COMMENTS ON *On the Unstable Relationship between Exchange Rates and Macroeconomic Fundamentals*

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Main Idea

Rational Confusion

Unobserved Fundamentals + Unobserved Time-Varying Parameters on Observed Fundamentals

$\Rightarrow$ Estimated coefficients on observed fundamentals can change even when there is no underlying change in the parameters

$\Rightarrow$ 'Scapegoat Effects'

General Comments

1. Nice idea.
2. Intuitively plausible.
3. Analysis seems like it could be simplified.

Simplification Strategies

1. Express model in State-Space form and apply *recursive* nonlinear filtering methods.
    - Zakai/Kushner Equations.
    - The extended Kalman filter.

SIMPLIFICATION STRATEGIES

1. Express model in State-Space form and apply *recursive* nonlinear filtering methods.
   - Zakai/Kushner Equations.
   - The extended Kalman filter.

2. Are time-varying parameters and unobserved fundamentals even *necessary* to generate scapegoat effects?
   - Perceived vs. Actual TVP.
   - Learning Cycles. (Sargent & Williams (*RED*, 2005)).

The Extended Kalman Filter

Model: $E_t s_{t+1} = \mu s_t + f_t + b_t \qquad \mu > 1$
$$f_{t+1} = \beta_t f_t + \varepsilon_{1,t+1}$$
$$\beta_{t+1} = \alpha \beta_t + \varepsilon_{3,t+1}$$

Let $X_{t+1} = (f_{t+1}, E_t s_{t+1}, \beta_{t+1}, b_{t+1})'$ and $Y_t = (f_t, s_t)'$.

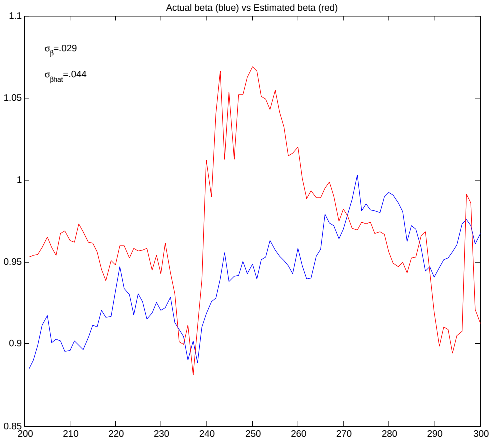
Then model can be written as:

$$\begin{aligned} X_{t+1} &= F(X_t) + C\varepsilon_{t+1} \\ Y_{t+1} &= GX_t + D\varepsilon_{t+1} \end{aligned}$$

Key Idea: Recursively linearize the system around current state estimate in order to update state estimates, but propagate the system forward using the original nonlinear system.

A SIMULATION

$$\mu = 1.03 \quad \alpha = .95 \quad \gamma = .95 \quad \sigma_1 = .03 \quad \sigma_3 = .01$$



LEARNING CYCLES

Model:

$$s_t = \lambda E_t s_{t+1} + \beta_1 f_{1,t} + \beta_2 f_{2,t}$$

$$\begin{pmatrix} f_{1,t} \\ f_{2,t} \end{pmatrix} = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix} \begin{pmatrix} f_{1,t-1} \\ f_{2,t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1,t} \\ \varepsilon_{2,t} \end{pmatrix}$$

Note: β_1 and β_2 are *constant* and f_t is *observed*

PLM:

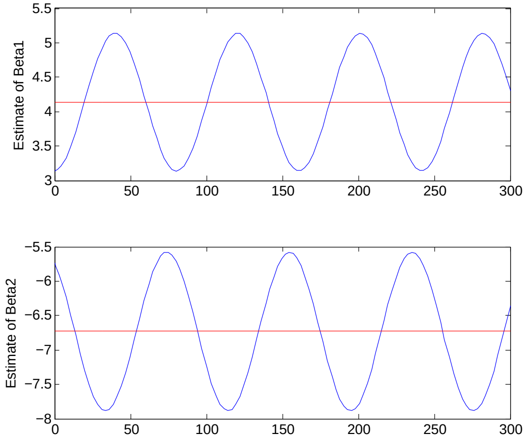
$$\begin{aligned} s_t &= b_1 f_{1,t} + b_2 f_{2,t} + \epsilon_t \\ b_t &= b_{t-1} + v_t \qquad\qquad var(v_t) = V \end{aligned}$$

MeanODEs:

$$\begin{aligned} \dot{b} &= Pg(b) \\ \dot{P} &= \sigma_\epsilon^{-2} V - PMP \end{aligned}$$

A SIMULATION

$$\lambda = .95 \quad \beta_1 = .6 \quad \beta_2 = .4 \quad a_{11} = a_{22} = .9 \quad a_{21} = -.35$$



One Last Comment

1. Parameter Uncertainty vs. Model Uncertainty
   - Cho and Kasa (2008), "Learning and Model Validation"'
   - Markiewicz (2010), "Monetary Policy, Model Uncertainty and Exchange Rate Volatility"'