“Commodity Trade and the Carry Trade: A Tale of Two Countries”

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Carry trade returns:

- *Conditional carry trade*: high interest rate currency *today* earns high returns
- *Unconditional carry trade*: currency with high interest rate *on average* earns high returns

Risk-based explanations: high interest-rate currencies are risky
- Habit formation, long-run risks, disaster risks
- Country size, home bias

This paper:
- Asymmetry: heterogeneity in production technology + shipping costs
Basic Idea

Real exchange rate:

\[ S_t = \frac{\text{Price of domestic consumption basket}}{\text{Price of foreign consumption basket}} = \frac{\Lambda_t}{\Lambda^*} \]

- Heterogeneity: Some of the countries are safer – less exposed to global shocks.
  - Lower precautionary demand ⇒ higher interest rates
  - Their currencies tend to depreciate upon global recessions ⇒ risk premium

- “Currency safe havens” are those countries most exposed to global shocks.

- What is the economic mechanism?
Model

- Heterogeneity: commodity country vs. producer country
- Quadratic shipping cost: $\Phi(X)$
- Consumption allocation:
  - Producer country: $Y - X$
  - Commodity country: $X - \Phi(X)$
- Complete markets $\rightarrow$ planner problem:
  \[
  \max_X u^c(X - \Phi(X)) + \lambda u^p(Y - X)
  \]
- Spot exchange rate: price for one unit of producer currency in units of commodity currency
  \[
  S_t = \lambda \frac{(u^p_t)'}{(u^c_t)'} = 1 - \Phi'(X_t)
  \]


**Implication for Exchange Rate**

\[
S_t = \lambda \frac{(u_t^p)'}{(u_t^c)'} = 1 - \Phi'(X_t)
\]

1. \(\Phi'(X) = 0: S_t = 1\)
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1. \( \Phi'(X) = 0: S_t = 1 \)
2. \( \Phi'(X) > 0: S_t < 1 \)
3. \( \Phi''(X) > 0: X_t \uparrow \rightarrow S_t \downarrow \)

When either country receives positive shocks, \( Y_t \uparrow \rightarrow X_t \uparrow \rightarrow \Phi'(X_t) \uparrow \)

With negative shocks, \( Y_t \downarrow \rightarrow X_t \downarrow \rightarrow \Phi'(X_t) \downarrow \)

Shipping cost hurts less in bad times.
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Shipping cost hurts less in bad times.
I. Two-way Shipping Costs

- Why only one side of the shipping costs matters?
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- Why only one side of the shipping costs matters?
- Two countries, two intermediate goods (e.g., capital goods + commodity):
  \[
  d \log(Y_t) = \mu dt + \sigma dB_t \\
  d \log(Y^*_t) = \mu^* dt + \sigma^* dB^*_t
  \]

- Final good production: \( D_t = x_t^a (x^*_t)^{1-a} \), \( D^*_t = x_t^{a^*} (x^*_t)^{1-a^*} \)
- Shipping cost: \( \Phi(X) \), \( \Phi^*(X^*) \)
- Logarithmic preferences
- Planner problem:

$$\max_{X,X^*} \ln((X - \Phi(X))^{a^*}(Y^* - X^*)^{1-a^*})$$

$$+ \lambda \ln((X^* - \Phi^*(X^*))^{a}(Y - X)^{1-a})$$

- Spot exchange rate when $a = a^* = 0.5$:

$$S_t = \left( \frac{1 - \Phi'(X_t)}{1 - (\Phi^*)'(X_t^*)} \right)^{\frac{1}{2}}$$

- Relative marginal shipping cost and the origination of shocks matter now.
II. Exchange rate volatility

\[ S_t = 1 - \Phi'(X_t) \]

\[ \implies d \ln S_t = (\cdot)dt - \frac{\Phi''(X_t)}{1 - \Phi'(X_t)} dX_t \]

Is the implication on exchange rate volatility/correlation consistent with the data?

1. Carry trade returns are negatively correlated with exchange rate volatility?

2. Currencies that perform badly during periods of high exchange rate correlation have high average returns.
AUD/YEN exchange rate

01/90 01/95 01/00 01/05 01/10 01/15
0.008
0.01
0.012
0.014
0.016
0.018
0.02

AUD/YEN exchange rate
AUD/YEN exchange rate

AUD/YEN volatility
III. Other forms of heterogeneity

- Basic goods vs. complex goods, or goods with less vs. more elastic demand (differences in terms of trade hedge)?

- Is the distinction of basic vs. complex goods producers correlated with other characteristics?
  - Monetary and fiscal policies; access to financial markets; social insurance; banking sectors.

- Who are the marginal investors:
  - Botman et al. (2013): “The Curious Case of the Yen as a Safe Haven Currency: A Forensic Analysis.”
Conclusion

- Economic mechanism for currency risk premia is much appreciated!
- Challenges: Small number of countries, short samples.
- This paper provides a very intuitive mechanism and empirical support.