

The Share of Systematic Variation in Bilateral Exchange Rates

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What's the paper about?

- 1 Explores the factor structure of bilateral exchange rates
- 2 Explores the importance of a pricing factor that emphasizes the importance of the US dollar
- 3 Explores the properties of models that would rationalize the results

Factor Structure of Bilateral Exchange Rates

The paper's main claim about bilateral exchange rates

- “Changes in exchange rates appear random to most investors, central bankers, and researchers alike, except perhaps at very high or very low frequencies.”
- “To the contrary, [this paper reports] that two variables—the carry and the dollar factors—account for a substantial share of individual exchange rate time-series in developed countries, as well as in emerging and developing countries with floating exchange rates.”

The representative investor, central banker & researcher?

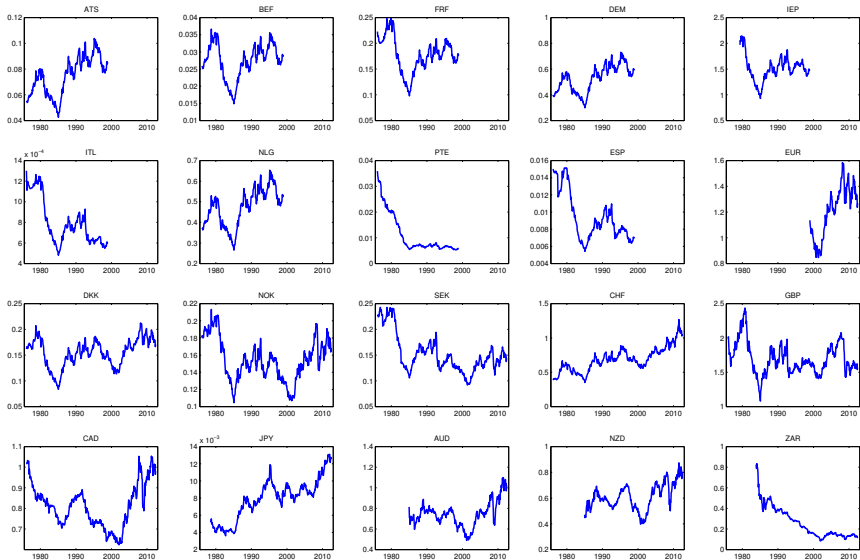


Is everyone this confused?

- Do “people” think exchange rates are “random”?
- If “random” means “difficult to forecast”, then, yes, most people probably feel that there is a lot randomness in exchange rates
 - But they’re right: exchange rates *are* difficult to forecast
- If it means “uncorrelated with each other” then, *no*, most people are aware that currencies comove.
 - The covariation of currencies is interesting, but it’s *not* a discovery!

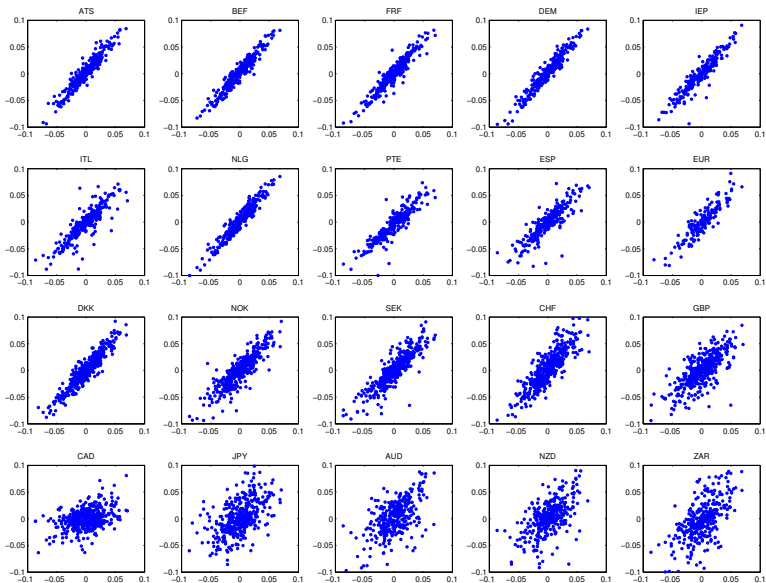
Covariation at low/medium frequencies

USD/FCU spot exchange rates



Covariation at high frequencies

Month-to-month log changes USD/FCU vs average across all currencies



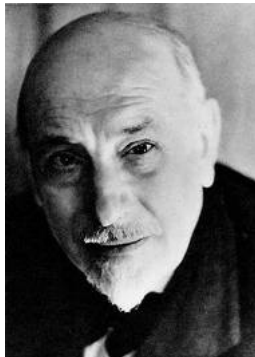
The main regression re-summarizes what we already know

$$\Delta s_{t+1} = \alpha + \beta(i_t^* - i_t) + \gamma(i_t^* - i_t)C_{t+1} + \delta C_{t+1} + \tau D_{t+1} + \varepsilon_{t+1}$$

$$D = \Delta \bar{s}_{t+1} \quad C = \Delta \bar{s}_{t+1}^{(6)} + \bar{i}_t^{*(6)} - [\Delta \bar{s}_{t+1}^{(1)} + \bar{i}_t^{*(1)}]$$

- We know that Δs_{t+1} is hard to forecast: so the usual regression with only the interest rate differential is well-known to have a small R^2
- We know the data have factor structure: so we'd expect Carry (C) and Dollar (D) to be informative about Δs_{t+1} , with Dollar likely to be more informative given the obvious positive correlation in the data
- Classic tests of UIP do not “suffer from an omitted variable bias” relative to this regression.

A (Dollar) Risk Factor in Search of Six Portfolios



Existing factors: Carry trade

- Exchange rates are somewhat predictable, at least in sample, by interest differentials

$$\Pr[\text{sign}(\Delta s_{t+1}) = \text{sign}(i_t^* - i_t)] = 0.519$$

- Implies that long foreign currency payoff are more reliably predictable

$$\Pr[\text{sign}(\Delta s_{t+1} + i_t^* - i_t) = \text{sign}(i_t^* - i_t)] = 0.570$$

- Motivates carry trades based on the sign of interest differentials vs USD
 - These carry trades are studied by Burnside, Eichenbaum and Rebelo (various) and others
 - Simple carry trade portfolio:

$$\text{Carry}_{\text{BER}} = \frac{1}{N} \sum_{i=1}^N (\Delta s_{t+1} + i_t^* - i_t) \text{sign}(i_t^* - i_t)$$

Existing factors: Dollar-neutral carry

- Lustig, Roussanov and Verdelhan (RFS, 2011) characterize two factors, DOL and HML_{FX}
- Based on six long-the-foreign-currency portfolios sorted on interest rates

$$DOL = \Delta \bar{s}_{t+1} + \bar{i}_t^* - i_t \quad HML_{FX} = \Delta \bar{s}_{t+1}^{(6)} + \bar{i}_t^{*(6)} - [\Delta \bar{s}_{t+1}^{(1)} + \bar{i}_t^{*(1)}]$$

- DOL and HML_{FX} price the cross-section of the sorted portfolios
- But the price of DOL risk is small and statistically insignificant

Existing factors: VOL, SKEW and Momentum

- Menkhoff, Sarno, Schmeling, and Schrimpf (JF, 2012): a currency volatility factor, VOL
- Rafferty: a currency skewness factor, SKEW
- Momentum:

$$\Pr [\text{sign}(\Delta s_{t+1} + i_t^* - i_t) = \text{sign}(\Delta s_t + i_{t-1}^* - i_{t-1})] = 0.570$$

Simple momentum portfolio:

$$\text{MOM}_{\text{BER}} = \frac{1}{N} \sum_{i=1}^N (\Delta s_{t+1} + i_t^* - i_t) \text{sign}(\Delta s_t + i_{t-1}^* - i_{t-1})$$

Existing factors: “Dollar” carry trade

- Lustig, Roussanov and Verdelhan (Countercyclical Currency Risk Premia) refine the predictability result
- The average interest differential vs USD is a better predictor than that currency's own interest differential

$$\Pr [\text{sign}(\Delta s_{t+1}) = \text{sign}(\bar{i}_t^* - i_t)] = 0.547$$

$$\Pr [\text{sign}(\Delta s_{t+1} + i_t^* - i_t) = \text{sign}(\bar{i}_t^* - i_t)] = 0.579$$

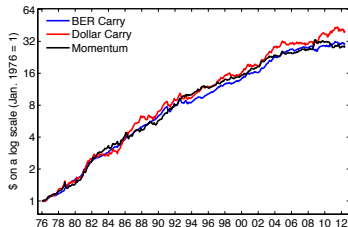
- Motivates a “Dollar Carry” strategy based on the *average* interest differential vs USD:

$$\text{Carry}_{\text{DOL}} = \frac{1}{N} \sum_{i=1}^N (\Delta s_{t+1} + i_t^* - i_t) \text{sign}(\bar{i}_t^* - i_t) = (\Delta \bar{s}_{t+1} + \bar{i}_t^* - i_t) \text{sign}(\bar{i}_t^* - i_t)$$

Profitability of currency strategies

BER data set, 1976M2-2012M6

	Mean (%)	SD (%)	SR
Carry _{BER}	4.4 (0.9)	5.2 (0.4)	0.85 (0.20)
MOM _{BER}	4.3 (1.1)	7.3 (0.5)	0.59 (0.16)
Carry _{DOL}	5.4 (1.5)	9.0 (0.4)	0.61 (0.17)



This paper: A risk factor in search of portfolios

- This paper: *redefine* dollar risk in terms of Carry_{DOL} rather than DOL
- A new set of portfolios by sorting on the time-varying exposures of currencies to the original DOL factor, but then takes positions in these portfolios based on $\text{sign}(\bar{i}_t^* - i_t)$
- Carry_{DOL} prices these portfolios
- Suggestion: Is there any ex-ante reason to be interested in these new portfolios? If so, emphasize this.

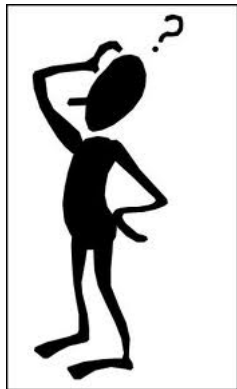
Do we need all of these risk factors?

- I think these risk factors are useful to the extent that they shrink the set of things we need to explain economically

Do we need $\text{Carry}_{\text{BER}}$, DOL , HML_{FX} , VOL , SKEW , MOM , and $\text{Carry}_{\text{DOL}}$?

- Not if what we are interested in is the original interest rate-sorted portfolios: $\text{Carry}_{\text{BER}}$ explains them all with no important marginal contribution from any of the others.
- VOL and SKEW are, in my view, attempts to get at the economics of what's going on in carry trades, whereas $\text{Carry}_{\text{BER}}$, DOL , HML_{FX} , and $\text{Carry}_{\text{DOL}}$ are all restatements of their profitability
- MOM is very different and can't be explained by the others

Models



- My paper with Jeremy Graveline is a substitute for a discussion of this part of the paper