

Comments on:

The Dynamics of the Real Exchange Rate:  
A Bayesian DSGE Approach

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# Contribution of the Paper

- Attempts to reconcile the implications of open-economy DSGE models with stylised facts of real exchange-rate dynamics, with a particular focus on:
  - the observed high degree of real exchange-rate volatility and persistence;
  - the observed negative correlation between cross-country consumption differentials and the real exchange rate (i.e., the Backus-Smith correlation).
- Extends the two-country model of Corsetti, Dedola and Leduc (2006) — designed to generate a high *endogenous* exchange-rate volatility and a low exchange-rate pass-through — by allowing for wage stickiness, while neglecting capital accumulation.
- Compares the empirical properties of alternative model specifications by applying Bayesian techniques using data for the euro area and the United States.
- Related papers: Numerous.

# Main Features of the Model

- Two-country setting with *tradable and non-tradable goods* (cf. Stockman and Tesar, 1995), allowing for *home bias* in consumption bundles.
- *International price discrimination* (“pricing to market”) arising from:
  - *Stickiness in local currency prices* (cf. Betts and Devereux, 1996) assuming monopolistic competition and price-setting à la Rotemberg (1982):
    - ⇒ Domestic producers of tradable goods charge a markup on marginal cost resulting in limited exchange-rate pass-through at the *border* level in the short run.
  - *Distribution services intensive in local non-tradable goods* (cf. Corsetti and Dedola, 2004):
    - ⇒ Distribution costs drive a *wedge* between the producer price and the consumer price of tradable goods causing incomplete exchange-rate pass-through in the long run.
- *Incomplete markets* (“imperfect risk-sharing”), with households trading in a risk-free international bond.

# Distribution Services and Pricing to Market

- With a competitive distribution sector, the (retail) price of a tradable variety  $h$  at the consumer level is

$$p(h) = \bar{p}(h) + \eta P_N,$$

where  $\bar{p}(h)$  is the (wholesale) price at the producer level and  $\eta P_N$  represents the distribution cost intensive in non-traded goods.

- Pricing to market derives endogenously from the solution of the producer's price-setting problem (neglecting adjustment cost):

$$\bar{p}(h) = \text{markup}(Z_N, W, \dots; \eta) \frac{W}{Z_H}$$

$$S \bar{p}^*(h) = \text{markup}(Z_N^*, S W^*, \dots; \eta) \frac{W}{Z_H}$$

- Since in general  $\text{markup}(Z_N, W, \dots; \eta) \neq \text{markup}(Z_N^*, S W^*, \dots; \eta)$ , the law of one price does not hold:  $\bar{p}(h) \neq S \bar{p}^*(h)$ .

# Incomplete Financial Markets and Exchange-Rate Dynamics

- *Imperfect international risk sharing:*

- Consumption growth — adj. for exchange-rate movements — is equated across countries:

$$\mathbf{E}_t[\hat{s}_{t+1}^r - \hat{s}_t^r] \approx \mathbf{E}_t[(\hat{u}_{C,t+1}^* - \hat{u}_{C,t}^*) - (\hat{u}_{C,t+1} - \hat{u}_{C,t})]$$

- *Reconciling real exchange-rate dynamics and consumption growth differentials:*

- “Elasticity approach” (Backus, Kehoe and Kydland, 1995), assuming a low price elasticity of imports.

- “Risk aversion approach” (Chari, Kehoe and McGrattan, 2004), assuming a low intertemporal elasticity of substitution.

- Inclusion of an ad-hoc risk-premium shock isolating the exchange rate from fundamentals.

- Distribution services lower the import price elasticity and may, in principle, mitigate the need to resort to a risk-premium shock.

# Comparing Alternative Model Specifications

- Posterior modes and marginal likelihood to assess the plausibility of the parameter estimates and the “fit of the data”.
- Standard deviations and correlations to examine the model’s ability to account for the stylised exchange-rate facts.
- Accounting exercise to quantify the contributions to exchange-rate fluctuations attributed to: tradables vs. non-tradables, home bias and international price discrimination (i.e., local currency pricing and distribution services).
- Forecast-error-variance decompositions to infer the role of shocks as underlying sources of economic fluctuations.

## Comparing Alternative Model Specifications: Results

- The data prefer the model featuring incomplete exchange-rate pass-through arising from a combination of both local-currency pricing and distribution cost.
- International price discrimination and, to a lesser extent, home bias are the main factors accounting for real exchange-rate fluctuations.
- The historical fluctuations in the real exchange rate are mainly explained by the inclusion of an ad-hoc risk-premium shock in the Euler equation for international bond; i.e., by the risk-adjusted UIP condition.
- A negative correlation between the real exchange rate and consumption growth differentials is generated only to the extent that the risk-premium shock isolates the exchange rate from fundamentals.

# The Dilemma of Current-Generation Open-Economy Models

## Contributions to Unconditional Variances

	Domestic Shocks	Foreign Shocks	Risk-Premium Shock
Consumption	93.1	1.0	5.9
CPI Inflation	94.5	0.7	4.8
Real Exchange Rate	13.3	9.2	77.5

- Fluctuations in domestic variables are largely separated from fluctuations in the real exchange rate (“exchange-rate disconnect”), while fluctuations in the real exchange rate are mainly attributed to risk-premium shocks.

# The Dilemma of Current-Generation Open-Economy Models

Contributions to Unconditional Variances

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Consumption	93.1	1.0	5.9
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- The contribution of foreign shocks to domestic fluctuations is negligible and international co-movement is essentially absent, in contrast to available reduced-form evidence (see, eg., Kose, Otrok and Whiteman, 2003).

# A Major Problem: Misspecification

- Misspecification leads to invalid cross-equation restrictions on the reduced-form representation of the model resulting in:
  - implausible parameter estimates (e.g., the home-bias parameter in the PCP case);
  - need for inclusion of ad-hoc shocks (e.g., the risk-premium shock).
- However, the inclusion of ad-hoc shocks may have the unintended consequence of shutting down the channels of international transmission (see, e.g., Justiniano and Preston, 2006).
- To this end, it would also be useful to have some information on the mutual correlation of the shocks in sample.
- A possible solution: inclusion of a common shock, capturing the common factor in national business cycles?

## Some Questions: Identification

- Inference is based on a limited set of variables ( $2 \times 4 + 1 = 5$ ): consumption, CPI inflation, non-traded goods inflation (?), short-term nominal interest rate, real exchange rate:
  - wage dynamics (arising from first-order adjustment cost alone) is not reliably identified, as revealed by the dispersion of estimation results across alternative specifications;
  - the estimated degree of home bias seems uncertain as well and could be inferred more easily from the observed share of imports in consumption;
  - more generally, lack of information in the data seems partly to result in posterior distributions that are not very different from the prior distributions.
- The focus on euro area-US linkages is also not innocuous, given the limited size of the bilateral trade flows and the fact that third-country effects are not incorporated.
- The assumed symmetry may be too restrictive.

## Some Suggestions: Model Evaluation

- Evaluation focuses on a limited set of stylised exchange-rate facts, but neglects other aspects of potential interest:
  - the typical hump-shaped response pattern of the real exchange rate;
  - terms-of-trade vs. real exchange-rate dynamics (cf. Obstfeld and Rogoff, 2000);
  - volatility of import volumes and the need for adding import adjustment costs.
- Evaluation could be based on autocorrelation/autocovariance functions, rather than selected moments, and then be compared to those of an unconstrained VAR model.
- Statistical vs. economic validation: there is not much effort to provide insights into the model's propagation mechanism by, e.g., reporting dynamic responses to specific shocks.