Discussion of

Currency Manipulation

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General Comments

- Great paper!
- Important question:
  - Rationale of currency manipulation.
  - Novel theory based on risk-based view of differences in currency returns.
  - Currency manipulation affects the interest rate and capital accumulation.
- Very neat theoretical model with clear implications.

Mechanism

- 2 Period model. Two countries: target and stabilizing (t,s), different in size.
- T and NT goods. Country productivity shocks in NT. Markets are complete.
- Real exchange rate (logs):

$$s^{t,s} = p^t - p^s$$

- Consumption Euler equation:

$$r^t + \Delta\,\mathbb{E}^{t,s} - r^s = cov(\lambda_T, p^s - p^t)$$

$cov(\lambda_T, p^s - p^t)$: covariance b. shadow price of T goods and RER.

1. A currency appreciating in bad times offers a hedge & pays lower returns.

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$$s^{t,s} = p^t - p^s$$

- Consumption Euler equation:

$$r^t + \Delta\, \mathbb{E}^{t,s} - r^s = cov(\lambda_T, p^s - p^t) + \pi\sigma^2_{\lambda_T}$$

$cov(\lambda_T, p^s - p^t)$: covariance b. shadow price of T goods and RER.

1. A currency appreciating in bad times offers a hedge & pays lower returns.
2. A policy that affects this covariance can alter the interest rate and capital accumulation.

Currency Manipulation

- Currency manipulation: two objectives

$$\text{(P1)} \qquad var(s^{t,s}) = (1-\zeta)^2 var(s^{t,s*})$$

$$\text{(P2)} \qquad \mathbb{E}[s^{t,s}|K^n] = \mathbb{E}[s^{t,s*}|K^n]$$

$\zeta \in (0,1]$ strength of stabilization, $\zeta = 0$ freely floating, $\zeta = 1$ peg. *freely floating regime.

- Exchange rate stabilization:
  - Re-write RER as a function of shadow prices of consumption:

$$s^{t,s} = \lambda^t - \lambda^s$$

  - Countries affect marginal utility of consumption (λ^s). How?
  - Tax: state-contingent and lump-sum to affect consumption of T goods.

Currency Manipulation: Example for SOE

$$s^{t,s} = \lambda^t - \lambda^s$$

1. Target country (U.S.) has a negative productivity shock and λ^t increases.
2. Stabilizing country (EM) can increase local shadow price (λ^s). How?
3. Levy a tax on T goods to reduce its local consumption (exports of increase).
4. If stabilization is successful, r^s decreases and K accumulation increases.

   Proposition 1: *"A country that stabilizes its RER relative to a target country sufficiently larger than itself lowers its risk-free interest rate, increases capital accumulation and increases the average wage".*

5. Stabilization is financially sustainable, if small and risk aversion high enough.

Additional Results

1. The cost of the stabilization increases with the size of the stabilizing country.
2. Effects on the target country: ambiguous effects on welfare.
3. Results hold when considering the nominal ER, a basket of currencies, inflation shocks, market segmentation and preference shocks.

Comments

$\rightarrow$ Very interesting paper! Very complete with lots of results.

Empirics

1. Can we test the model's implications in data?
2. How sustainable are currency manipulations?

Model (for future research?)

1. How important are the effects quantitatively?
2. Sustainability of currency manipulation: accumulation vs depletion of reserves.

Empirics

→ **How to identify the impact of currency manipulation in the data?**

1. Real exchange rate shock in the target economy.
2. Identify the impact on the stabilizing economy, given its ER regime.

→ **Empirics**

- Focus on Emerging Markets (stabilizing) and study the impact of RER shocks in the U.S. (target):
  - → Response of exports, interest rate and capital accumulation in EMs to an (exogenous) U.S. RER shock.

Use the Model to Guide Empirics

The model predicts larger responses for tighter ER regimes $\rightarrow$ Exploit differences across regimes.

(i) Exports:

$$\underbrace{c_T^s - c_T^{s*}}_{\downarrow \text{T consumption } (\uparrow \textit{export})} = \zeta\, \kappa\, \underbrace{(y_N^t - y_N^s)}_{\text{if } y_N^t < y_N^s}$$

$\zeta \in (0, 1]$ strength of stabilization, $\zeta = 0$ freely floating, $\zeta = 1$ peg. κ=parameter. *freely floating

– If t country has a negative productivity shock, s country reduces T consumption ($\uparrow$ exports) to increase its shadow price and stabilize the currency. The expansion in exports increases with the strength of the stabilization, ζ.

(ii) Interest rate and capital accumulation:

$$\underbrace{r^s + \Delta\, \mathbb{E}\, s^{mt} - r^t}_{\text{stabilizing}} = \underbrace{r^{s*} + \Delta\, \mathbb{E}\, s^{mt*} - r^{t*}}_{\text{freely floating}} - \zeta \tilde{\kappa} \sigma_N^2$$

– The interest rate drops with ζ.

Data

- **Shock**: real effective exchange rate for U.S.
- **Exchange Rate Regime (ζ)**:
  - ER indicator: Ilzetki, Reinhart and Rogoff (2016).
  - 1: Peg. 2: Crawling peg. 3: Managed float. 4: Freely float. 5: Freely falling. 6: Dual market.
- **Sample**: 20 Emerging Markets.
  - Argentina, Brazil, Bulgaria, Chile, Colombia, Czech Republic, Ecuador, Hungary, India, Indonesia, Iran, Korea, Malaysia, Mexico, Peru, Philippines, Russia, Thailand, Turkey and Ukraine.
- **Period**: 1990Q1:2015Q4.

Panel VAR

→ ***Proposition 1:*** *Following a target country's appreciation (US), stabilizing countries (EMs) increase (net) exports, lower interest rate and increase capital accumulation.*

$$\Delta y_{it} = \sum_{j=1}^{N} \Gamma_j \ \ \Delta y_{jit} + \mu_i + X_{it} + \varepsilon_{it}$$

- where $y = \{rer_{US}, ca/gdp, r, inv/gdp\}$, X_{it}= crisis, μ_i: country FE.
- Cholesky Decomposition:

$$rer_{US} \rightarrow ca/gdp_{EM} \rightarrow r_{EM} \rightarrow inv/gdp_{EM}$$

- PVAR for each ER regime (peg, crawling peg, managed float), as larger response for tighter ER regime.

Panel VAR- Results

→ ***Proposition 1:*** *Following a target country's appreciation (US), stabilizing countries (EMs) increase (net) exports, lower interest rate and increase capital accumulation.*

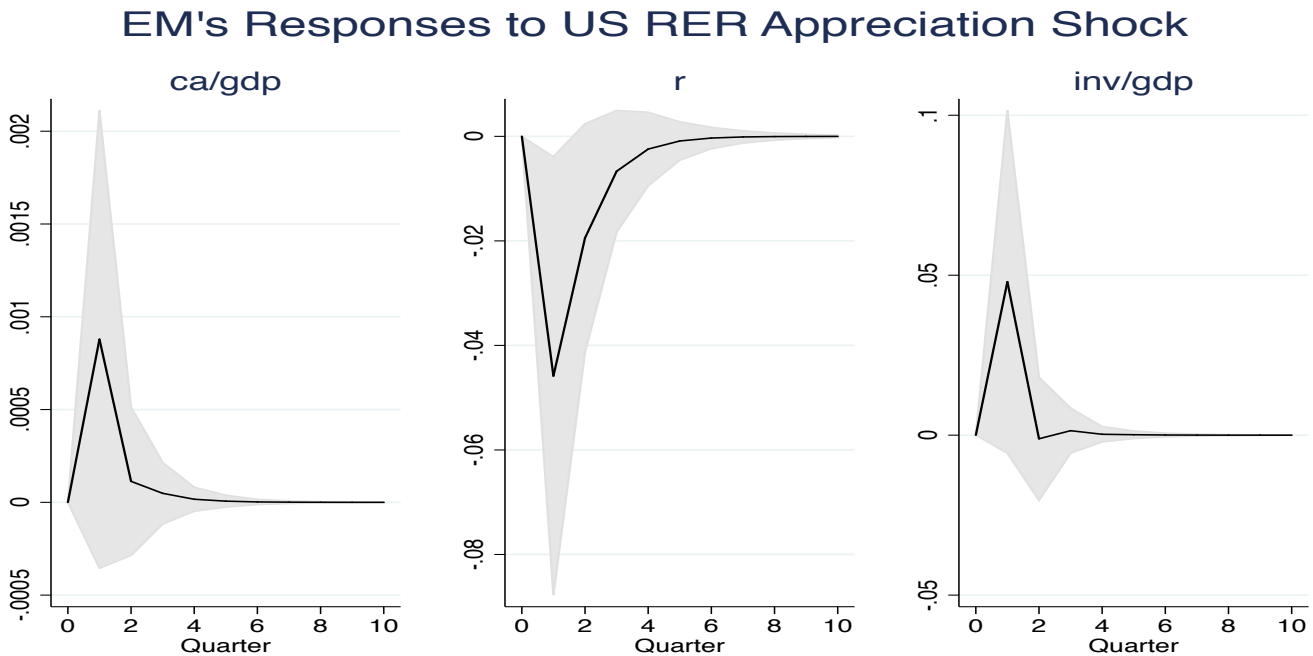
Table: Response to a RER US Appreciation

	Peg		Crawling Peg		Managed Float	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta ca/gdp$	0.0002**	0.0009*	0.0001	0.0001	-0.0006	-0.0006
	(0.0001)	(0.0005)	(0.0003)	(0.0008)	(0.0007)	(0.0007)
Δr		-0.0458**		-0.0163**		0.0085
		(0.0185)		(0.0073)		(0.0088)
$\Delta(inv/gdp)$		0.0479*		0.0037		0.0113
		(0.0258)		(0.0528)		(0.0315)
Country FE			yes	yes	yes	yes
Crisis Dummy	yes	yes	yes	yes	yes	yes
Countries	7	4	10	8	16	12
N	205	114	312	244	645	426

Source: IMF (IFS) and Ilzetki, Reinhart and Rogoff (2016).

IRFs for Peg Regimes

– **Cholesky decomp.:** (exogenous) $rer_{US} \rightarrow ca/gdp_{EM} \rightarrow r_{EM} \rightarrow inv/gdp_{EM}$



Other Model's Implications

1. Exports should be more volatile with ζ.
2. Prices of target and stabilizing should be more correlated with ζ.

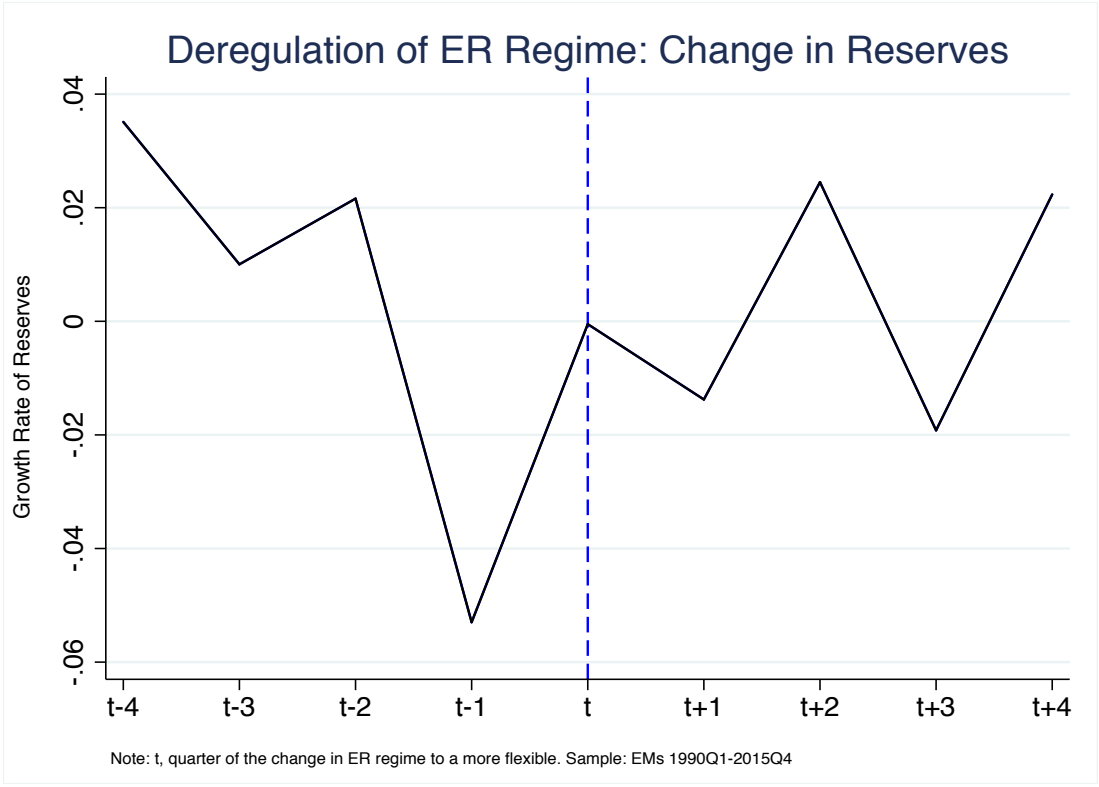
	Peg	Crawling Peg	Managed Float
	(1)	(2)	(3)
Std. Dev Δ ca/gdp	6.83	4.38	2.85
Corr (CPI_{US}, CPI_{EM})	0.307***	0.246***	0.179***
	(0.015)	(0.008)	(0.005)
N	295	596	848

Source: IMF (IFS) and Ilzetki, Reinhart and Rogoff (2016).

Sustainability of ER Regime

How sustainable is currency manipulation?

- Consider deregulation of ER regimes for 20 EMs between 1990Q1:2015Q4.
- Deregulations are preceded by decreases in reserves.



Back to the Model

Model (for future research?)

1. How important are these effects quantitatively?
   - How much countries should adjust consumption and the CA?
   - What are the dynamic implications on capital accumulation?
2. Sustainability of currency manipulation: accumulation vs depletion of reserves. How long do reserves last? Crisis?

Conclusions

- Great paper!
- Novel approach on currency manipulation based on risk-based view of differences in currency returns.
- First empirical exercise suggests that qualitative implications hold in data.
- Open question is how important is the mechanism quantitatively.