# EC4100: Exchange Rate Economics IV

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# Topics in Exchange Rate Economics

- Deviations from UIP
- Carry Trade
- Deviations from PPP

# Deviations from UIP

- UIP condition [here $S$ denotes the nominal exchange rate]

$$
\begin{aligned}
i_{\$} &= i_{€} + \frac{\Delta S^{e}_{\$/€}}{S_{\$/€}} \\
i_{\$} &= i_{€} + \Delta s^{e}
\end{aligned}
$$

  where $s = \log(S)$ since log changes approx. equal to percentage changes

- During a given period, the actual change in exchange rate equals expected change plus an error term

# Deviations from UIP

- This implies

$$\Delta s = (i_{\$} - i_{€}) + \eta$$

or

$$\Delta s = FD + \eta$$

where $FD$ is the forward discount $f - s$ where $f$ is log of forward exchange rate

# Empirical test

- Run regression

$$\Delta s = \alpha + \beta(i_{\$} - i_{€}) + \eta$$

or

$$\Delta s = \alpha + \beta FD + \eta$$

- UIP: $\beta = 1 \ \ (\alpha = 0)$
- Empirically, $\beta < 0$.
- Positive interest rate gap on average associated with appreciation, not depreciation
- But $R^2$ typically very low - not a risk-free strategy

# Interpretations

- Expected rate of depreciation driven by "rare events" (eg periodic currency crashes): in a typical period, no activity; but occasionally, very large jumps. If regression run on a no-crisis sample, get puzzling result
  - "Peso problem" - high interest rate in Latin America in 1970s b/c crashes expected [even if not observed in selected sample periods]
  - Skewed distribution [mean $\neq$ median]

- Currency risk premium - a high interest rate may be compensation for greater volatility (risk), not higher expected depreciation

$$i = i^* + \Delta s^e + rp$$

- This implies

$$s = -(i - i^*) + s^e + rp$$

- Risk premium 'explains' $\beta < 0$ if covariance between $(i - i^*)$ and $rp$ is positive.
- Currency risk may be correlated with other financial risks (eg global or local equity market risks)

# Carry Trade

- Invest in currencies with high interest rates, borrow in currencies with low interest rates
- Positive expected return but risky for any individual pair of currencies ($R2$ low)
- Carry trade portfolios: invest in a portfolio of high interest currencies; fund in a portfolio of low interest currencies
- Key to success: risk management
  - Invest less when risk indicators increase; invest more when risk indicators decrease
  - Identification of "turning points" [probability of return reversal]
  - Crash risk
  - "Picking Pennies in Front of a Steamroller"
  - Reversal periods: "revenge of the steamroller"

# Deviations from PPP

- Traded goods versus Nontraded goods

$$\begin{aligned} P &= P_T^{\alpha} P_N^{1-\alpha} \\ P^* &= P_T^{*\alpha} P_N^{*1-\alpha} \end{aligned}$$

- LOOP

$$P_T = SP_T^*$$

- But

$$P_N \neq SP_N^*$$

# Deviations from PPP

- Real exchange rate

$$q = \frac{SP^*}{P}$$

$$q = \frac{SP_T^* \left(\frac{P_N^*}{P_T^*}\right)^{1-\alpha}}{P_T \left(\frac{P_N}{P_T}\right)^{1-\alpha}}$$

$$q = \left\{ \frac{\left(\frac{P_N^*}{P_T^*}\right)}{\left(\frac{P_N}{P_T}\right)} \right\}^{1-\alpha}$$

- Relative price of nontradables driven by
  - Productivity differentials (Balassa-Samuelson)
  - Demand factors (short run)
- N sector extensive, includes 'mixed' goods [eg retail]

# Balassa-Samuelson Hypothesis

- Productivity levels $A_T, A_N$
- Internationally mobile capital - fixed world interest rate $r$
- $P_T$ fixed on world markets (LOOP)
- Intersectoral labour mobility - common economy-wide wage $w$
- Positive shock to $A_T$
  - Optimal increase in $K_T, L_T$
  - Capital inflow
  - Increase in labour demand - $w$ increases
  - Rise in $w$ increases marginal cost of producing $N$ good - $P_N$ increases
  - Real appreciation ($P_N / P_T$ increases)

# Demand-Side Factors

- Long run: increase in demand for $N$ goods - move labour into N sector
- Short run: limited intersectoral mobility, increase in demand for N goods leads to real appreciation
- Demand for T goods - imports can adjust

Application: 'Transfer Problem'

- Shift from trade deficit to trade surplus: reduction in domestic spending $\rightarrow$ real depreciation
- Aid inflow: real appreciation
- War reparations: real depreciation