The Forward Premium Puzzle in a Two-Country World by Ian Martin

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Outline

- Why care about Uncovered Interest Parity and Country Size?
- Model Summary
- Some theoretical results
- Comments

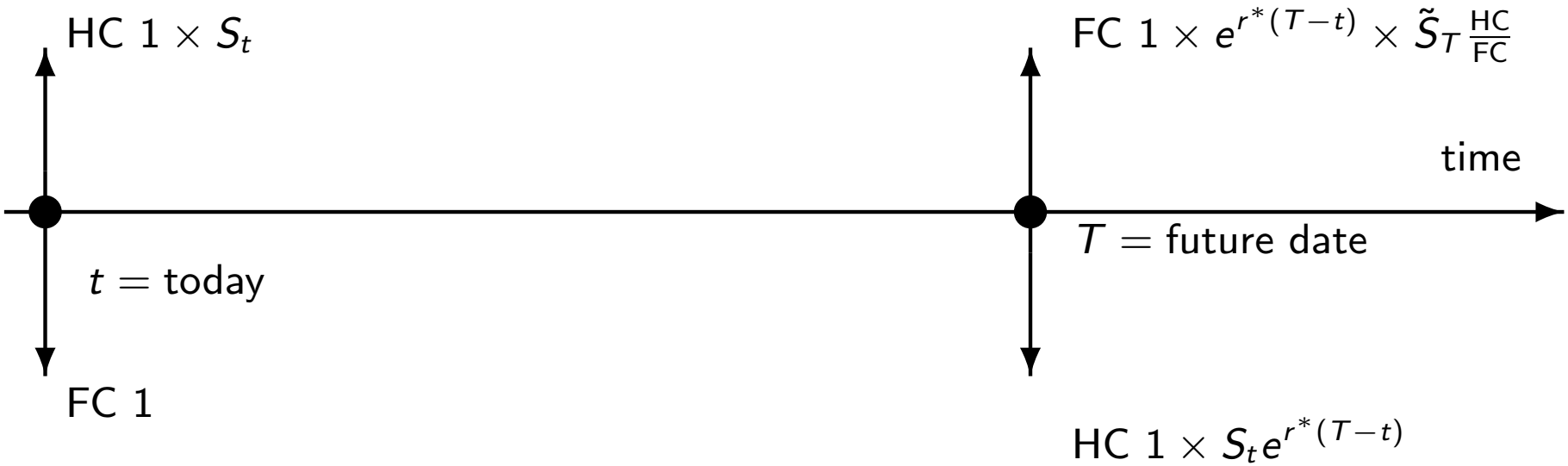
FX market

- Much focus on equity market phenomena
  - Equity markets: USD 54 Trillion in 2011
  - Bond markets: USD 174 Trillion in 2011
  - FX: daily turnover of USD 5.3 Trillion per day!
- Perhaps need to focus more on FX puzzles: there are many, e.g. UIP, FPP
- Major capital markets are integrated internationally
- Need to account for this when thinking about
  - equity and bond prices
  - monetary policy
  - fiscal policy
  - investment and production
  - growth
- FX is actually central, but leading macro-finance models focus on closed economies.

What is FPP?

$S_t \frac{\text{HC}}{\text{FC}}$: date-$t$ price of 1 unit of FC in units of HC (spot FX rate)

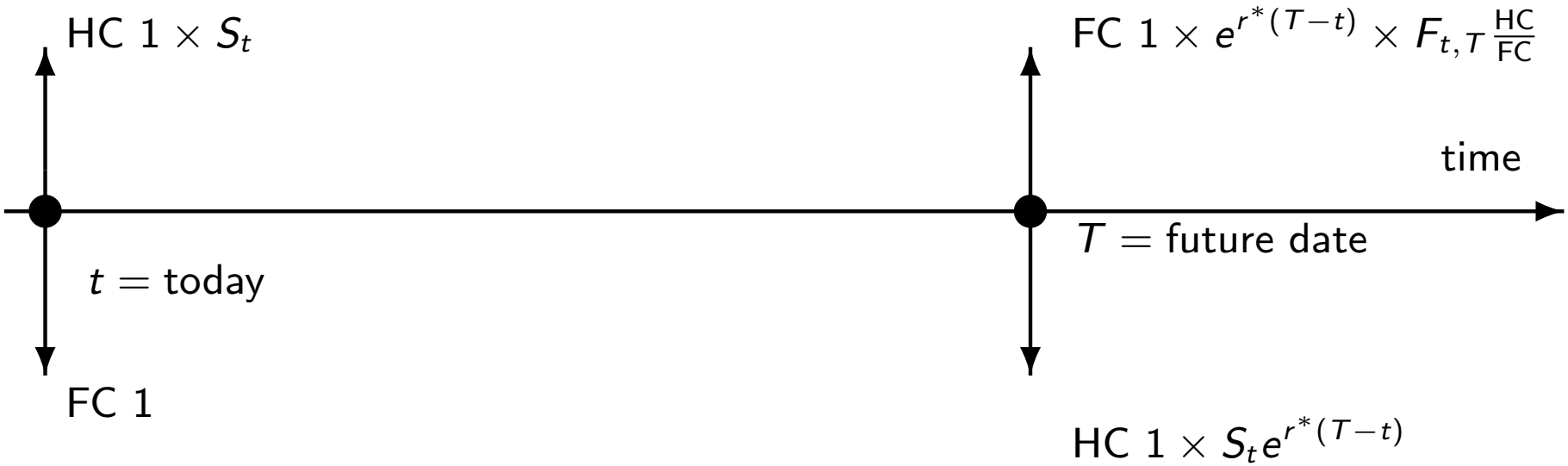
- Date-t
  - Borrow S_t HC till date-T
  - Convert into 1 FC and invest at FC risk-free rate r^* till date T
- Date-T
  - Receive 1FC $\times e^{r^*(T-t)}$ and convert into HC to get $\tilde{S}_T$ HC $\times e^{r^*(T-t)}$
  - Pay back S_t HC $\times e^{r(T-t)}$



- Return (in HC) on initial investment

$$\tilde{R}_{t,T} = \frac{\tilde{S}_T}{S_t} e^{r^*(T-t)}$$

What happens if we cover the FX risk



From no arbitrage

$$F_{t,T} = S_t e^{(r-r^*)(T-t)} \tag{1}$$

Also,

$$F_{t,T} = E_t^{\mathbb{Q}}[\tilde{S}_T] \tag{2}$$

If $\mathbb{P}$ and $\mathbb{Q}$ are the same

$$E_t\left[\frac{\tilde{S}_T}{S_t}\right] = \frac{F_{t,T}}{S_t}, \tag{3}$$

so we should be able to predict FX premia via the forward premium.

UIP Logic (so-called)

$$E_t\left[\frac{\tilde{S}_T}{S_t}\right] = e^{(r-r^*)(T-t)} \tag{4}$$

On average, the risk-based component in the return from investing in the FC should be offset by a corresponding change in the FX rate (a depreciation in the FC)
Would be true in a world with no risk premia.

World Interest Rates

Country	Current Rate	Previous Rate	Change	Last Change
Australia	**2.5%**	2.75%	-0.25%	Nov 06 2013
Brazil	**7.25%**	7.5%	-0.25%	Oct 10 2012
Canada	**1%**	0.75%	0.25%	Sep 08 2010
Chile	**4%**	4.25%	-0.25%	Mar 13 2014
China	**6%**	6.31%	-0.31%	Jul 05 2012
Colombia	**4%**	3.75%	0.25%	Jun 20 2014
Czech Republic	**0.75%**	1%	-0.25%	May 06 2010
Denmark	**1.25%**	0.75%	0.5%	Jul 08 2011
Egypt	**9.25%**	8.25%	1%	Nov 24 2011
European Monetary Union	**0.75%**	1%	-0.25%	Jul 05 2012
Hong Kong SAR	**0.5%**	1.5%	-1%	Dec 17 2008
Hungary	**6%**	6.25%	-0.25%	Nov 27 2012
Iceland	**6%**	5.75%	0.25%	Nov 14 2012
India	**8%**	8.5%	-0.5%	Apr 17 2012
Indonesia	**7.5%**	7.25%	0.25%	Nov 12 2013
Israel	**0.75%**	1%	-0.25%	Feb 24 2014
Japan	**0.1%**	0.3%	-0.2%	Dec 19 2008
Korea, Republic of	**2.75%**	3.25%	-0.5%	Oct 11 2012
Malaysia	**3%**	2.75%	0.25%	Jul 08 2010
Mexico	**3%**	3.5%	-0.5%	Jun 06 2014
New Zealand	**2.5%**	3%	-0.5%	Mar 09 2011
Norway	**1.5%**	1.75%	-0.25%	Mar 14 2012
Philippines	**3.5%**	3.75%	-0.25%	Oct 25 2012

This paper

- Simple 2 country model, open economy, integrated financial markets, no frictions
- power utility with CES aggregator
- general Levy processes for individual country output
- general (non-numerical) conditions for violations of UIP

Main contribution

- methodological
- Use cumulant generation functions + Residue Thm in a 2 country model
- do not have to make many assumptions about stochastic process for output
- small country limit is very tractable

Model

- Output processes. One for each country. Different goods.

$$D_1,\ D_2$$

- Fraction $1-\phi$ of each tree consumed locally by agents who do not participate in financial markets.
- Remainder consumed by jetsetters who face complete markets. Power utility, CES aggregator

$$\frac{\left[\left(w^{\frac{1}{\eta}}\left(\phi D_{1,t}\right)^{1-\frac{1}{\eta}}+(1-w)^{\frac{1}{\eta}}\left(\phi D_{2,t}\right)^{1-\frac{1}{\eta}}\right)^{(1-\frac{1}{\eta})^{-1}}\right]^{1-\gamma}}{1-\gamma} \tag{5}$$

Some results

- Look at small country limit. Country 1 is very small, country 2 is very large.
  - Country 2 is like a closed ecomomy: trivial
  - Asset pricing in Country 1 less trivial: would be hard to know some of this with numerical results.
  - Under weak symmetry conditions:
    - excess return on small country's stock market is positive in large-country units
    - $R_{f,1} > R_{f,2}$
    - there is empirical support for this: Hassan (2013)
    - Small countries also have FX rates will strengthen despite low interest rates.
  - Under weak symmetry conditions & convex difference property
    - exorbitant privilege
    - large country's bond earns a negative risk premium in small country units

Comments & Suggestions

- Paper's main strength is also its weakness
  - Properties of CGF's are not economically intuitive.
  - More examples of economies where properties do and do not hold.
  - Perhaps start with log normal case first and then look at general case.
- Looking at finiteness of utility is common (Ingersoll textbook).
  - In one-tree domestic economies with power utility, equivalent to finiteness of wealth-consumption ratio.
  - Also done for Epstein-Zin in one-tree domestic economies.

Suggestions

- Distinguish between various FX puzzles
  - UIP/FPP
  - Carry trade
    - Carry trade and UIP may not be so tightly linked – see next paper.
  - FX Option smirks
- Why should we focus on this model?
  - Need a better reason than tractability.
  - Need to compare with other work resolving UIP (Hollifield & Uppal)
- Can we resolve non -FX puzzles within this model? Or is the model easy to reject when we look at equities or bonds?

Suggestions

Link insights CGF approach to intuition from basic asset pricing equation in local and long-run (Hansen-Schneinkman) forms.

Conclusion

- Powerful hammer.
- Are you hitting too many FX nails?
- Explain what the results mean in more familiar terms.