Summary of Models

Study parameters

- Exchange rates: national currency/dollar, e.g., euro/dollar, yen/dollar, pound/dollar, etc.

- Out of sample forecasting periods:
  (1) 1983q1 - 2014q4: the period after the US disinflation --- Great Moderation
  (2) 2001q1 - 2014q4: the period after the dot.com boom
  (3) 2007q4 - 2014q4: the period starting with the beginning of the Great Recession

Models

1. Purchasing power parity, hereafter PPP. Use CPI's.
   $s_t = \beta_0 + \hat{p}_t$,
2. Sticky price monetary (Dornbusch-Frankel), hereafter SPMM. Use M2, GDP, 3 month interest rates, CPIs for 4 quarter inflation rates, as described in CCG-P.
   $s_t = \beta_0 + \beta_1 \hat{m}_t + \beta_2 \hat{y}_t + \beta_3 \hat{i}_t + \beta_4 \hat{\pi}_t + u_t,$
3. Stylized Behavioral Equilibrium Exchange Rate model, hereafter BEER. Use CPI/PPI ratio, government debt, terms of trade and net foreign assets, as described in CCG-P.
   $s_t = \beta_0 + \hat{p}_t + \beta_5 \hat{\omega}_t + \beta_6 \hat{r}_t + \beta_7 \hat{g}debt_t + \beta_8 tot_t + \beta_9 nfa_t + u_t,$
4. Interest rate parity, hereafter IRP. Use offshore interest rates for up to one year; 5 year sovereign yields to maturity for longer, as in CCG-P. Recall, we did not estimate this relationship; we used exact UIP relationship.
   $s_{t+k} = s_t + \hat{i}_{i,k}$
5. *Real interest differential, using shadow rates. Use policy shadow rates to calculate real interest rates (lagged one year inflation) as predictor for level of exchange rate. Note, these are overnight rates.*
   $s_t = \beta_0 + \beta_1 (\hat{i}_t^{shadow} - \hat{\pi}_t) + u_t,$
6. *Taylor rule fundamentals (Papell, et al.). Use HP filter to obtain output, inflation gaps* over entire sample*. In order to mitigate end-point problem, we use ARIMAs to forecast out output, inflation six quarters, then apply (two-sided) HP filter to extended data.*
   $s_{t+k} - s_t = \beta_0 + \beta_1 \tilde{\hat{y}}_t + \beta_2 \hat{\pi}_t + u_t$
7. *Sticky price monetary model, augmented by VIX and TED*
   $s_t = \beta_0 + \beta_1 \hat{m}_t + \beta_2 \hat{y}_t + \beta_3 \hat{i}_t + \beta_4 \hat{\pi}_t + \beta_5 VIX_t + \beta_6 TED_t + u_t,$

8. *Yield curve slope (3 mo – 10 yr)*. Regress change in exchange rate on interest rate differential, and differential yield curve slope, at different horizons. (Chen and Tsang regress on level, slope and curvature).

$$s_{t+k} - s_t = \beta_0 + \beta_1(\hat{i}_t) + \beta_2(slope_t) + u_t,$$

Specifications (details in handout "Econometric Techniques")

- Error-Correction Specification (not applicable for IRP)
- First differences (not applicable to IRP, Taylor rule fundamentals)

Metrics to evaluate performance of different models:

(a). Diebold-Mariano-West statistics (Diebold and Mariano, 1995; West, 1996)
How much does the forecasted exchange rate deviate from the actual exchange rate?

(b). direction-of-change statistic
For trading purposes, whether the forecasted exchange rate changes towards the same direction (appreciation or depreciation) as the actual exchange rate?

(c). consistency metric (Cheung and Chinn, 1998)
whether the forecast exchange rate and the actual exchange rate are cointegrated

References

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