Discussion of "Intermediary Elasticity"

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Overview of the Paper

- This paper proposes an asset-pricing methodology that simultaneously considering returns and flows, and quantifies it with foreign exchange market.
- Core idea: **traded risks are priced**, which **simultaneously** involve flows and returns.
- Unique dataset: daily trades between intermediaries and their customers in FX spot and derivatives.
- Quantitative results: three FX traded risk factors (Dollar, Carry, and Euro-Yen) account for 90% of trading-induced risks and these factor loadings are very stable in subsamples.

The Model

- Two components: (1) representation of returns and flows into orthogonal factors; (2) intermediaries pricing these factors subject to risk aversion.

- The PCA-like procedure generates factor loadings $\mathbf{b}_1, \mathbf{b}_2, \cdots, \mathbf{b}_K$, so that factor returns are uncorrelated.

- Intermediaries of mass μ acccomodate flow imbalances subject to risk aversion,

$$\max_{y_1,\cdots,y_K} \mathbb{E}\left[-\exp\left(-\sum_{k=1}^{K} \gamma_k (y_k \mathbf{b}_k \cdot \mathbf{r} - y_k R_F (1 + \Delta p_k)\right)\right]$$

  - Note: this is a two-period optimization. Multi-period time-series correlations are not considered.
  - Since $\{\mathbf{b}_k \cdot r\}$ are uncorrelated, using $\lambda_k = \gamma_k / (\mu R_F)$, we get

$$\Delta p_k = \lambda_k q_k var(\mathbf{b}_k \cdot \mathbf{r})$$

- Generality: heterogeneous intermediaries specialized in different risks.

Factor Representation

- Factors matter in terms of quantities of risks. Flow into factor k,

$$q_k = \sum_{n=1}^{N} f_n \beta_{n,k} = \sum_{n=1}^{N} f_n \frac{Cov(r_n, \mathbf{b}_k \cdot \mathbf{r})}{var(\mathbf{b}_k \cdot \mathbf{r})}$$

- Key idea: factor flows drive return fluctuations.
- Find $\mathbf{b}_1$ such that it explains both returns and quantities

$$\max_{b_1} var(\mathbf{b}_1 \cdot \mathbf{r}) var(q_1)$$

- Find $\mathbf{b}_2$ such that

$$\max_{b_2} var(\mathbf{b}_2 \cdot \mathbf{r}) var(q_2)$$

subject to $Cov(\mathbf{b}_1 \cdot \mathbf{r}, \mathbf{b}_2 \cdot \mathbf{r}) = 0$.

Factor Representation – Theoretical Intuitions

- The procedure guarantees that quantities are also uncorrelated, $Cov(q_k, q_j) = 0$ for $k \neq j$.
  - Step 1: rotate currency returns into $\hat{\mathbf{r}} = U\mathbf{r}$, so that $Cov(\hat{\mathbf{r}}, \hat{\mathbf{r}}) = Cov(U\mathbf{r}, U\mathbf{r}) = I$.
  - Step 2: denote factor-k loading on $\hat{\mathbf{r}}$ as g_k. Then flow is

    $$q_k = (g_k^T g_k)^{-1} g_k^T \hat{\mathbf{f}}$$

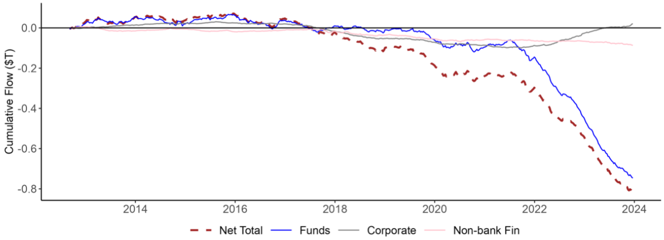
    with $\hat{\mathbf{f}} = U\mathbf{f}$.
  - Step 3: the objective function is $var(g_k \hat{r}) var(q_k) = (g_k^T g_k)^{-1} var(g_k^T \hat{f})$. The optimization leads to g_k as eigenvalue of $var(\hat{f})$. Thus,

    $$Cov(g_k^T \hat{\mathbf{f}}, g_j^T \hat{\mathbf{f}}) = \hat{\lambda}_k \hat{\lambda}_j Cov(g_k^T, g_j^T) = 0$$

- In theory, why orthogonality among flows is needed?
  - Intuitively, authors want to capture "flow-driven returns".
  - It will be nice to have theoretical foundations for why this is better.

FX Factors

- Three FX factors can be interpreted as "Dollar", "Carry", and "Euro-Yen". Factor loadings are stable in sub-periods.
- These factors explain 90% of trading-induced risks, $\sum_k var(q_k)var(b_k^T \mathbf{r})$.
  - What fraction of total currency returns are explained?
  - What fraction of total flow variations are explained?
- Why flows into factors are non-converging? Intermediary balance sheet cannot continue sustained growth.



(b) **Carry Factor**

Is the Foreign-Exchange Market Elastic?

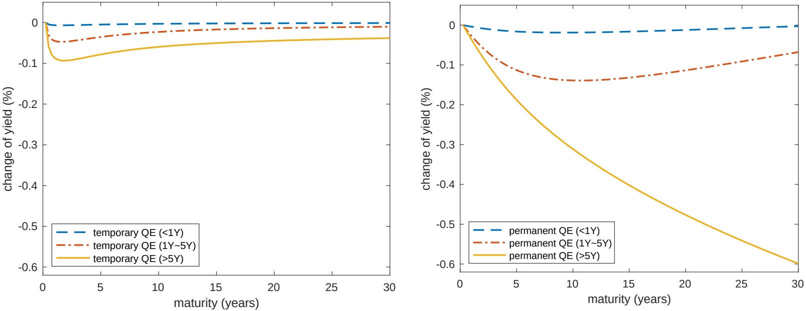
- The implied currency market elasticity is very low.
  - $1 billion demand shock raises dollar-factor price by 5 basis points. Suppose the relevant dollar denominated assets are $50 trillion. This implies 25 billion value change. A multiplier of **25**!
  - Even assuming all flows are into U.S. Treasuries, the multiplier is still more than **10**.
- Other markets:
  - U.S. Treasury market: about **0.27** (Jansen, Li, and Schmid (2024)). Quarterly data.
  - U.S. Equity market: about **5** (Gaibaix and Koijen (2024)). Quarterly data.
- Why the currency market is so inelastic?
  - Hypothesis 1: trading horizon is only one week. Maybe slow-moving capital will weaken it over longer periods.
  - Hypothesis 2: exchange rate is too volatile (however, equity return is much more volatile)
  - Hypothesis 3: intermediaries specialized in FX markets have too low risk-bearing capacity.

What about Preference-Based Demand?

- Dollar is special: global demand for safety and liquidity, provided by U.S. government debt.
  - Safety: protection of value in rare disasters, such as global financial crisis.
  - Liquidity: market depth and speed of transaction.
- Key challenge: such demand is not about the covariance of a factor structure.
  - Factor interpretation: stronger covariance with the dollar indicates higher risks and larger risk premium.
  - Preference interpretation: U.S. earns lower expected returns because of convenience demand.
- More generally, does the approach provide a bound on the importance of preference-based demand?

Price Impact: the Role of Expected Demand Persistence

- Expectation effect: longer-term demand shocks carry larger quantities of risks. E.g, persistent U.S. dollar dropping v.s. cyclical fluctuations. The former may require policy intervention.
- Example in the Treasury market (Jansen, Li, and Schmid (2024)):



(a) Temporary QE (b) Permanent QE

Summary

- Novel dataset + novel method = a great paper!
- Connects nicely the demand-based asset pricing with classical arbitrage-based pricing theories.
  - Factor pricing meets quantities.
- Suggestions:
  - More theoretical foundations for the return+flow PCA approach.
  - Understand why implied elasticity is so low, and why flows into factors are exploding.
  - Risk-based v.s. preference-based demand: can we shed light on the latter?
  - Expectation of demand shock persistence matters.
- Exciting area with so many open questions!