Discussion of: “Global and Local Risks in Currency Markets”

by: Liliana Varela & Francisco Legaspe

Mauricio Calani C.
Central Bank of Chile

XXVII Annual Conference of the Central Bank of Chile
November 5, 2024

Paper in a nutshell

- Fundamental concept in international finance: Uncovered Interest Parity Condition (UIP)

$$\lambda^{e}_{t+h} = i_t - i^{*}_t - (s^{e}_{t+1} - s_t)$$

- Using four Latam currencies (CL, BR, MX, CO) for 1996m11-2023m12, authors document UIP rarely holds, and examine can better explain these deviations
  - Local vs global risk
  - Construct new/own data on relevant local risk

- Findings
  - Expected excess returns in the order of 3pp in LATAM
  - Not just global risk. Local factors are critical to characterize UIP deviations
  - Point towards the role of market segmentation in EME

General Comments

- Important question
  - ERs are at the core of international macro/finance
  - Understanding ER markets is critical to central bankers to formulate exchange rate policy

General Comments

- Important question
  - ERs are at the core of international macro/finance
  - Understanding ER markets is critical to central bankers to formulate exchange rate policy

- This paper looks simple but actually delivers very deep insights

General Comments

- Important question
  - ERs are at the core of international macro/finance
  - Understanding ER markets is critical to central bankers to formulate exchange rate policy
- This paper looks simple but actually delivers very deep insights
- My discussion focuses mostly on three suggestions to help highlight these insights
  1. The statistical components of λ_t^e
  2. The interpretation of λ_t^e
  3. Market segmentation

1. The statistical components of λ_t^e

- Fama regressions

$$s_{it+1} - s_t = \beta^F (i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1}^F \quad (1)$$

$$E(s_{it+1}) - s_t = \beta(i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1} \quad (2)$$

1. The statistical components of λ_t^e

- Fama regressions

$$s_{it+1} - s_t = \beta^F(i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1}^F \tag{1}$$

$$E(s_{it+1}) - s_t = \beta(i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1} \tag{2}$$

- What can we learn from these complementary regressions?

$$\begin{aligned}
\beta^F &= \frac{\text{cov}(i_t - i_t^*, s_{t+1} - s_t)}{\text{var}(i_t - i_t^*)} \\
&= \frac{\text{cov}(i_t - i_t^*, E(s_{t+1}) - s_t - (E(s_{t+1}) - s_{t+1}))}{\text{var}(i_t - i_t^*)} \\
&= \frac{\text{cov}(i_t - i_t^*, i_t - i_t^* - \lambda_t^e - \eta_{t+1})}{\text{var}(i_t - i_t^*)} \\
&= 1 - \frac{\text{cov}(i_t - i_t^*, \eta_{t+1})}{\text{var}(i_t - i_t^*)} - \frac{\text{cov}(i_t - i_t^*, \lambda_t^e)}{\text{var}(i_t - i_t^*)}
\end{aligned}$$

1. The statistical components of λ_t^e

- Fama regressions

$$s_{it+1} - s_t = \beta^F(i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1}^F \quad (1)$$

$$E(s_{it+1}) - s_t = \beta(i_{it} - i_{it}^*) + \mu_i + \varepsilon_{it+1} \quad (2)$$

- What can we learn from these complementary regressions?

$$\begin{aligned}
\beta^F &= \frac{\operatorname{cov}(i_t - i_t^*, s_{t+1} - s_t)}{\operatorname{var}(i_t - i_t^*)} \\
&= \frac{\operatorname{cov}(i_t - i_t^*, E(s_{t+1}) - s_t - (E(s_{t+1}) - s_{t+1}))}{\operatorname{var}(i_t - i_t^*)} \\
&= \frac{\operatorname{cov}(i_t - i_t^*, i_t - i_t^* - \lambda_t^e - \eta_{t+1})}{\operatorname{var}(i_t - i_t^*)} \\
&= 1 - \frac{\operatorname{cov}(i_t - i_t^*, \eta_{t+1})}{\operatorname{var}(i_t - i_t^*)} - \frac{\operatorname{cov}(i_t - i_t^*, \lambda_t^e)}{\operatorname{var}(i_t - i_t^*)}
\end{aligned}$$

- Captures contribution of UIP premium (λ_t^e) AND forecast errors (η_{t+1}^e)
  - This is where using **data on expectations** comes into play

1. The statistical components of λ_t^e

- Hold on to this one: $\beta^F = 1 - \frac{\mathrm{cov}(i_t - i_t^*, \eta_{t+1})}{\mathrm{var}(i_t - i_t^*)} - \frac{\mathrm{cov}(i_t - i_t^*, \lambda_t^e)}{\mathrm{var}(i_t - i_t^*)}$

- Same logic with equation (2)

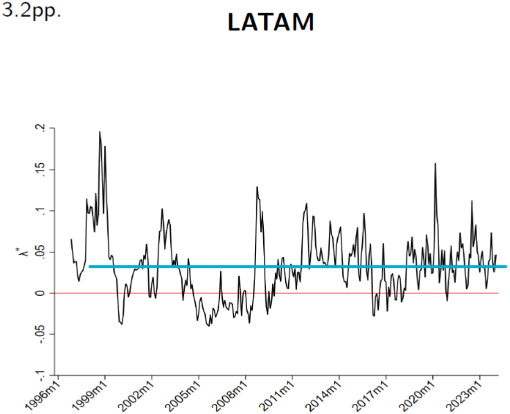
$$\beta = \frac{\mathrm{cov}(i_t - i_t^*, E(s_{t+1}) - s_t)}{\mathrm{var}(i_t - i_t^*)}$$
$$= \frac{\mathrm{cov}(i_t - i_t^*, i_t - i_t^* - \lambda_t^e)}{\mathrm{var}(i_t - i_t^*)} = 1 - \frac{\mathrm{cov}(i_t - i_t^*, \lambda_t^e)}{\mathrm{var}(i_t - i_t^*)}$$

- Then $\beta - \beta^F = \frac{\mathrm{cov}(i_t - i_t^*, \eta_{t+1})}{\mathrm{var}(i_t - i_t^*)} = 0.588 - 0.399 = 0.189 \Rightarrow$ risk premium $\frac{\mathrm{cov}(i_t - i_t^*, \lambda_t^e)}{\mathrm{var}(i_t - i_t^*)} = 0.412$

- Contribution of risk is much more important than that of forecast error
  - This result **IS** in the presentation ... but helps me make a more subtle point

1. The statistical components of λ_t^e

LATAM: (average) expected excess returns are 3.2pp.



1. The statistical components of λ_t^e

- Let $\lambda_t^e = \overline{\lambda}^e + \widetilde{\lambda}_t^e$

$$\beta = \frac{\text{cov}(i_t - i_t^*, E(s_{t+1}) - s_t)}{\text{var}(i_t - i_t^*)} = \frac{\text{cov}(i_t - i_t^*, i_t - i_t^* - \overline{\lambda}^e + \widetilde{\lambda}_t^e)}{\text{var}(i_t - i_t^*)} = 1 - 0 - \frac{\text{cov}(i_t - i_t^*, \widetilde{\lambda}_t^e)}{\text{var}(i_t - i_t^*)}$$

1. The statistical components of λ_t^e

- Let $\lambda_t^e = \overline{\lambda}^e + \widetilde{\lambda}_t^e$

$$\beta = \frac{\mathrm{cov}(i_t - i_t^*, E(s_{t+1}) - s_t)}{\mathrm{var}(i_t - i_t^*)} = \frac{\mathrm{cov}(i_t - i_t^*, i_t - i_t^* - \overline{\lambda}^e + \widetilde{\lambda}_t^e)}{\mathrm{var}(i_t - i_t^*)} = 1 - 0 - \frac{\mathrm{cov}(i_t - i_t^*, \widetilde{\lambda}_t^e)}{\mathrm{var}(i_t - i_t^*)}$$

- It turns out that the “constant” UIP deviation is quantitatively the most interesting part, not picked up in this parameter
  - Large $\approx$ 3pp, and in AE ≈ 0
  - Seems to vary across countries. R2 in risk-regressions go from 0.068 to 0.24 when including currency FE
  - Not attributable to poor forecast accuracy

- This suggests that while covariances are interesting, structural explanations to persistent and predictable UIP premium are even more interesting.

1. The statistical components of λ_t^e

- Let $\lambda_t^e = \overline{\lambda}^e + \widetilde{\lambda}_t^e$

$$\beta = \frac{\mathrm{cov}(i_t - i_t^*, E(s_{t+1}) - s_t)}{\mathrm{var}(i_t - i_t^*)} = \frac{\mathrm{cov}(i_t - i_t^*, i_t - i_t^* - \overline{\lambda}^e + \widetilde{\lambda}_t^e)}{\mathrm{var}(i_t - i_t^*)} = 1 - 0 - \frac{\mathrm{cov}(i_t - i_t^*, \widetilde{\lambda}_t^e)}{\mathrm{var}(i_t - i_t^*)}$$

- It turns out that the “constant” UIP deviation is quantitatively the most interesting part, not picked up in this parameter
  - Large $\approx$ 3pp, and in AE ≈ 0
  - Seems to vary across countries. R2 in risk-regressions go from 0.068 to 0.24 when including currency FE
  - Not attributable to poor forecast accuracy

- This suggests that while covariances are interesting, structural explanations to persistent and predictable UIP premium are even more interesting.

  $\Rightarrow$ **My suggestion:** highlight this + discuss relation to structural factors using cross country dimension: capital market development, financial frictions, likelihood of FXI, etc.

2. The interpretation of λ_t^e

What would be most reasonable empirical specification?

2. The interpretation of λ_t^e

What would be most reasonable empirical specification?

- Based in Itskhoki and Mukhin, 2023 and Itskhoki and Mukhin, 2024
  - Two country NKOEM with dominant currency that can reconcile many puzzles in ER. Good starting point.
  - Markets are segmented if $J_t \cap J_t^* = \emptyset$
  - Investors do carry trade. They *require compensation to hold risk* (D^*).

2. The interpretation of λ_t^e

What would be most reasonable empirical specification?

- Based in Itskhoki and Mukhin, 2023 and Itskhoki and Mukhin, 2024
  - Two country NKOEM with dominant currency that can reconcile many puzzles in ER. Good starting point.
  - Markets are segmented if $J_t \cap J_t^* = \emptyset$
  - Investors do carry trade. They *require compensation to hold risk* (D^*).

- Three main equations
  - Goods market equilibrium (expenditure switching)
  - Country level budget constraints
  - Asset markets clearing

2. The interpretation of λ_t^e

What would be most reasonable empirical specification?

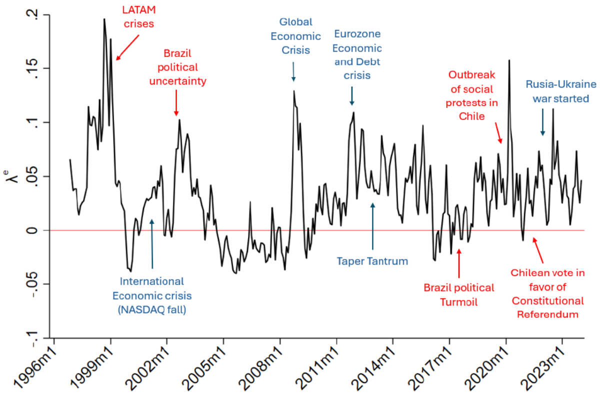
- Based in Itskhoki and Mukhin, 2023 and Itskhoki and Mukhin, 2024
  - Two country NKOEM with dominant currency that can reconcile many puzzles in ER. Good starting point.
  - Markets are segmented if $J_t \cap J_t^* = \emptyset$
  - Investors do carry trade. They *require compensation to hold risk* (D^*).
- Three main equations
  - Goods market equilibrium (expenditure switching)
  - Country level budget constraints
  - Asset markets clearing
- In order to get ER disconnect + UIP deviations you need **financial shocks** that affect foreigners' demand for local assets

$$i_t - i_t^* - E(\Delta s_{t+1}) = \lambda_t^e = \omega_t \sigma_t^2(s) D^*$$

ω_t: risk aversion investor; $\sigma^2(s_t)$: ER volatility; D^*: carry trade position

2. The interpretation of λ_t^e

- You have that! $\rightarrow$ news shocks (PRP) inform about risk and expected return of portfolio investments: act like financial shocks



2. The interpretation of λ_t^e

- Consistent with Albagli et al., 2024
- Using event study methodlogy, they emphasize conditional vs unconditional interpretation of UIP deviations
  - Monetary policy shocks: consistent with UIP

$$i_t - \uparrow i_t^* - E(s_{t+1} - \uparrow s_t) = \lambda_t^e = \omega_t \sigma_t^2(s) D^*$$

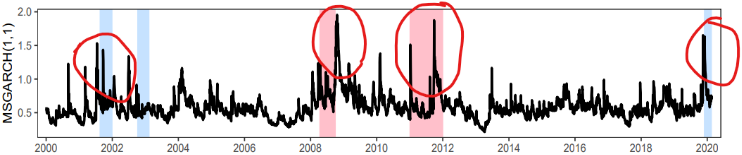
  - Risk-off shocks: in-consistent with UIP

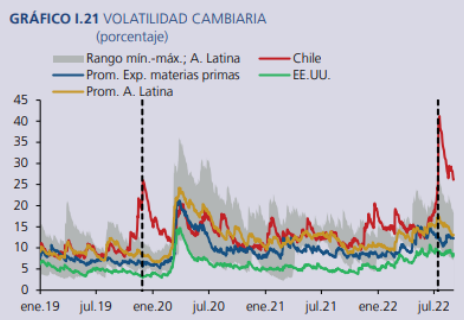
$$\uparrow i_t - \downarrow i_t^* - E(s_{t+1} - \uparrow s_t) = \uparrow \lambda_t^e = \uparrow \omega_t \uparrow \sigma_t^2(s) D^*$$

    - Flight to quality + dollar appreciation ($\downarrow i_t^*$, $\uparrow s_t$), EME rates countercyclical ($\uparrow i_t$)
    - Holds in equilibrium with higher risk aversion ($\uparrow \omega_t$) and ER volatility ($\uparrow \sigma_t^2(s)$)

2. The interpretation of λ_t^e

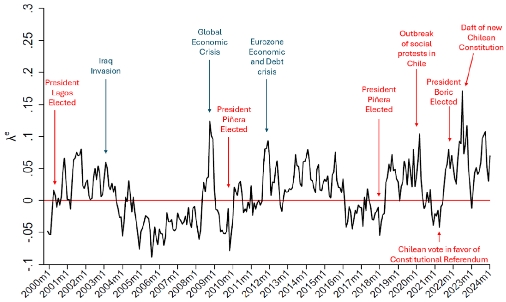
Measures of exchange rate volatility in Chile



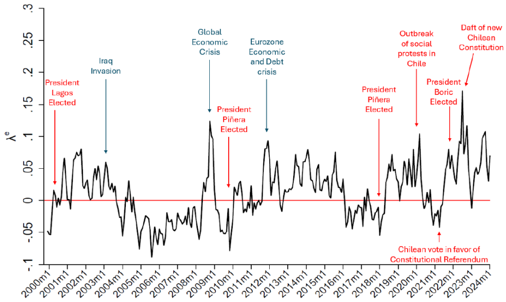


Sources: Jara and Piña, 2023 & Monetary Policy Report 2022

2. The interpretation of λ_t^e



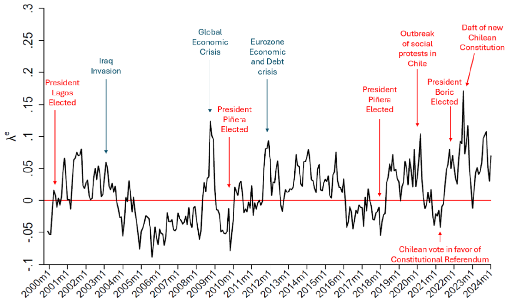
2. The interpretation of λ_t^e



- Not surprisingly, empirical specification is about risk and investors' portfolio ✓

$$Y_{ct} = \gamma_1 \text{Capital Inflows/GDP}_{ct-1} + \gamma_2 \text{Convenience/Liquidity}_{t-1} + \gamma_3 VIX_{t-1} + \gamma_4 PRP_{t-1} + \mu_c + \varepsilon_{ct}$$

2. The interpretation of λ_t^e



- Not surprisingly, empirical specification is about risk and investors' portfolio ✓

$$Y_{ct} = \gamma_1 \text{Capital Inflows/GDP}_{ct-1} + \gamma_2 \text{Convenience/Liquidity}_{t-1} + \gamma_3 \mathit{VIX}_{t-1} + \gamma_4 \mathit{PRP}_{t-1} + \mu_c + \varepsilon_{ct}$$

⇒ Can you exploit higher **dispersion** of analysts' forecast as a measure of volatility?

⇒ **Suggestion 2:** Link your empirical specification to theory that actually helps you defend it and helps us choose between competing models

3. The hypothesis of market segmentation

- I agree

3. The hypothesis of market segmentation

- I agree
- Alternative ingredients to usual models that would operate as financial shocks
  i Convenience yields
  ii Heterogeneous beliefs
  iii Infrequent portfolio adjustment
  iv Financial frictions to intermediation
  v Risk based intermediation + **segmented markets**
    - Exchange rate risk gets priced $\Rightarrow$ compensation to investors
    - Can accomodate the Mussa Puzzle
- But ... this paper can contribute with some suggestive evidence from Chile

3. The hypothesis of market segmentation

A quasi-experiment, from Chile

- Motivated by Covid, Congress passed 3 Pension Fund withdrawals (July 2020, December 2020, April 2021)

- $\approx$ 18% of GDP

- This unexpected shock changed the balance of local vs foreign investors demand of local assets $\rightarrow$ "segmentation shock"

$\Rightarrow$ **My suggestion**: use PF withdrawal shocks in Chile as a "segmentation shock"

- This would highlight a very tangible channel of importance integrated but also deep capital markets in EME, and of policies that change this balance

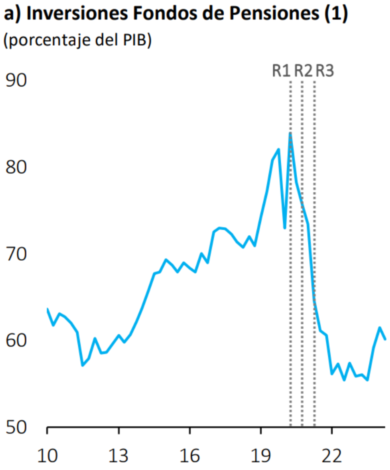


Figure: Pension Funds Investment in Chile

Wrapping up

- Enjoyed it very much.
- This paper is deeper than what meets the eye. Make sure you sell it well.
- Useful for policy makers in EME: delivers concrete insights for policy design

References

Albagli, Elias et al. (2024). "UIP deviations: Insights from event studies". In: *Journal of International Economics* 148, p. 103877.

Itskhoki, Oleg and Dmitry Mukhin (2023). "Exchange rate puzzles and policies". In: *Creditbility of Emerging Markets, Foreign Investors' Risk Perception, and Capital Flows*. Ed. by Alvaro Aguirre, Andres Fernandez, and Sebnem Kalemli-Ozcan. Santiago: Central Bank of Chile, pp. 47–96.

— (2024). "Mussa puzzle redux". In: *Econometrica*.

Jara, Alejandro and Marco Piña (2023). "Exchange rate volatility and the effectiveness of FX interventions: The case of Chile". In: *Latin American Journal of Central Banking* 4.2, p. 100086.

Discussion of: “Global and Local Risks in Currency Markets”

by: Liliana Varela & Francisco Legaspe

Mauricio Calani C.
Central Bank of Chile

XXVII Annual Conference of the Central Bank of Chile
November 5, 2024