

Discussion of
"Real Exchange Rate, Real Interest Rates and the
Risk Premium"
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Global Research Forum, Frankfurt, 17/12/2012

What is the paper about?

- Two prominent findings in the international finance literature
 - ▶ High interest rate country tends to earn high excess returns in the short-run (failure of UIP)
 - ★ Risk-based explanation: high interest rate countries have **higher risk-premium**
 - ▶ High real interest rate countries tend to have stronger real currency (above average) in levels (\Rightarrow **lower risk premium in levels**)
- Empirical evidence provided for G7 countries
- Hard to match both stylized facts with existing models
- New Keynesian model with monetary policy and liquidity shocks can do the job

Puzzle Part I

Definition of excess return of the Foreign asset

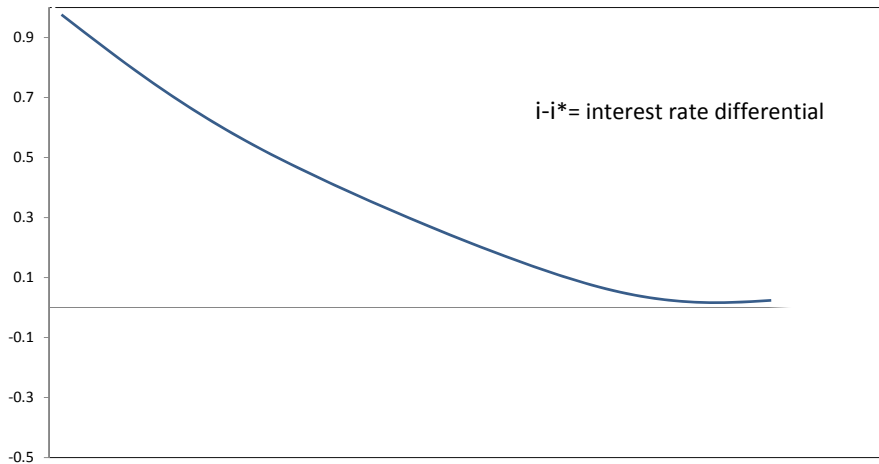
$$\lambda_t = i_t^* + E_t s_{t+1} - s_t - i_t \quad (1)$$

- Expected return in Home currency terms for a Foreign currency (first-order log approximation) can be written as $i_t^* + E_t s_{t+1} - s_t$
- UIP puzzle states that change in the log of the exchange rate $E_t s_{t+1} - s_t$ is negatively correlated with the interest rate differential $i_t - i_t^*$.
- That is $cov(E_t s_{t+1} - s_t, i_t - i_t^*) < 0$. This can be rewritten as

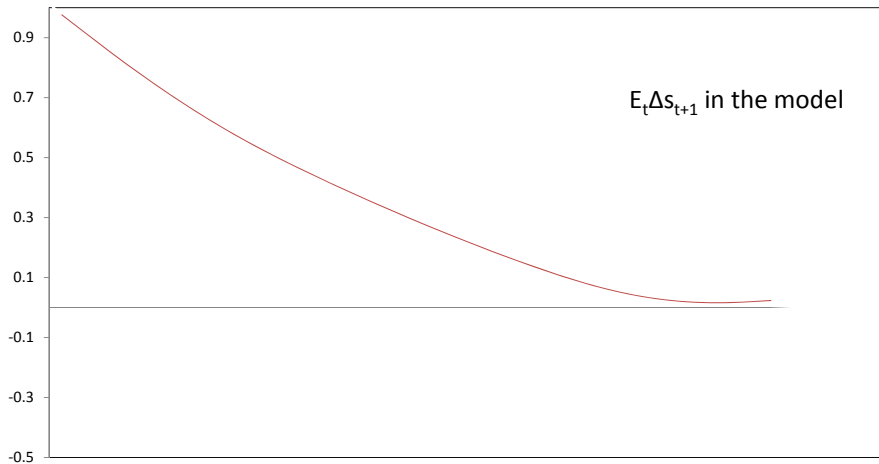
$$cov(\lambda_t, i_t - i_t^*) < 0 \quad (2)$$

- This is the well known UIP puzzle

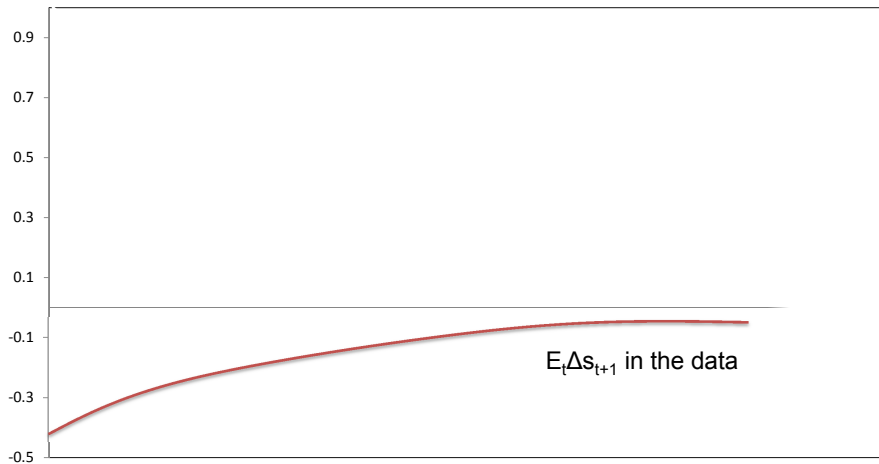
Graphical Representation: Interest Rate Differential



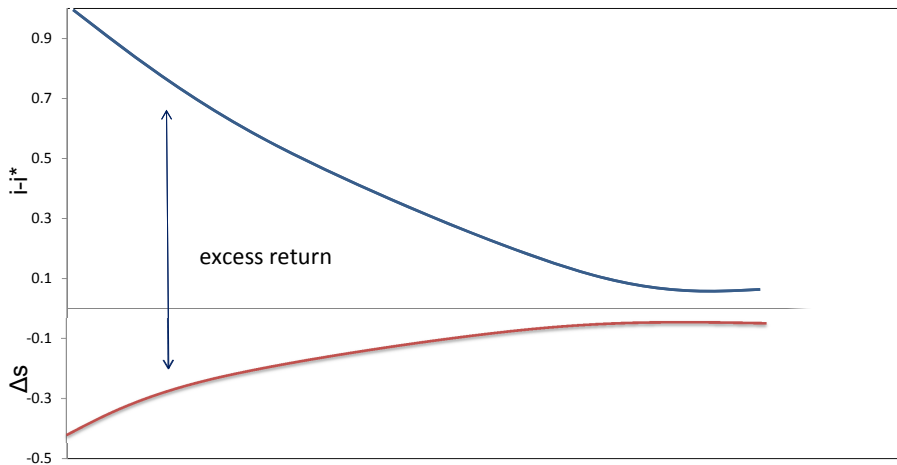
Graphical Representation: FX in the Model



Graphical Representation: FX in the Data



Graphical Representation: Excess Return



Why excess returns?

- Much in common with other puzzles in the finance literature
 - ▶ Data hard to be reconciled with existing models
- Risk premium (Backus et. al.,2001)
 - ▶ Needs very high risk aversion necessary to match the data
 - ▶ Models with non-standard preferences is needed (Campbel and Cochrane, 1990)
- Peso problems (Lewis, 2008)
 - ▶ Small sample biases
- Rare disasters (Farhi and Gabaix, 2011)
 - ▶ Combination of the two previous approaches.
- Learning (Weitzman, 2007)
 - ▶ Bayesian updating of unknown structural parameters imply a permanent tail-thickening effect explaining thereby excess returns.

Puzzle Part II

Rewrite the Model in real terms

- Define the log of the consumer price index $\pi_{t+1} = p_{t+1} - p_t$.
- Define the log of the real exchange rate $q_t = s_t + p_t^* - p_t$.
- Define $r_t = i_t - E_t \pi_{t+1}$. Equivalent relationship holds for the foreign country.
- This results in

$$\lambda_t = r_t^* + E_t q_{t+1} - q_t - r_t \quad (3)$$

- Some assumptions
 - ▶ Uncontroversial: $r_t^* - r_t$ and λ_t are stationary random variables without trends (with mean \bar{r} and $\bar{\lambda}$).
 - ▶ More controversial: Unconditional mean of $E_t q_{t+1} - q_t$ is zero.

Puzzle Part II (cont'd)

Iterating this equation forward results into

$$q_t - \bar{q} = -R_t - \Lambda_t \quad (4)$$

- Where $R_t = \sum_{j=0}^{\infty} E_t(r_{t+j} - r_{t+j}^* - \bar{r})$
- And $\Lambda_t = \sum_{j=0}^{\infty} E_t(\lambda_{t+j} - \bar{\lambda})$
- Λ_t can be labeled as the "level risk premium".
- $q_t - \bar{q}$ can be considered the transitory component of the RER. Note that, under stationarity $\lim_{j \rightarrow \infty} (E_t q_{t+j}) = \bar{q}$
- Question: **what is the correlation of $cov(\Lambda_t, r_t - r_t^*)$?**

Empirical Evidence

Empirical evidence (expectations derived by VARs) provided in the paper suggest that

$$\text{cov}(\Lambda_t, r_t - r_t^*) > 0 \quad (5)$$

This implies that

$$\text{cov}(q_t, r_t - r_t^*) < 0 \quad (6)$$

- This is in line with the Dornbusch(1976) and Frankel(1990) narrative that when a country's real (relative) interest rate is high, its currency tend be to strong in real terms.

Central Puzzles

These are the two central puzzles of the paper

$$\text{cov}(\lambda_t, r_t - r_t^*) < 0 \quad (7)$$

and

$$\text{cov}(\Lambda_t, r_t - r_t^*) > 0 \quad (8)$$

Given the definition of Λ_t , this implies that at least for some $j > 0$

$$\text{cov}(E_t \lambda_t + j, r_t - r_t^*) > 0 \quad (9)$$

- But many models in literature that are constructed to explain $\text{cov}(\lambda_t, r_t - r_t^*) < 0$ (i.e. the UIP puzzle), imply also that $\text{cov}(\Lambda_t, r_t - r_t^*) < 0$

What model can account for both stylized facts?

- Models of the FX premia under complete markets
 - ▶ Model with non-standard preferences (e.g. as suggested by Campbell and Cochrane, 1990 or Epstein and Zin, 1989) can deliver $cov(\lambda_t, r_t - r_t^*) < 0$, but not $cov(\Lambda_t, r_t - r_t^*) > 0$.
- Models with delayed overshooting/reaction
 - ▶ Delayed overshooting is a necessary, but not sufficient condition, since it only implies $cov(E_t \lambda_t + j, r_t - r_t^*) > 0$ for some j 's.

What model can account for both stylized facts?

- New-Keynesian Models with liquidity return
 - ▶ Key to solve both puzzles: two sources of economic shocks
 - ▶ Monetary policy shock: tightening reduces short-term Home currency denominated liquidity, so the "liquidity return" of remaining assets increases ($cov(\lambda_t, r_t - r_t^*) > 0$).
 - ▶ Liquidity shock: If domestic asset are more valued for their liquidity, the currency will appreciate, allowing for a fall in interest rates $cov(\lambda_t, r_t - r_t^*) < 0$.
 - ▶ When the variance of the liquidity shock is sufficiently high they can imply that $cov(\lambda_t, r_t - r_t^*) < 0$
 - ▶ When the persistence of the monetary policy shock is sufficient they can imply $cov(\lambda_t, r_t - r_t^*) > 0$.

Comments: Constructing variables in expectations

- UIP failure: ex-ante concept (in contrast to the ex-post concept of carry trade)
- Fama regressions in the paper relies upon the rational expectations methodology superimposed in the VAR (Note: $r_t^d = i_t - E_t \pi_{t+1} - i_t^* - E_t \pi_{t+1}^*$, and $\Lambda_t = \sum_{j=0}^{\infty} E_t(\lambda_{t+j} - \bar{\lambda})$).
- However, Chinn and Frankel (1994, 2002) and also Froot and Frankel (1989) document that it is difficult to reject UIP for a broader set of currencies, when using forecasts provided by the *Currency Forecasters' Digest* (CFD).
- Measured expectations vs. rational expectation
- What drives the difference: information set or (rational) expectation formation?

Comments: Law of iterated expectations

- $\Lambda_t = \sum_{j=0}^{\infty} E_t(\overline{\lambda_{t+j}})$
- The marginal buyer is likely to be a different agent in every period
- Homogeneity of agents is not sufficient for the law of iterated expectations to hold
- Allen, Morris and Shin (2006): Important role of higher order beliefs
- Agents need to know how other market participants form expectations

Comments: Testing the Model

- Two shocks → two objectives (Tinbergen rule for researchers)
- Constrained to a linear set-up with rational expectations
- But introducing non-linearities and deviations from rational expectations might be helpful
- But even in a current set-up:
 - ▶ Are liquidity and monetary shocks the main drivers of excess returns?
 - ▶ Liquidity shocks → shocks to the collateral value
 - ▶ For understanding better the transmission: Endogenizing liquidity shock in a Kyotaki and Moore (2008) framework

Comments: Short vs. Long Maturities

- Focus on short maturities
- Monetary policy might be important as a driver
- What about the longer horizons?
- Evidence of some divergence between short and long horizons in the literature
- In fact, Chinn and Meredith (2004) explain the divergence through the impact of monetary policy
- Less impact of monetary policy on long-term interest differentials/excess returns

Conclusions

- Real pleasure to discuss this very interesting paper!
- It outlines two main puzzles in the literature, and provides a solution
- But it also directs towards new avenues for research in the field