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Exchange Rate Models Are Not as Bad as You Think

Discussion by

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Exchange Rate Models are Not as Bad as You Think

Charles Engel, Nelson Mark, and Ken West

Comments by Valerie Cerra

Thought provoking paper

- Fund staff can learn more:
- Charles Engel, New Developments in Exchange Rate Economics, February 8, 2007
- Nelson Mark, Exchange Rates, July 6, 2007
- Ken West, Exchange Rate Models are Not as Bad as You Think, August 8, 2007

Objective of paper

- Model Evaluation
- Not forecasting, per se
- This paper hopes to overturn Meese-Rogoff's (JIE 1983) pessimistic finding that RW beats fundamentals out of sample

Meese-Rogoff's pessimistic results refer to industrial countries at intermediate horizon

<table>
<tr><th></th><th>Short-run</th><th>Medium-run</th><th>Long-run</th></tr>
<tr><td rowspan="2">Industrial countries</td><td rowspan="2">Anderson, Bollerslev, Diebold, and Vega
Clarida and Waldman
Fatum and Scholnick
Faust, Rogers, Swanson, and Wright

(news and high frequency data)</td><td>Meese Rogoff

many others</td><td rowspan="2">Mark and Sul
MacDonald

(Cointegration and long horizon tests)</td></tr>
<tr><td>Chen and Rogoff (commodity currencies)

Taylor, Peel, and Sarno (nonlinear models)</td></tr>
<tr><td>Non-industrial Countries</td><td colspan="3">← Cerra and Saxena →
(Fundamentals beat RW at 1 yr and 5 yrs
Strong cointegration results)</td></tr>
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Optimistic	Pessimistic

Engel-West theorem: If PV model is true, Exchange Rate is nearly a Random Walk

Model: $s_t = (1-b) \Sigma b^j E_t x_{t+j}$ and $\Delta x_t = \varphi \Delta x_{t-1} + e_t$

		Correlation of Δs_{t+1} with:	
b	φ	Δs_t	Δx_t
(1)	(2)	(3)	(4)
0.90	0.3	0.03	0.03
	0.5	0.05	0.06
	0.8	0.09	0.13
0.95	0.3	0.02	0.02
	0.5	0.03	0.03
	0.8	0.04	0.07

This insight does not overturn Meese Rogoff

- Engel-West: Out of sample **forecast**
  - Use **current** fundamentals to forecast future exchange rates
- Meese-Rogoff: Out of sample **fit**
  - Use **future** fundamentals to "forecast" (fit) future exchange rates

EMW model does not match the data

Model: $s_t = (1-b) \Sigma b^j E_t x_{t+j}$ and $\Delta x_t = \varphi \Delta x_{t-1} + e_t$

		Correlation of Δs_{t+1} with:			
		Model			Data
b	φ	Δs_t	Δx_t	Δx_{t+1}	Δx_{t+1}
(1)	(2)	(3)	(4)	(5)	(6)
0.90	0.3	0.03	0.03	0.96	
	0.5	0.05	0.06	0.89	
	0.8	0.09	0.13	0.70	0
0.95	0.3	0.02	0.02	0.96	
	0.5	0.03	0.03	0.88	
	0.8	0.04	0.07	0.65	

Model implies Future fundamental should be highly correlated w/ exch rt change

Meese Rogoff find no correlation in data

EMW criticize out of sample fit methodology

- They say out of sample fit can be abused:
- Use s_{t+1} to predict s_{t+1}
  - could beat RW
  - but silly and misleading*

* same warning for using future price of financial contract (e.g. forward) that is linked to price of exchange rate

But critique is not relevant to M-R

- Meese-Rogoff don't use s_{t+1} to predict s_{t+1}
- And their RHS variables don't beat RW

- Engel-West theorem shows out of sample forecast should have low power
- Conversely, Meese-Rogoff's out of sample fit should have high power

→ Theorem can't explain Meese-Rogoff's pessimist findings from out of sample fit

Paper (and recent lit) uses error correction term for out of sample forecasting

$$\Delta s_{t+1} = \beta (s_t - x_t) + \Sigma_j \gamma_j \Delta x_{t-j} + \Sigma_j \delta_j \Delta s_{t-j}$$

Error correction term

Short term dynamics

Coefficient of adjustment to equilibrium

- Interprets $\beta<0$ as favorable evidence

Irony: Error correction results are stronger when model is worse (more noise)

Model: $s_t = (1-b) \Sigma b^j E_t x_{t+j} + u_t$ and $\Delta x_t = \varphi \Delta x_{t-1} + e_t$

b	φ	Correlation of Δs_{t+1} with:				
		Δx_t	$(s_t - x_t)$			
			Standard deviation of u (noise)			
		0	0	0.25	1.0	2.0
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0.90	0.3	**0.03**	**0.03**	-0.07	-0.48	-0.64
	0.5	**0.06**	**0.06**	0.03	-0.29	-0.54
	0.8	**0.13**	**0.13**	0.16	0.09	-0.07
0.95	0.3	**0.02**	**0.02**	-0.07	-0.48	-0.64
	0.5	**0.03**	**0.03**	0.01	-0.28	-0.53
	0.8	**0.07**	**0.07**	0.09	0.05	-0.07

more noise →
stronger ECM results →

Panel data and longer horizons

- $\Delta s_{it+k} = \beta(s_{it}-x_{it}) + u_i + v_{t+k} + e_{it+k}$
- Panel improvement driven by time effect?
- Robustness to forecast of v_{t+k} ?
- Time effect not part of fundamentals
- Suggestion: Try demeaned data
- Cross-sectional dependency
  - Average Corr(Δs_{it},Δs_{jt}) = 0.6
  - Unless corrected, 18 countries with corr=0.6 give same info as 1.6 independent countries

Taylor rules

- Conceptually interesting models
  - Emphasizes endogeneity
- Good in-sample fit
- Poor out of sample forecasts
- Robustness of parameters?
- Suggestion: Try out of sample fit

Granger causation results in paper are not consistent with model

- $\Delta s_{t+1} = \beta(s_t - x_t) + \Sigma_j \gamma_j \Delta x_{t-j} + \Sigma_j \delta_j \Delta s_{t-j}$
- Data: mixed 2-way Granger causation
  - Interpretation?
- Strict PV model shows
  - Fundamentals Granger cause ex rt
    - F → S
  - Ex rt does **not** Granger cause fundamentals
  - $(s_t - x_t) = (b\varphi/1-b\varphi)\ \Delta x_t$
    - Perfect collinearity in specification

Volatility of fundamentals does not match exchange rates

- PV fundamentals only about half as volatile as exchange rate (except Canada)
- F-test rejects equality of variances

Synthesis of evidence on exchange rate models

- Favorable evidence for: (1) Commodity currencies; (2) Non-industrial countries; (3) Industrial countries at short and long horizons

- Yet for this paper's subset of non-commodity industrial countries at intermediate horizon:

  1) Fundamentals and ex rate may be anchored in long run, but...

  2) Noise causes lots of deviations in medium run
     - Evidence against strict PV model
     - Poor out of sample fit results are still puzzling