Real Exchange Rates and Primary Commodity Prices
by João Ayres, Constantino Hevia and Juan Pablo Nicolini

Discussion by Carlo Galli (University College London)

Salento Macro Meetings, August 29th 2019
The Paper

A long-standing puzzle
- RERs are volatile, persistent, unrelated to fundamentals

This paper
- Shocks to PCPs can account for large fraction of RER variation
- Holds for developed countries, not just for “commodity” currencies
- Relationship robust, works out of sample
- Calibration of simple model matches key RER moments

Proposed mechanism
- PCPs affect RER via pass-through from inputs to final goods prices
Discussion Outline

▶ Review paper
  ▶ Context
  ▶ Empirics
  ▶ Theory

▶ Ask two main questions
  ▶ test theory mechanism in the data
  ▶ quantitative performance of (extended) model
Exchange Rate Disconnect

\[ RER_t := \frac{S_t P_t^*}{P_t} \]

in logs: \( rer_t = s_t + p_t^* - p_t \)

RER puzzles:

1. \( \approx \) random walk process, very persistent
2. very volatile, 10x more than macro fundamentals, mostly driven by \( E_t \)
3. not robustly correlated with fundamentals
Context

Classic arguments

1. Volatility driven by monetary/financial shocks + nominal rigidities
   ▶ financial shocks should die out in long-run, $\neq$ high $RER$ persistence
   ▶ additional frictions in $s_t$ pass-through:
     ▶ trade barriers
     ▶ home bias
     ▶ pricing to market
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2. Persistence driven by real shocks
   - real shocks hardly volatile enough to explain short-term fluctuations
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2. Persistence driven by real shocks
   ▶ real shocks hardly volatile enough to explain short-term fluctuations

   ▶ this paper: PCPs are volatile and persistent real shocks!
Empirical Result

Estimate

\[ rer_{t}^{US,j} = \eta' \text{pcp}_{t}^{US} + u_{t} \]
Empirical Result

Estimate

\[ \text{rer}_t^{US,j} = \eta' \text{pcp}_{t}^{US} + u_t \]

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<td>(a) 10 commodities, 4-year differences</td>
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<td>(b) 4 commodities (best fit), 4-year differences</td>
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Empirical Result

Estimate

\[ rer_t^{US,j} = \eta' \text{pcp}_{t}^{US} + u_t \]

- Works well out of sample
- Robust to parametric bootstrap test of orthogonality
Theory

CPI decomposition

Typically, on final goods \( p_t = (1 - \alpha)p_t^T + \alpha p_t^N \)

Write RER as

\[ rer_t = s_t + p_t^T - p_t^T + \alpha^*(p_t^N - p_t^T*) - \alpha(p_t^N - p_t^T) \]
Theory

CPI decomposition

- Typically, on final goods: \( p_t = (1 - \alpha) p_T^T + \alpha p_T^N \)
- Write RER as:

\[
rer_t = \underbrace{s_t + p_T^{T*} - p_T^T}_{\text{ Tradable component}} + \underbrace{\alpha^* (p_T^{N*} - p_T^{T*}) - \alpha (p_N - p_T^T)\text{ Relative T-N Price}}_{\text{ Relative T-N Price}}
\]

Here

- CPI decomposition on inputs: \( p_t = (1 - \gamma)p_{t}^{PC} + \gamma p_{t}^{OI} \)
- PCPs satisfy LOP: \( s_t + p_{t}^{PC*} = p_{t}^{PC} \)
- Write RER as:

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rer_t = \gamma^* (p_{t}^{OI*} - p_{t}^{PC*}) - \gamma (p_{t}^{OI} - p_{t}^{PC})
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Rearrange

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⇒ test for unobserved factor, common to \( p_t^{PC} \) and \( rer_t \)
Model Testable Implications

- Empirical result: \(rer_t\) and \(p_t^{PC}\) are correlated...
- Theory: ...via pass-through input prices \(\rightarrow\) CPI
  - real common factors = shocks to commodity endowments & TFP
  - \(rer_t = s_t + p_t^* - p_t\)
- Calibration shows theory can work quantitatively
  - replicates moments of RER
  - without large movements in quantities
Model Testable Implications

- Empirical result: $r_{er_t}$ and $p_t^{PC}$ are correlated...
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  - $r_{er_t} = s_t + p^*_t - p_t$
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Q Can we test theory implications further?
  - model is real and static, mechanism goes through CPI
  - producer prices, commodity-heavy price categories
  - how far could full dynamic model go in explaining remaining menu of puzzles?
Financial Shocks

- Itskhoki and Mukhin (2019)
  - financial (UIP) shocks → $s_t$ more volatile than macro variables
  - no direct effect on product/labour markets
  - muted pass-through to CPI & output → “disconnect”

A quick experiment: Credit Default Swaps

Correlation of 1-year changes, 2004 - 2018 monthly

<table>
<thead>
<tr>
<th>Country</th>
<th>Corr(RER, CDS 5y)</th>
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![Correlation of 1-year changes, 2004 - 2018 monthly](chart)
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▶ A quick experiment: Credit Default Swaps

Q What are the common factors driving PCPs and RER? Real or financial?
Conclusion

- Great paper: clear question, solid result, provocative conclusion

- Two main comments
  - test implications of the theory
  - quantitative performance in extended model