Pension Fund Flows, Exchange Rates, and Covered Interest Rate Parity

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Exchange rate determination

- Traditional angles:
  - Macroeconomic (dis)connect: Pavlova and Rigobon (2007), Itskhoki and Mukhin (2021).
  - Asset pricing factors: Lustig, Roussanov, and Verdelhan (2011).
  - Market microstructure: Sarno and Taylor (2001).

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- Recent additions:
  - Supply and demand: Koijen and Yogo (2020).
  - Intermediary constraint: Du, Tepper, and Verdelhan (2018), Du, Hébert, and Huber (2022).

- This paper: brings together several strands.

THIS PAPER

- Objective:
    1. Estimate elasticity of Chilean FX market.
    2. Identify dealer hedging as a cause for Chilean CIP deviations.

- Approach:
    - Uninformed trade induced by Chilean financial advisory.
        - Chilean pension funds vary by fund type (A through E) and not by manager.
        - FyF makes frequent recommendations, especially for Funds A and E.
    - Linking daily data on fund flow to exchange rate prices.

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- Discussion plan:
    1. Clarify a key assumption in elasticity estimation.
    2. Suggest a deeper dive into the cause of CIP deviations in Chile.

Elasticity of Chilean FX market

- Estimation:
  - Foreign currency trade following FyF rec: \$858 M (=AUM in A × % flow to A × 0.69).
    - When FyF recommends a portfolio switch from Fund E to Fund A, exposure to USD increases by 69% on average.
    - Avg foreign investments in Fund A: 75%.
    - Avg foreign investments in Fund E: 6%.
  - Depreciation of CLP against USD: 0.59%(= 0.85% × 0.69).
  - ⇒ Uninformed purchase of \$1B leads to CLP depreciation of 0.69%.

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- Key assumption: **FX flow**, not AUM flow, **is uninformed**.
  - Managers make foreign purchases following FyF recs without timing the market.

CHILEAN PENSIONS HAVE DIVERSIFIED PORTFOLIOS

Tabla N° 13

Inversión Extranjera por Países
(% de la inversión en el extranjero, marzo 2023)

N°	País	Inversión (%)						Total (MM USD)	% Activos Totales	Inversión Acumulada
		Fondo A	Fondo B	Fondo C	Fondo D	Fondo E	Total			
1	Estados Unidos	34,08%	33,38%	24,96%	29,90%	42,12%	30,54%	24.547	12,8%	30,54%
2	China	17,49%	16,22%	13,65%	10,57%	3,64%	14,72%	11.827	6,2%	45,26%
3	Brasil	5,63%	4,96%	5,20%	5,93%	0,25%	5,16%	4.146	2,2%	50,42%
4	México	2,91%	3,46%	4,68%	6,65%	11,10%	4,29%	3.447	1,8%	54,71%
5	Islas Caimán	2,58%	2,74%	4,03%	4,93%	9,99%	3,59%	2.887	1,5%	58,30%
6	Luxemburgo	2,48%	2,64%	3,85%	4,35%	8,11%	3,36%	2.703	1,4%	61,66%
7	Japón	3,11%	1,77%	4,33%	4,01%	0,48%	3,20%	2.573	1,3%	64,87%
8	Alemania	3,35%	2,70%	2,76%	1,33%	1,54%	2,73%	2.195	1,1%	67,60%
9	Reino Unido	2,15%	2,50%	2,79%	3,56%	4,49%	2,67%	2.147	1,1%	70,27%
10	Francia	2,21%	2,58%	3,04%	2,70%	2,58%	2,65%	2.133	1,1%	72,92%
11	India	2,24%	2,41%	2,78%	1,54%	0,47%	2,35%	1.892	1,0%	75,28%
12	Corea, Rep. de	2,87%	2,67%	1,60%	1,08%	0,29%	2,12%	1.705	0,9%	77,40%
13	Países Bajos	1,39%	1,54%	1,78%	1,43%	1,01%	1,56%	1.252	0,7%	78,96%
14	Hong Kong (China)	1,53%	1,53%	1,64%	0,89%	0,71%	1,49%	1.194	0,6%	80,44%
15	Taiwán, China	1,48%	1,42%	1,28%	0,56%	0,04%	1,26%	1.016	0,5%	81,71%
16	Indonesia	1,05%	1,33%	1,34%	0,87%	0,31%	1,18%	951	0,5%	82,89%
17	Irlanda	0,82%	1,07%	1,23%	1,29%	1,62%	1,10%	882	0,5%	83,99%
18	Suiza	0,87%	0,85%	1,03%	0,79%	1,34%	0,93%	747	0,4%	84,92%
19	OTROS	11,73%	14,22%	18,05%	17,62%	9,90%	15,08%	12.121	6,3%	100,00%
	Total General	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**80.365**	**41,98%**	

Fuente: Superintendencia de Pensiones

CHILEAN PENSIONS' USD INVESTMENT FLUCTUATES
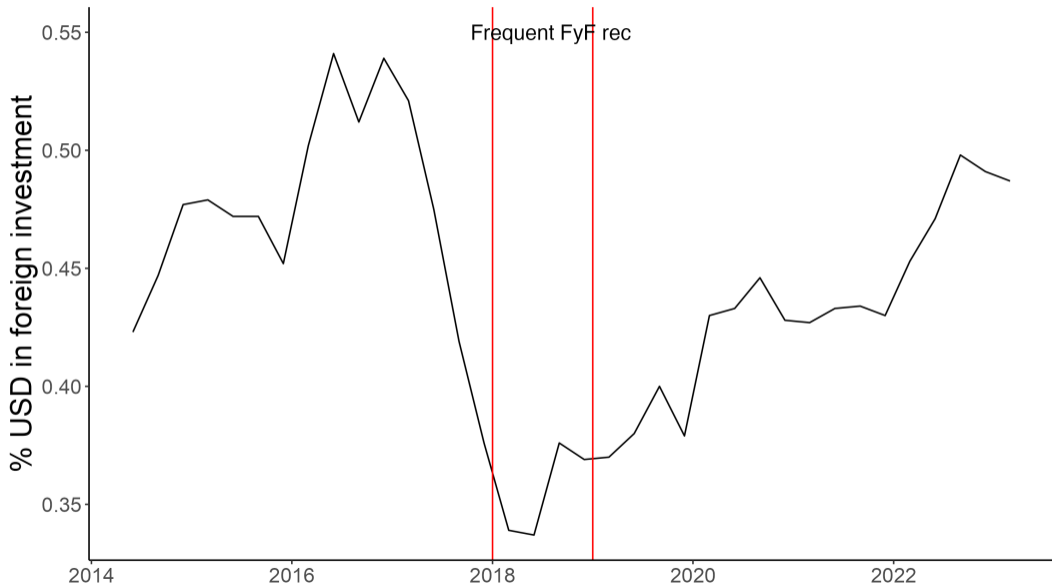
Timing and exchange rate

- Findings:
    - Fund flow responds 4 days after FyF rec.
    - Spot FX responds immediately after FyF rec.
    - No evidence of FX reversal within 10 days.

- Authors' interpretation:
    - Market participants all know that FyF buy recs will induce uninformed fund flow and thereby FX purchase flow so they trade in anticipation of the actual flow.
        - But uninformed flow induced price movement should revert?

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- An alternative story:
    - $t + 1$: Market participants buy *some* USD to sell to pension managers.
    - $t + 4$: Pension managers buy *some* USD to invest inflows abroad. However, they internalize price impact and smooth out purchases, keeping FX high for days.

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- Implications:
    - True that FyF buy recs induce USD purchase and depreciate CLP.
    - Elasticity estimation must circumvent any market timing induced endogeneity.

CIP and deviations in advanced economies

- Textbook no-arbitrage: $s_t - f_{t,t+1} = r_{t,t+1}^{USD} - r_{t,t+1}^{CLP}$.

CIP AND DEVIATIONS IN ADVANCED ECONOMIES

- Textbook no-arbitrage: $s_t - f_{t,t+1} = r^{USD}_{t,t+1} - r^{CLP}_{t,t+1}$.
  - What connects spot and forward? Trades by arbitrageurs including dealers.
    - Dealers can't have net FX exposures.
    - If they have a net spot exposure, they hedge with forward.
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- Negative CIP basis: $s_t - f_{t,t+1} > r_{t,t+1}^{USD} - r_{t,t+1}^{CLP}$.
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- In advanced economies:
    - Spot exchange rate is competitive.
    - Forward market less competitive.
        - Dealers price forwards and have balance sheet costs.
        - To hedge out forward exposure requires trading in spot *and holding* till maturity, the corresponding balance sheet cost inserts a wedge in $f_{t,t+1}$.

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CIP and deviations in Chile

- Hedging by CLP dealers links the spot and forward markets.
  - Spot: dealers buy USD from foreigner to sell USD to locals.
  - Forward: dealers buy USD forward to cover short position vis-à-vis foreigners.
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- Key finding: following FyF buy recommendations, CLP CIP deviations become more negative.

- Key question: where is the intermediation wedge?
    - In AE, dealers insert wedge (B/S cost, market power) in the forward market.
    - In Chile, forwards are NDF.
        - Global market ⇒ competitive?
        - *Cash* settled in USD, no need to hold CLP till maturity ⇒ low B/S cost?
    - Is the distortion in the spot market? Is it market power?
    - Is this a generalizable difference between AE vs. (NDF) EM?

Conclusion

- Really cool setting to study FX, especially in EM.

- Strong evidence that FX responds to flow.

- Potential refinements:
    - Estimate the elasticity accounting for pension managers' strategic behavior.
    - Identify the intermediation wedge that causes CIP deviations in a market with NDFs and regulated local spot market.

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