Demand-Driven Risk Premia in FX and Bond Markets

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Motivation: Textbook Puzzles

- Textbook international macro: Uncovered Interest Parity (UIP) and Expectation Hypothesis (EH) hold. Empirically:
  1. Strong patterns in FX: currency carry trade is profitable $\implies$ deviations from UIP
     [Fama 1984...]
  2. Strong patterns in FI: bond carry trade is profitable $\implies$ deviations from the EH
     [Fama & Bliss 1987, Campbell & Shiller 1991...]
  3. Exchange rates disconnected from fundamentals; but important comovement in term premia and currency risk premia across countries
     [Obstfeld & Rogoff 2001, Itskhoki & Mukhin 2021, Lustig et al 2019, Chernov & Creal 2020...]
  4. Quantitative easing not only reduced domestic yields, but also had strong effects on exchange rates and foreign yields
     [Bhattarai & Neely 2018...]

- Rationalize with segmented markets model
  [Greenwood et al 2023, Gourinchas, Ray, Vayanos 2025]

Motivation: A Model of Imperfect Arbitrage (Gourinchas, Ray, Vayanos 2025)

- Global arbitrageurs intermediate FI and FX markets (hedge funds, dealers, ...)

$$\max \mathbb{E}_t(\mathrm{d}W_t) - \frac{a}{2}\mathbb{V}\mathrm{ar}_t(\mathrm{d}W_t)$$

$$\text{s.t. } \mathrm{d}W_t = W_t i_{Ht}\,\mathrm{d}t + W_{Ft}\,\mathrm{dCCT}_t + \int_0^T X_{Ht}^{(\tau)}\,\mathrm{dBCT}_{Ht}^{(\tau)}\,\mathrm{d}\tau + \int_0^T X_{Ft}^{(\tau)}\,\mathrm{dBCT}_{Ft}^{(\tau)}\,\mathrm{d}\tau$$

- Segmented demand from investor clienteles (pension funds, importers/exporters, ...)

$$Z_{jt}^{(\tau)} = -\alpha_j(\tau)\log P_{jt}^{(\tau)} - \theta_j(\tau)\beta_{jt} \quad (+X_{j,t}^{(\tau)} = 0) \qquad \text{(maturity } \tau\text{, country } j = H, F)$$

$$Z_{et} = -\alpha_e \log e_t - \theta_e \gamma_t \quad (+W_{Ft} = 0) \qquad \text{(spot FX)}$$

- Key ingredients:
  - Factors: short rates i_{jt}; idiosyncratic demand β_{jt}, γ_t
  - a: limits to arbitrageur risk-bearing capacity; $\alpha_j(\tau), \alpha_e$: demand elasticities

Motivation: Equilibrium and Predictions

$$\mathbb{E}_t \, \mathrm{dBCT}_{jt}^{(\tau)} = \mathsf{A}_j(\tau)^\top \mathbf{\Lambda}_t, \quad \mathbb{E}_t \, \mathrm{dCCT}_t = \mathsf{A}_e{}^\top \mathbf{\Lambda}_t, \quad \mathbf{\Lambda}_t \equiv a\mathbf{\Sigma} \left(W_{Ft} \mathsf{A}_e + \sum\nolimits_j \int_0^T X_{jt}^{(\tau)} \mathsf{A}_j(\tau) \, \mathrm{d}\tau \right)$$

- Endogenous coefficients $\mathsf{A}_j(\tau), \mathsf{A}_e$ govern sensitivity to global risk prices $\mathbf{\Lambda}_t$
  - Function of risk-bearing capacity a; physical risk $\mathbf{\Sigma}$; equilibrium holdings $X_{jt}^{(\tau)}, W_{Ft}$
- Elastic clientele demand $\implies$ monetary spillovers. Following $\uparrow i_{Ht}$:
  - Home yields rise $\uparrow y_{Ht}^{(\tau)}$. Dollar appreciates $\downarrow e_t$. Foreign yields rise $\uparrow y_{Ft}^{(\tau)}$
- Following a Home bond demand shock β_{Ht}: $\uparrow Z_{Ht}^{(\tau)} \implies \downarrow X_{Ht}^{(\tau)}$
  - Home yields fall $\downarrow y_{Ht}^{(\tau)}$ ($\implies$ deviation from EH)
  - Home currency depreciates $\uparrow e_t$ ($\implies$ deviation from UIP)
  - Foreign yields fall $\downarrow y_{Ft}^{(\tau)}$ ($\implies$ spillovers)
  - Stronger bond spillovers and weaker FX reaction when long-term bonds more correlated

Key Insight: Risk premia jointly determined as a function of equilibrium holdings, hedging properties of domestic/international bonds

Motivation: Identifying Idiosyncratic Demand Shocks

- "Demand shocks" $\Delta\beta_{Ht}$ are well-defined theoretically, but unobserved. In general: simultaneous innovations to all factors $\mathbf{q}_t = \begin{bmatrix} i_{Ht} & i_{Ft} & \beta_{Ht} & \beta_{Ft} & \gamma_t & (\dots) \end{bmatrix}^\top$
- QE/QT? Problems: few shocks, endogenous, transmission channels may differ, ...
- Alternative: take a page from monetary shock lit. HF windows in which:

$$\Delta\mathbf{q}_t \approx \begin{bmatrix} 0 & \dots & \Delta\beta_{Ht} & \dots & 0 \end{bmatrix}^\top$$

- For US bonds, primary market is ideal: institutional features imply that auction results reveal new information about demand only
- $\implies$ asset price reactions in small windows around close of auction can test model mechanisms [Ray, Droste, Gorodnichenko 2024]

This Paper: Main Findings

Hypotheses and Novel Findings: following an increase in demand for US bonds:

1. The dollar depreciates (model: ✓)
2. Foreign yields decrease (model: ✓)
3. Countries with short rates which exhibit higher correlation with US short rates:
   (a) The FX reaction is weaker (model: ✓)
   (b) The yield reaction is stronger (model: ✓)

Additional Results:

- 1. and 2. are stronger when demand shock is for long-maturity bonds (model: ✓)
- 1. and 2. are stronger when stock/bond correlation is high, weaker (or even reversed) when stock/bond correlation is low (model: ✓? or ✗?)

Minor Suggestions

Interpretation of "shocks":

- Observe and estimate

$$D_t \equiv p_{t+10min} - p_{t-10min}, \quad \Delta x_t = \alpha + \beta D_t + \epsilon_t$$

- Identifying assumption: $\Delta \mathbf{q}_t \approx \begin{bmatrix} 0 & \dots & \Delta\beta_{Ht} & \dots & 0 \end{bmatrix}^\top \iff \Delta \mathbf{q}_t = D_t$
  - With additional assumptions, can translate this to "quantity space" (eg, other auction statistics such as bid-to-cover)
  - Care needs to be taken with state-dependence, since $\Delta\beta_{Ht}$ to D_t mapping is also state-dependent

Hedging Properties of International Bonds:

- Short rate correlation only one aspect of hedging properties of international bonds
- Theory: long-maturity yield correlation closer to "sufficient statistic"

Comment: Rationalizing Stock/Bond Correlations and State-Dependence

1. This paper: convenience yields [Jiang, Krishnamurthy, Lustig 2021]
   - Well documented, but slightly orthogonal to portfolio rebalancing and arbitrageur hedging motives [Vayanos & Vila 2021, Greenwood et al 2023, Gourinchas, Ray, Vayanos 2025]
2. Stock/bond correlation is a proxy for "deeper" state-dependence?
   - Arbitrageur risk-bearing capacity, factor covariances, monetary policy stance, ...
3. If it's really stock/bond correlation:
   - Future work: add multi-country risky assets to framework
   - Conjecture: function of dividend process correlation with short rate, demand shocks
   - $\implies$ examine dividend yield curve covariance structure across countries
4. Alternative: on "safe" days: $\Delta \mathbf{q}_t \approx \begin{bmatrix} 0 & \dots & \Delta\beta_{Ht} & \Delta\gamma_t & \dots & 0 \end{bmatrix}^\top$
   - "Typical" demand shocks: clienteles use cash/borrow short USD to buy US bonds
   - "Flight to safety" demand shocks: clienteles sell international assets to buy US bonds
   - Currency demand shocks γ_t critical for understanding FX [Itskhoki & Mukhin 2021]
   - Broader point (which annoyingly applies to all PH-inspired work) that clientele demand is not so simple: correlated demand shocks, cross-elasticities, ...

Concluding Remarks

- Really nice paper!
- Uncovers new empirical facts which are consistent with predictions of modern international finance theories
- Also finds interesting state-dependence; helpful guide for future theoretical work
- Read it!