc.
  - What's the inution behind the portfolio responses given in the model?
  - Both TFP and investment shock increase equity holdings (roughly in equal proportions!) and decrease net bond holdings (lower F holdings by more than they increase H holdings).
  - That would suggest that the share of the net bond position in net (total) wealth decreases after a positive home shock.

A simple characterization of portfolio dynamics

$$\Delta NFA_t^k = \Delta NFB_t^k + \Delta NFE_t^k$$

Run regressions inspired by Kraay and Ventura (QJE 2000):

$$\frac{\Delta NFB_t^k}{Y_t^k} = \mu^k + \underset{(\beta=1:\ t=0.44)}{1.14} \times \left[\frac{NFB^k}{A^k}\right] \times \left[\frac{S_t^k}{Y_t^k}\right] + \varepsilon_t^k$$

$$\frac{\Delta NFE_t^k}{Y_t^k} = \mu^k + \underset{(\beta=1:\ t=2.23)}{1.62} \times \left[\frac{NFE^k}{A^k}\right] \times \left[\frac{S_t^k}{Y_t^k}\right] + \varepsilon_t^k$$

In CKM, holdings of home and foreign equity rise in roughly equal proportions, whereas holdings of foreign bonds seem to decrease after home shocks. Here we seem to see the opposite.

Conclusion

- Very impressive paper with loads of important results
- Some implications seem counterfactual though: maybe because the paper trying to push the argument that HB in consumption (and investment) can rationalize HB in portfolios just a bit too far?
- Would be nice to see a fuller discussions of the dynamics of the model and to develop some intuition on it.