Some Macroeconomic Puzzles: Conjectural Refutations

The Carry Trade: pennies from heaven?

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"Oh every time it rains
It rains pennies from heaven
Don't you know each cloud contains
Pennies from heaven"

<div align="right">Pennies from Heaven, 1936</div>

'might be going up by the stairs and in danger of going down in an escalator'

'they might be picking up nickels in front of a steamroller'

<div align="right">Traders' Aphorisms</div>

- The first involved the belief in weather-related money making schemes or "sunspots"
- The second that some returns are being collected at the risk of some large shock – insurance premia, like the 'man from the Pru'

Pennies from heaven for a capitalist
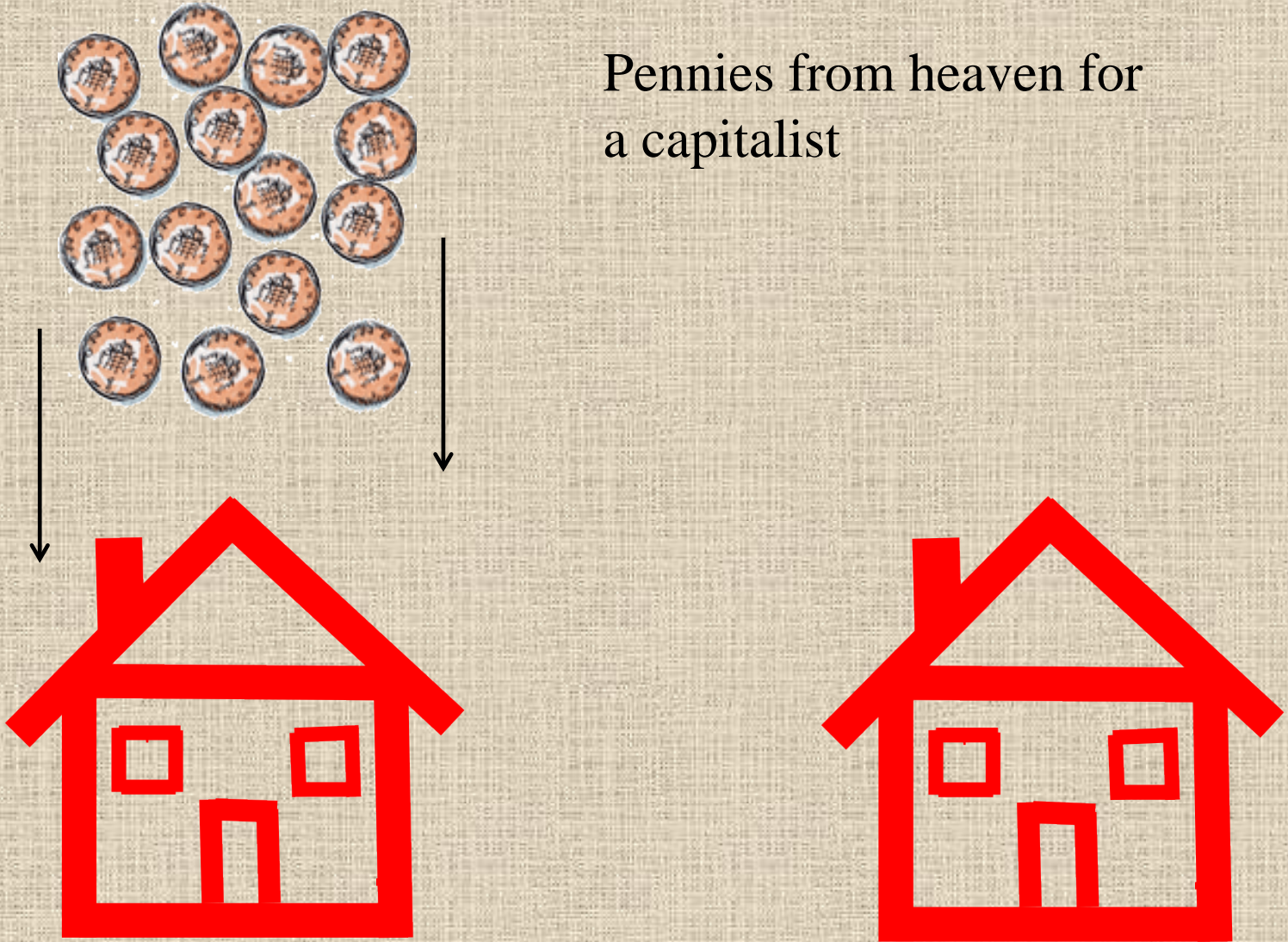
- 100 pennies a day means that the house on the left is worth £12,175 more than the one on the right!

Uncovered Interest Rate Parity

$$I^*_{t,k} - I_{t,k} = E_t(e_{t+k} - e_t) + \varepsilon_t$$

$$2\% - 1\% = 1\% + \text{error}$$

$I^*_{t,k}$ is the foreign interest rate, $I_{t,k}$ is the domestic interest rate and e_t is the foreign price of domestic currency

- In either common currency the return up to some random error should be the same
- Sterling return is 2% but depreciates 1% against the Euro
- Euro return is 1% and appreciates 1% against Sterling
- But consistently we find the common currency return of the higher interest rate dominates….

The 'Law of One Price'

Austria	€4.50	Macedonia	Den240
Bahrain	Din2.0	Malta	€4.00
Belgium	€4.50	Morocco	Dh50
Bulgaria	Lev8.75	Netherlands	€4.50
Croatia	Kn29.50	Nigeria	Naira715
Cyprus	€3.95	Norway	NKr39
Czech Rep	Kc120	Oman	OR2.00
Denmark	DKr41	Pakistan	Rupee 320
Egypt	E£25	Poland	Zl 22
Finland	€5.30	Portugal	€4.00
France	€4.50	Qatar	QR20
Germany	€4.50	Romania	Ron19
Gibraltar	£3.50	Russia	€5.00
Greece	€4.00	Saudi Arabia	Rls15
Hungary	Ft1190	Serbia	NewD480
India	Rup220	Slovak Rep	€4.50
Italy	€4.00	Slovenia	€4.00
Kazakhstan	US$7.00	South Africa	R60
Kenya	Kshs300	Spain	€4.00
Kuwait	KWD1.50	Sweden	SKr50
Latvia	€7.59	Switzerland	SFr6.90
Lebanon	LBP9000	Tunisia	Din9.00
Lithuania	€5.00	Turkey	TL12.75
Luxembourg	€4.50	UAE	Dh20.00

Australia	A$9.00(inc GST)
Brunei	B$8.00
China	RMB25
Hong Kong	HK$38
India	Rup220
Indonesia	Rp43,000
Japan	¥630(inc JCT)
Korea	W5,000
Malaysia	RM11.50
Pakistan	Rupee 320
Philippines	Peso 140
Singapore	S$6.50(inc GST)
Taiwan	NT$140
Thailand	Bht150
Vietnam	US$5.00

FT Cover prices: 30/31st January in
European and Asian Editions

- A single traded good should cost the same in any common currency
- A composite traded good should also cost the same
- Any undervaluation or overvaluation gives scope for trade to change prices or for the exchange rate to adjust to correct deviations
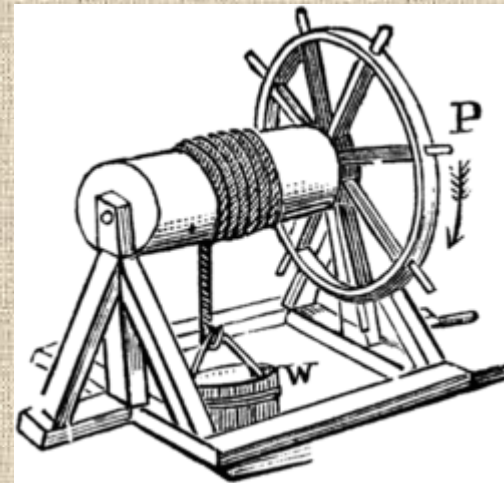
The FT and the 'Law of One Price'
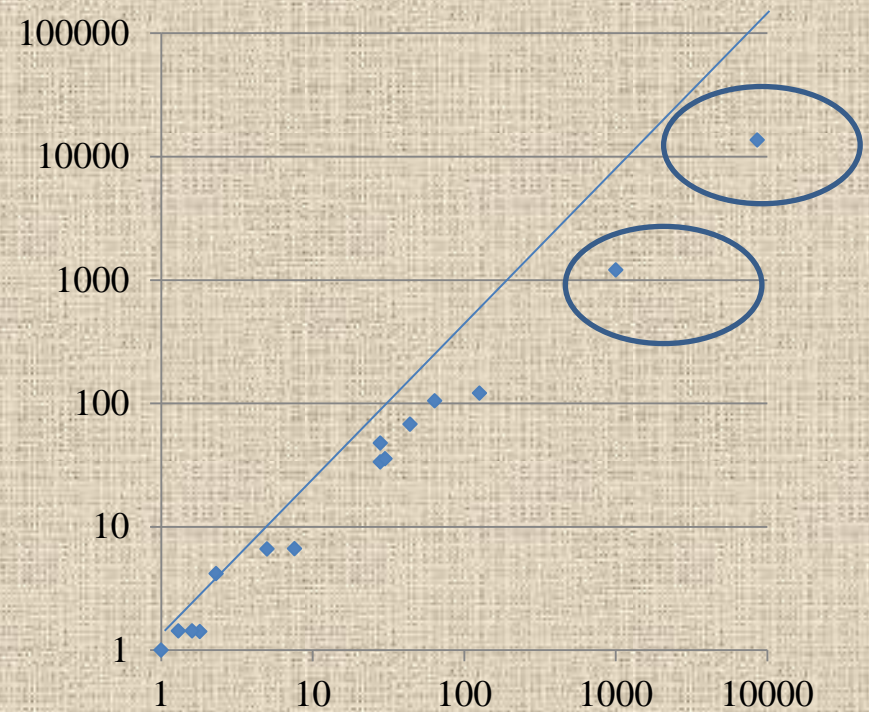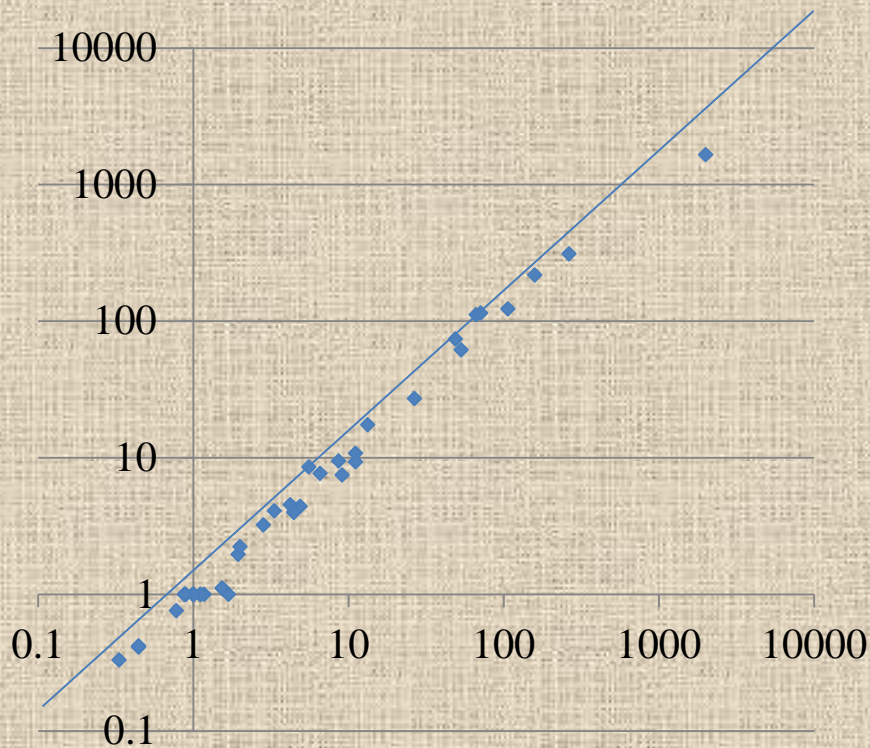
- Compare the posted FT exchange rate versus the 1st February close
- Euro Data not so far
- …but Asian Data suggest some revaluations coming….e.g. Korea or Indonesia

Purchasing and Interest Rate parity combined
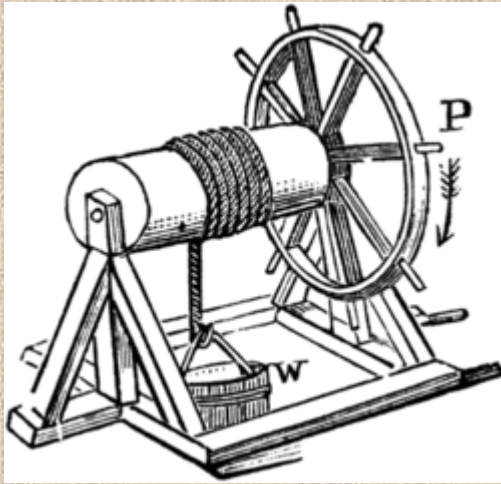
£10 machine
produces £1 per year
@10%

Euro20 machine
produces Euro2 per year
@10%

- Exchange Rate 2:1
- Now if prices of production are expected to rise in the Euro by 25% and the exchange rate is going to fall by 25% to 2.5:1
- Then the Euro machine price will fall until 2.5/(new price)-25%=10%

United Kingdom, FX Spot Rates, Bank of England, GBP per USD, Fixing

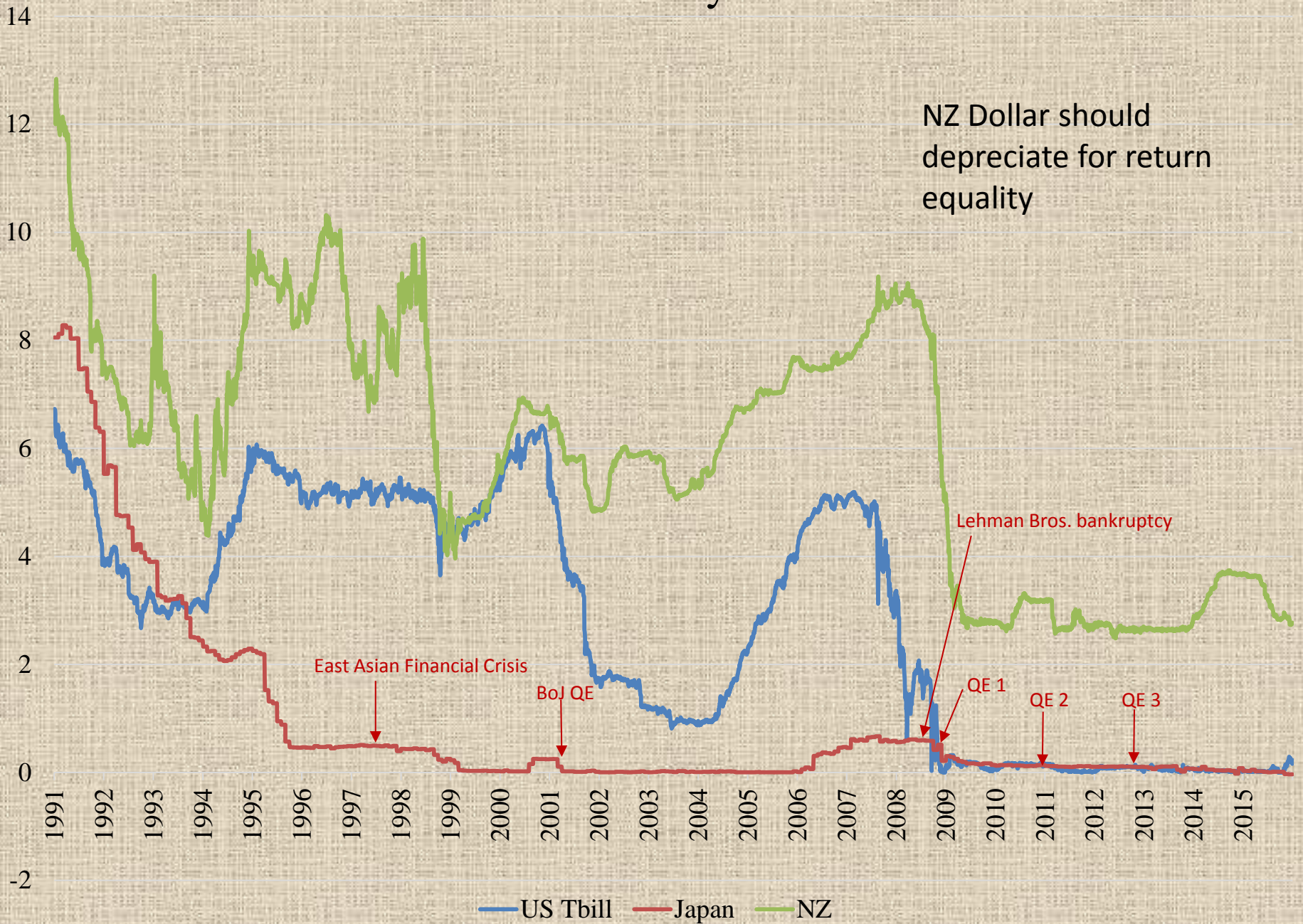Depreciations – large and from time to time
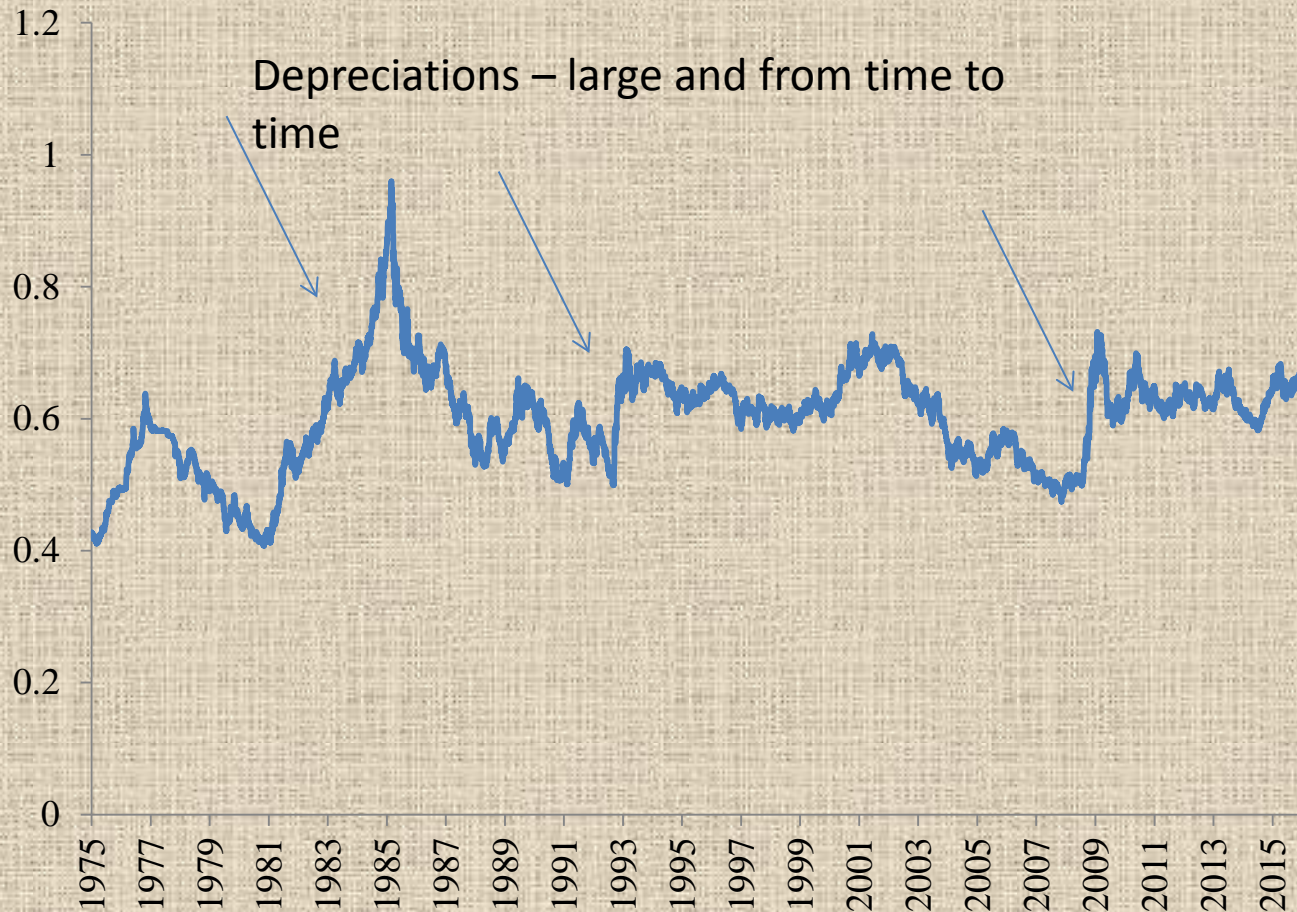
- Exchange Rates not well predicted – "disconnect" e.g. Meese and Rogoff
- Hold the high yield because that does not lead to systematic depreciations
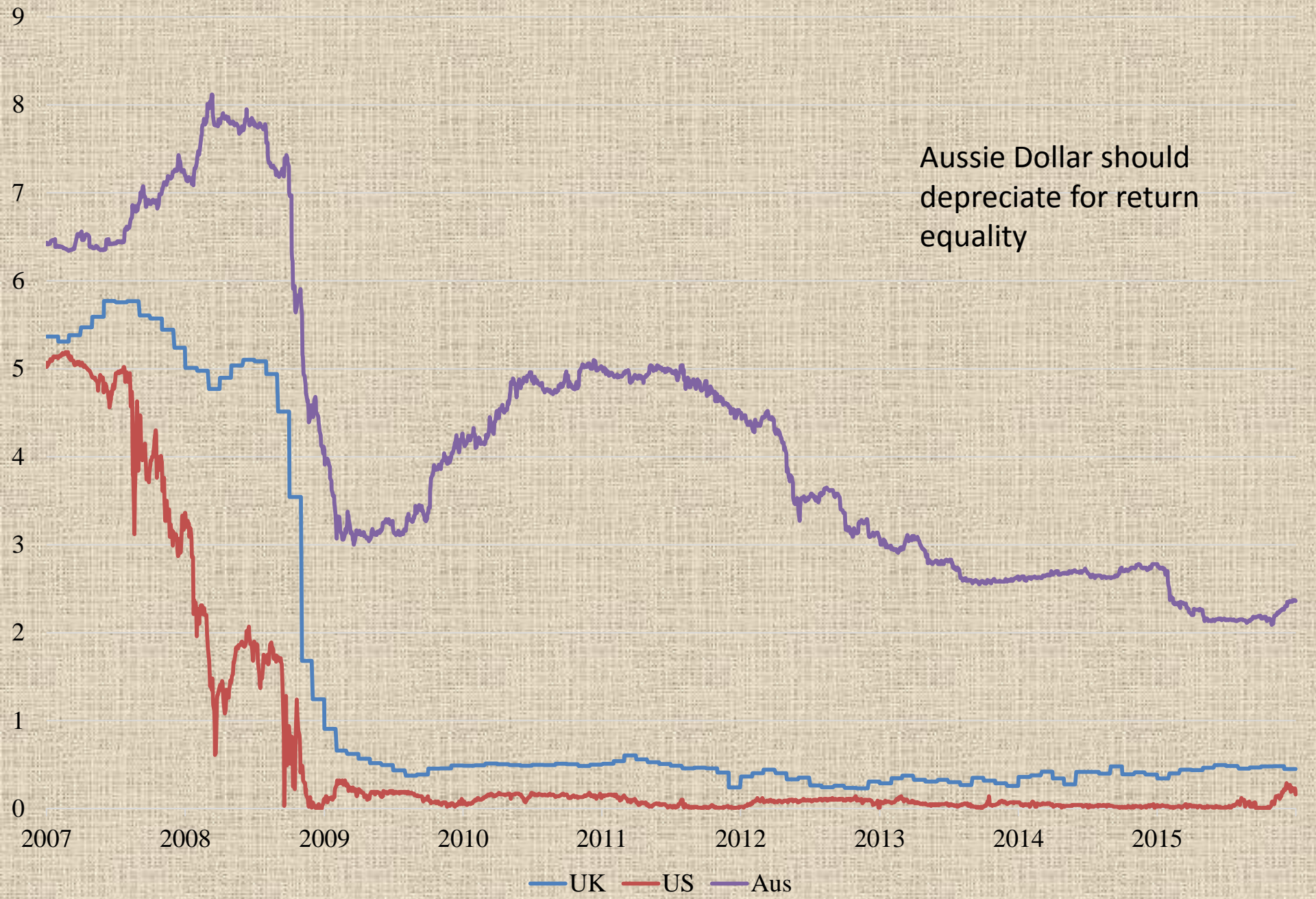
Empirics of Carry Trade

- Burnside et al. (2008) is typical and they find that over a period of mostly floating rates and capital account liberalisation, 1976--2007, a monthly carry trade portfolio, up to 20 currencies, earned an average annual excess return of about 5%.

- This significant return is smaller than the average excess return on the stock market over this same period of around 7% and we examined the equity risk premium in the previous lecture

- But the carry trade returns seemed to be much less variable than equity returns, with an annualized standard deviation of about 5% compared to 15% for equities.

- The way to compare returns across different portfolios is to divide the excess return over the risk-free interest by the standard deviation portfolio returns, which gives us the return per unit of risk and is called the Sharpe ratio. We can see that the Sharpe ratio of the carry trade is double that for equities and hence very attractive.

The Yen Carry Trade

NZ Dollar should depreciate for return equality

Lehman Bros. bankruptcy

East Asian Financial Crisis

BoJ QE

QE 1

QE 2

QE 3

US Tbill —— Japan —— NZ

The QE Carry Trade

Aussie Dollar should depreciate for return equality

— UK — US — Aus

An Unhedged, Simple Trade Carry Result

Dates	Average Return	Standard Deviation	Average Interest Differential
1994-2015	0.63653291	4.246339309	0.438357077
1994-2000	0.405536214	4.010553509	0.535699104
2001-2005	1.183543462	2.781640752	0.48575878
2006-2010	0.244837346	5.537247722	0.458507824
2011-2015	0.827744503	4.367771974	0.237843882

Yen Carry Trade

| 2009-2015	GBP to AUD	YEN to AUD	USD to AUD	Euro to AUD
Average	0.329867388	0.773897639	0.414702159	0.677072435
Std. Dev	3.107408135	4.238498865	7.821301284	2.765073714
Interest Differential	0.248683748	0.276524974	0.277222479	0.272555295

'QE' Carry Trade

- A positive return in the funding currency explained by both the interest rate differential and the depreciation of the funding currency
- Whole period of low Japanese Rates vs New Zealand Dollar...or...
- Ultra low rates since 2009 vs Aussies.

Yen to NZ 1994-2000
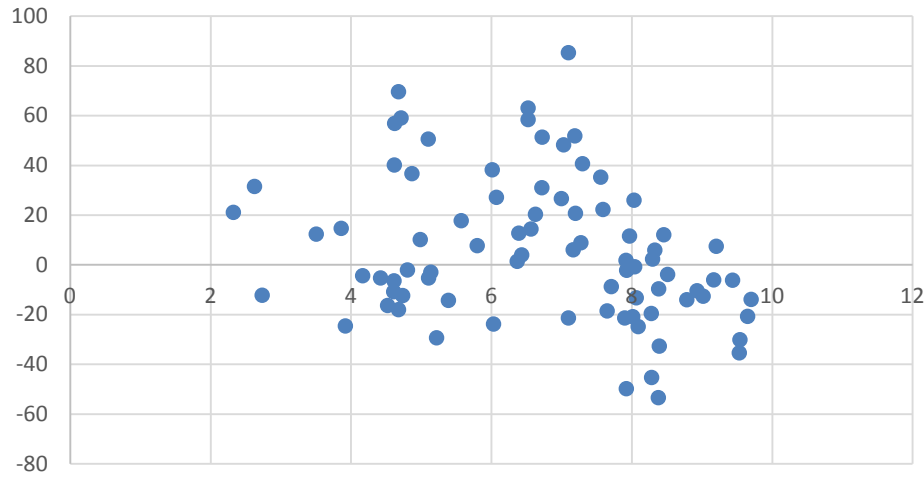
No positive 45 degree line – perhaps negative

USD to AUD 2009-2015
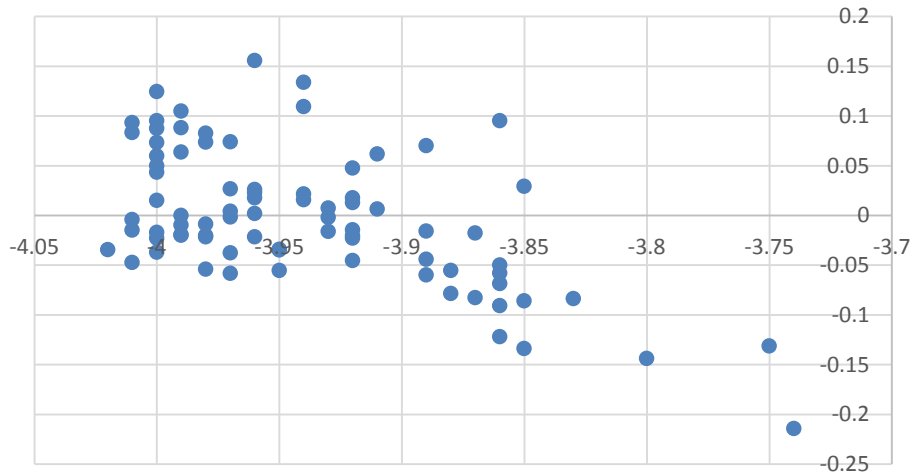
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Explanations…Excuses…Reasons

- Excess Returns related to measureable risk

- Reward for bearing disaster risk

- Peso Problems

- Financial Frictions e.g. liquidity

- Impact of uncertainty on continuing profits

- Intermediation by firms

- Monetary policy

What if risks are not normally distributed?

Symmetric

Asymmetric

Disaster Risk or Peso Problems
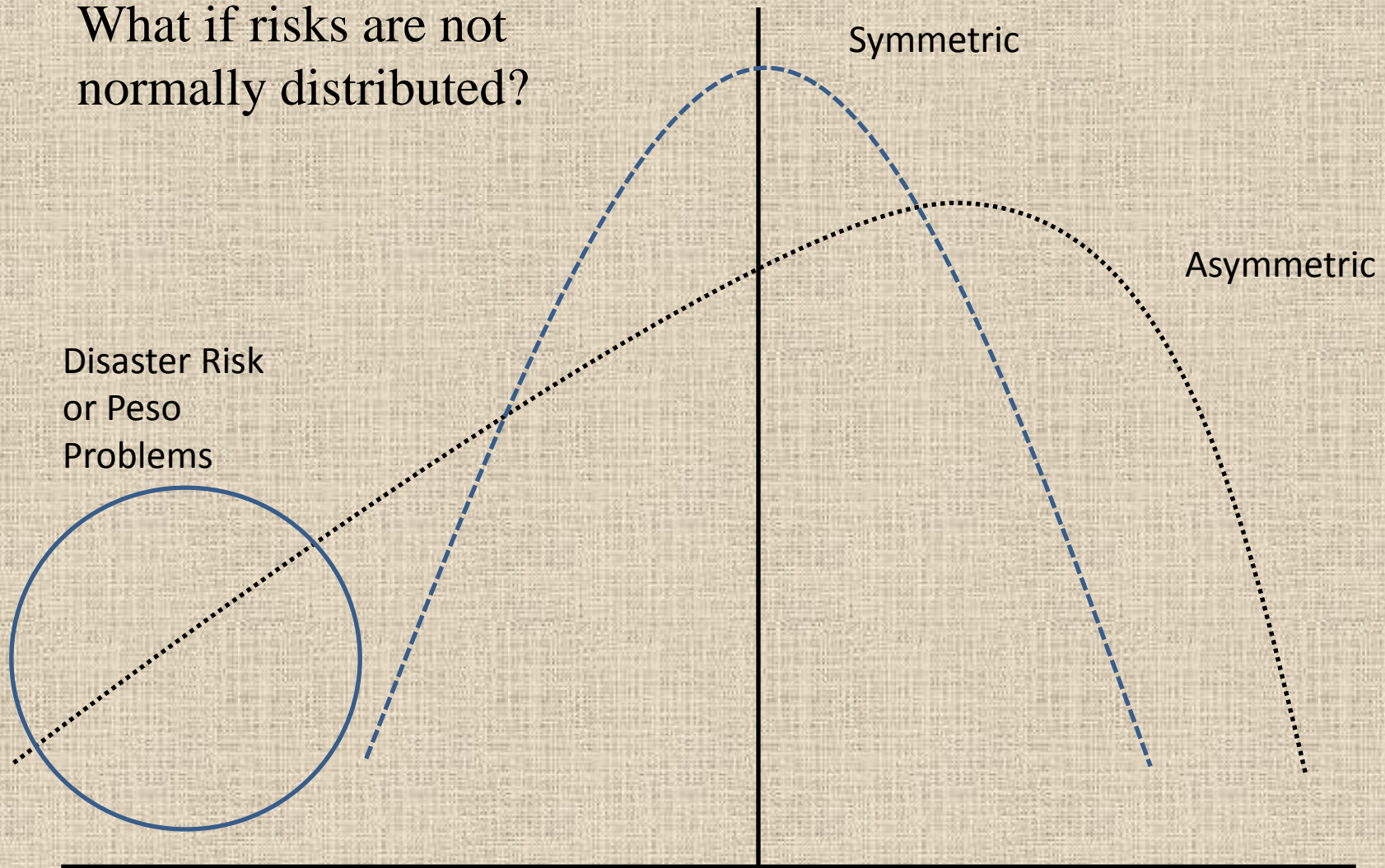
- Higher returns required for skewed distribution of returns

UIP deviations with frictions
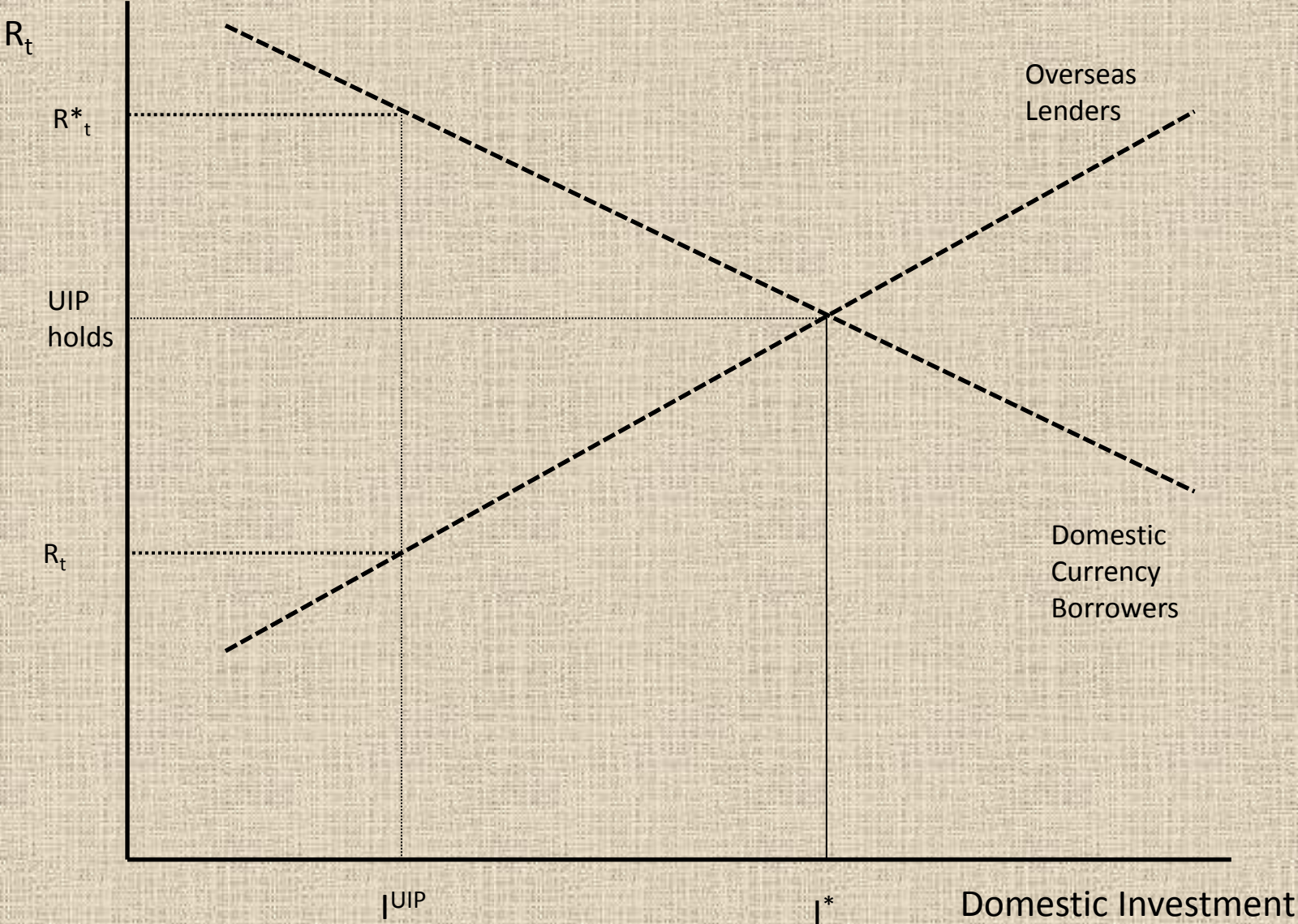
- Liquidity or informational constraints may keep premium alive

Money and Monetary Policy

I
- Money has a rate of return that is negative in inflation and yet it is held

- Currencies that are expected to appreciate but don't are also held

- Lack of safe assets in the world – faux safe havens

- Allows the interest rate on funding currencies to be too low given subsequent returns

II
- Asymmetric monetary policy rule in high yielder

- Expected depreciation when interest rates are high

- But then systematically prevents by changing interest rates or operating forex policies

- Helps explain excess returns in high yielding economy

Concluding Remarks

- Possible solutions have led to marked departure from simple arbitrage-free position

- Measured risk and Knightian uncertainly may play a role

- The net foreign asset position provide a clue to risk – as well as the impact on the economy from these trades

- But incomplete markets awash with informational and trading frictions may prevent full arbitrage from being complete…the penny drops…