

# CIP Then and Now

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# Alternate Titles: What's in a Name?

- Forty Years of CIP
- Forty Years of CIP: Have the Boundaries Shifted?
- CIP: Have the Boundaries Shifted, and if so, Why?
  - » By how much? For whom? Why?
  - » And “So what?” as long as CIP “holds” ?
- Setting the stage / laying out a historical context
  - » Maybe we’ve been here before
  - » CIP Then and Now

# CIP Cycles: Consensus Views Change

- 1920s: Keynes,
  - » CIP true in theory, not very precise in practice
- 1950s-60s: Holmes; Holmes and Schott, Officer and Willett
  - » CIP deviations can be large especially during political crises, turbulent periods, or when capital controls are in place
- 1960s-70s: Various authors – CIP is approximately true
  - » CIP holds, especially offshore, few in any profit opportunities
- 1980s to mid-2000s: CIP from “true” to “truism” to synonymous with *perfect capital mobility*
  - » FX dealers price using CIP. High frequency studies support that deviations are rarely, if ever, observed
- 2007-present: CIP breaks down, deviations surge
  - » A “new normal” or “back to the future” ?

## What Makes CIP So Important, and So Useful?

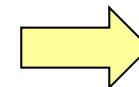
- How to price a forward contract

$$F = S \frac{(1 + i)}{(1 + i^*)}$$

- How to hedge a forward contract
- How to replicate an asset or liability position in home or foreign currency

$$(1 + i) = \frac{F}{S} (1 + i^*)$$

$$(1 + i^*) = \frac{S}{F} (1 + i)$$



# An Historical Highlight Reel

- Keynes (1923)

- » Credit risk and limits to arbitrage

- Holmes (1959) , Holmes and Schott (1965)

- » The standard graph
  - » Capital controls, political risk and deviations from CIP

- Tsiang (1959)

- » Limits to arbitrage and the “elasticities approach”
  - » An idiosyncratic, arbitrageur specific version of CIP

# Keynes, CIP and its limitations

- Popularized ideas about CIP, but noted reasons why it would likely be violated

- Credit Risk

“Such risks prevent the business from being based, as it should be, on a mathematical calculation of interest rates; they obliterate by their possible magnitude the small ‘turns’ which can be earned out of differences between interest rates plus a normal bankers commission; and being incalculable, they may even deter conservative bankers from doing the business on a substantial scale at any reasonable rate at all.” (p. 126-7)

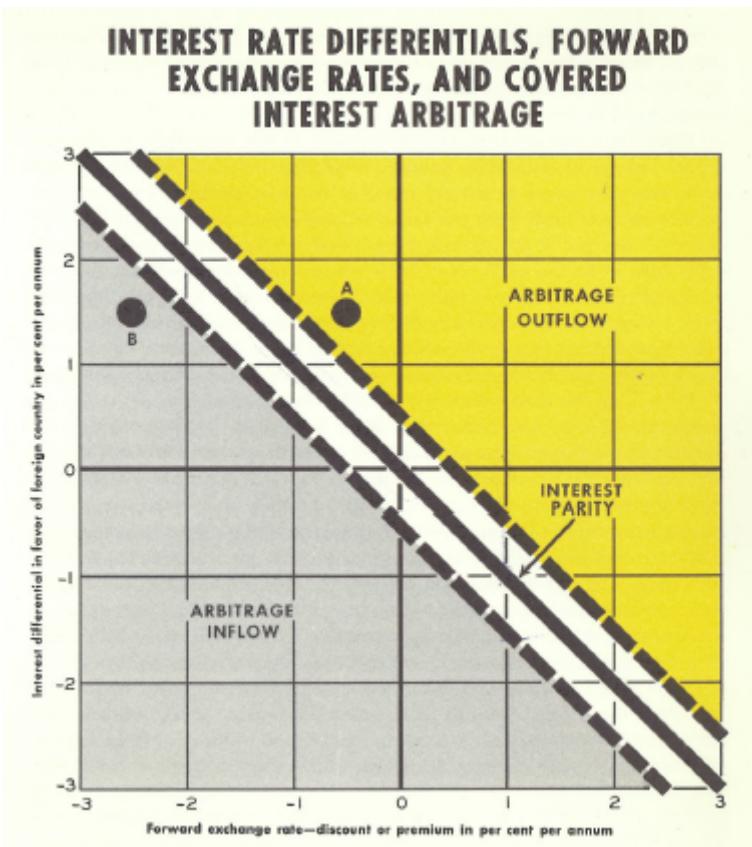
- Limits to Arbitrage

“the floating capital normally available, and ready to move from centre to centre for the purpose of taking advantage of moderate arbitrage profits between spot and forward exchange, is by no means unlimited in amount, and is not always adequate to the market’s requirements.” (p. 128-9)

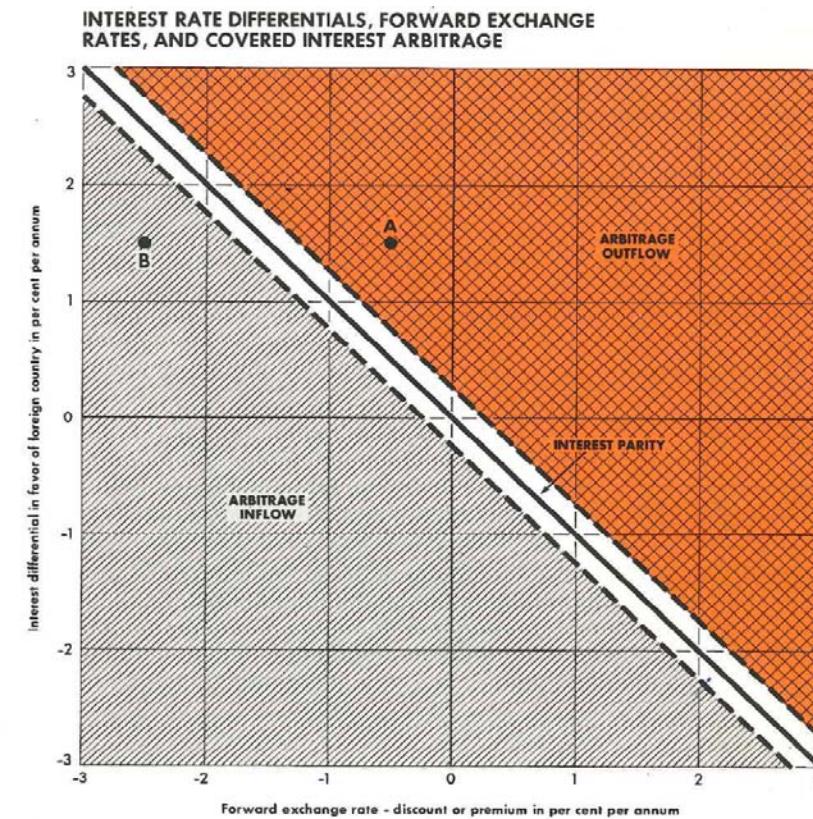
# 1950s – Living with CIP Deviations

- Holmes (1959) in first FRBNY FX market monograph
  - » Assumes, following Keynes, that deviations might have to 0.50% per annum to be worthwhile for arbitragers to move funds from one market to another
  - » Movements were restricted by exchange controls in place, possible future controls, sovereign risks, as well as bank credit risk, and limits to arbitrage.
  - » CIP deviations developed (between U.S. and foreign treasury bills) around periods of BOP, FX, and political crises.
    - ◆ Domestic policies sometimes reacted to these CIP deviations and vice-versa

# Neutral Bands: 0.50% and 0.25%



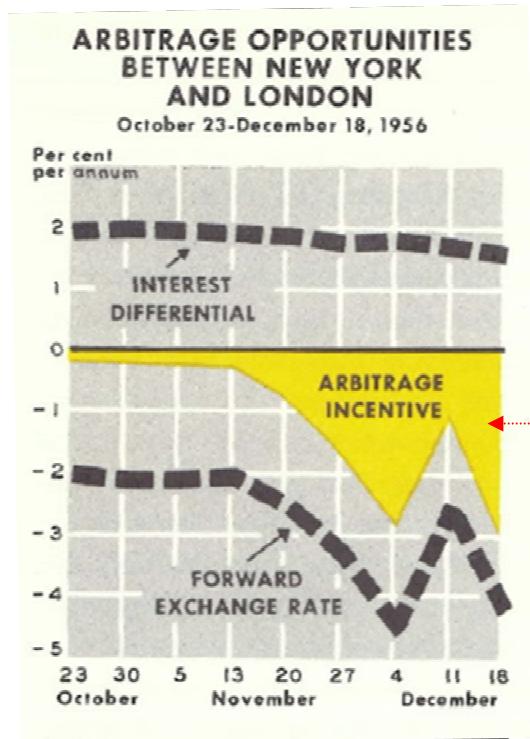
Source: Holmes (1959, p. 45)



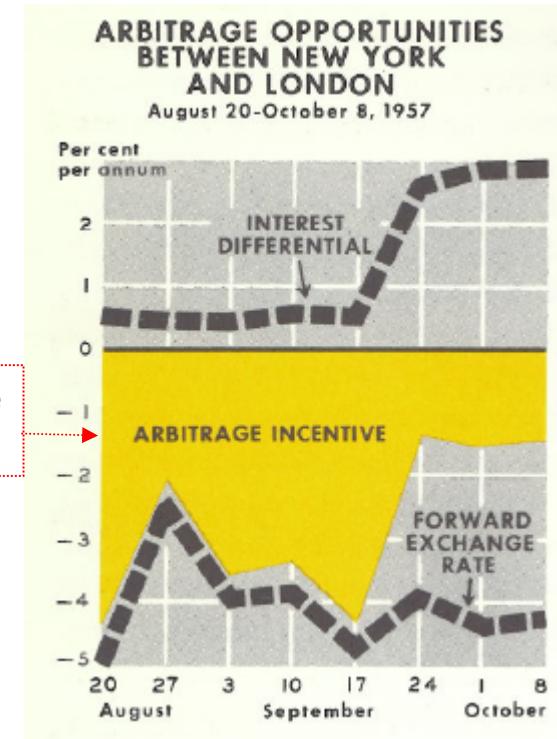
Source: Holmes and Schott (1965, p. 54)

# 1950s – Living with CIP Deviations

Sterling and Suez Crisis, October 1956



Sterling Exchange Crisis, August 1957



for covered arbitrage  
to New York (USD)

Source: Holmes (1959, p. 51-2)

## Tsiang: A Role for Convenience Yield

- CIP works as long as “arbitrage funds do not run out.”
  - » Banks are increasingly reluctant to transfer their spot liquid resources from their home to foreign centers, or vice versa

“for their regular business operations, banks ... must have command over certain amounts of spot liquid funds in every major overseas financial center; mere forward claims would not serve the purpose. ... spot liquid assets yield some intangible returns of convenience or liquidity in addition to their interest yields.”

$$\frac{F - S}{S} = (i_j + \rho_j) - (i_j^* + \rho_j^*)$$

- »  $i_j$  and  $i_j^*$  and  $\rho_j$  and  $\rho_j^*$  (convenience yields) are specific to individual arbitrageur  $j$

## 1960s,70s,80s: Confidence in CIP Builds

- Branson (1969) – Estimates min. CIP differential
- Frenkel (1973) – Estimates min. elasticities to bound 95%
- Aliber (1973) – Estimates using offshore rates r/t gov't bills
- Frenkel & Levich (1975, 1977)
  - » With trans. costs, no arbitrage profits using offshore rates
  - » FX market turbulence increases trans. costs and size of band
- Dooley & Isard (1980) – Costly FX controls, risk of more controls
- Clinton (1988) – FX swap trans. costs lowers band width
- M. Taylor (1989) – High frequency, time synch data
  - » No round trip and very few one-way profits
- Popper (1993) - Small deviations from L-T swap covered CIP
  - » But some evidence to the contrary

# One-Way Arbitrage

- Deardorff (1979) – RT arbitrage is overly demanding
  - » Natural underlying capital flows, borrowing and/or investing will lead to opportunistic behavior. For example:
  - » Comparison shopping of  $i$  vs.  $\hat{i} = \frac{F}{S} (1 + i^*) - 1$
  - » Comparison of forward hedge vs. money market hedge
  - » Etc., etc.
- McBrady and Schill (2007, 2011) – Strong evidence that bond issues are constructed and timed to take advantage of CIP deviations
- Treasurers and money managers are busy when there are deviations from CIP

# CIP just prior to the GFC

## ■ Akram et al. (2008, 2009)

- » 45 million tick-by-tick observations
- » Some short-lived but economically significant deviations from CIP for algorithmic traders

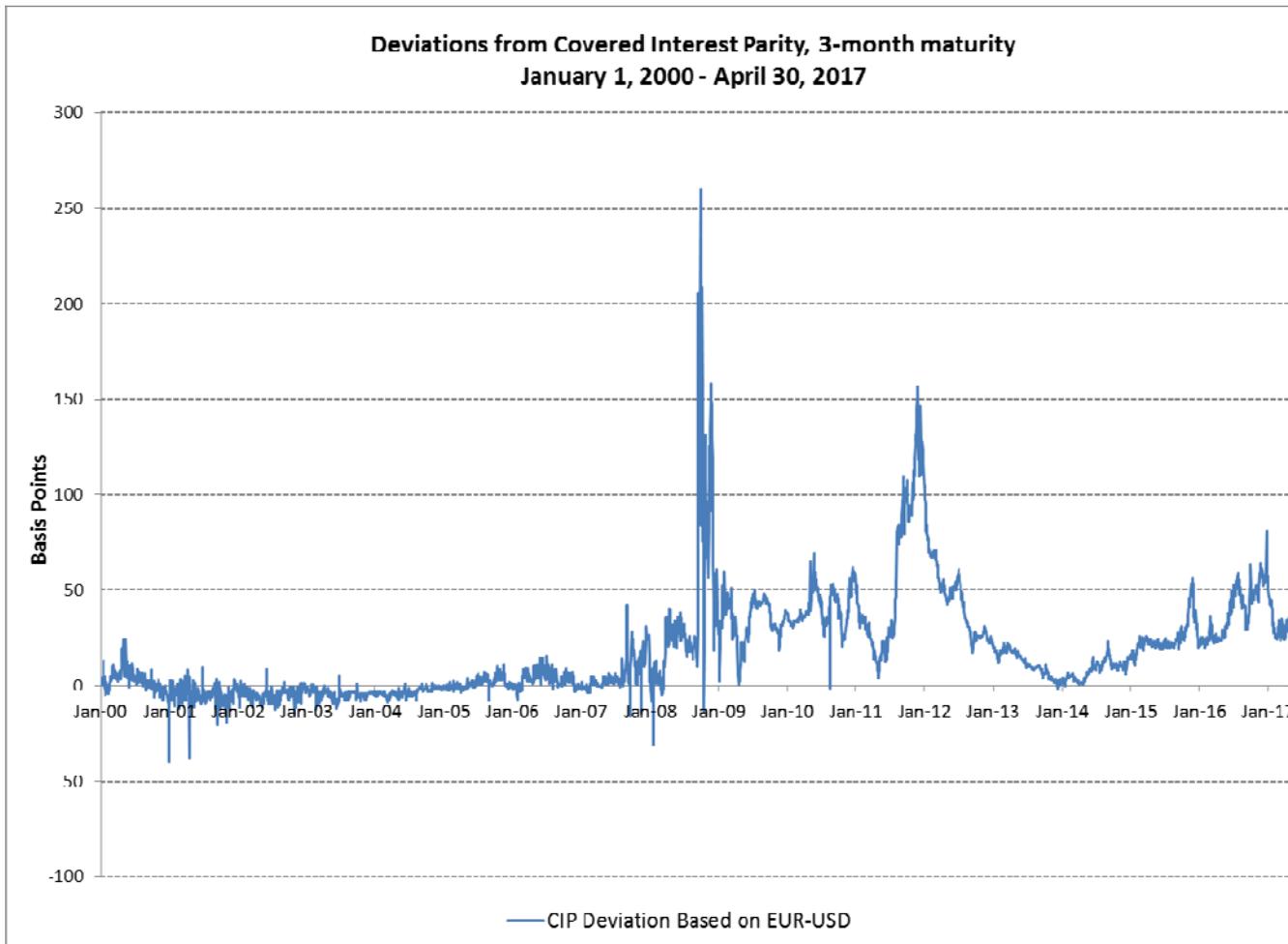
## ■ Kubarych (1978, p. 45)

“Often, the foreign exchange and Eurocurrency deposit traders sit side by side and work in tandem. So, if any divergence of forward rates from interest parity tends to develop, both sets of traders react. They instantly adjust forward quotations, Eurocurrency quotations, or both. Most often the relationship [CIP] is restored before any profitable arbitrage can be made.”

## ■ Cross (1998, p. 37)

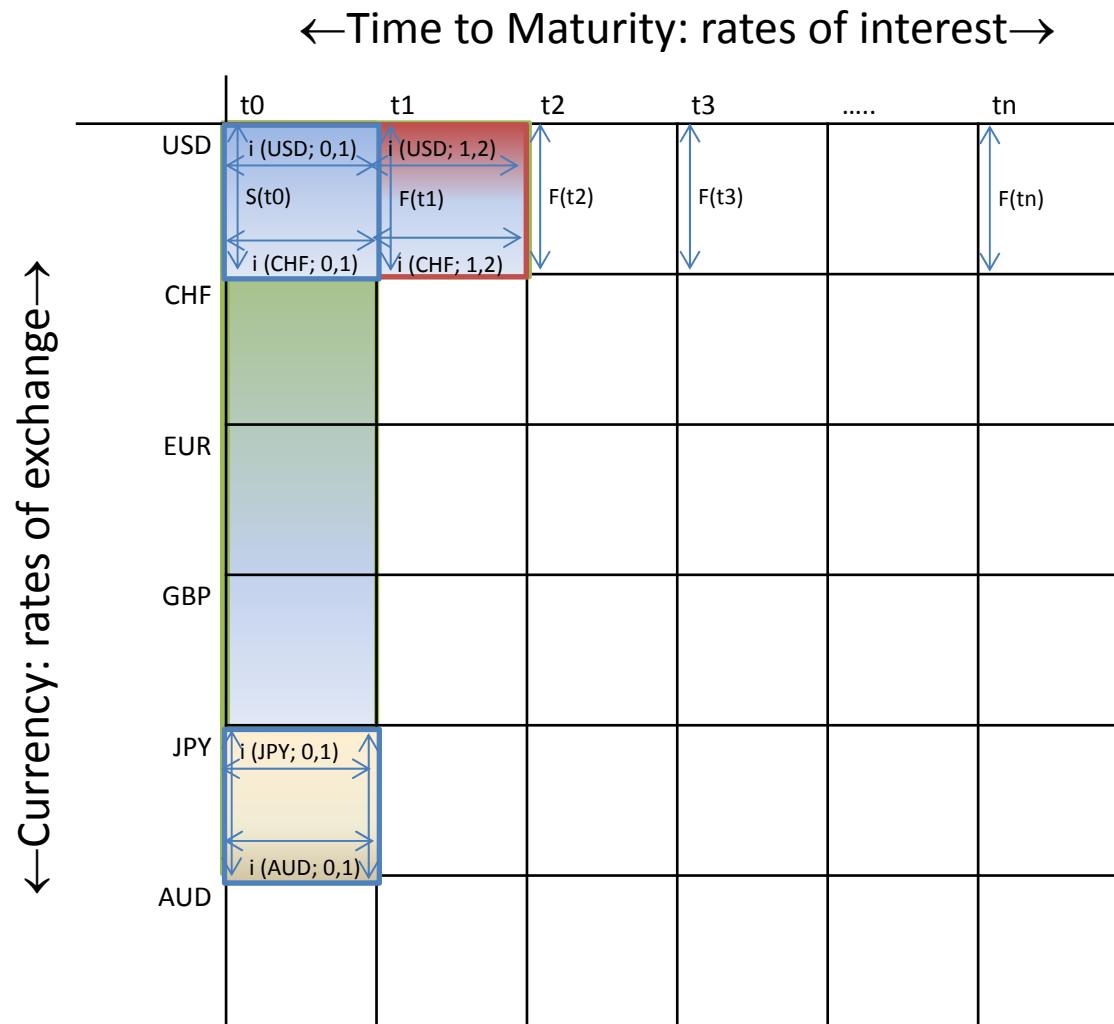
- » “heavily traded currencies are generally free of major impediments ... [bringing] the process of interest rate arbitrage in practice ... to its present high degree of efficiency.”

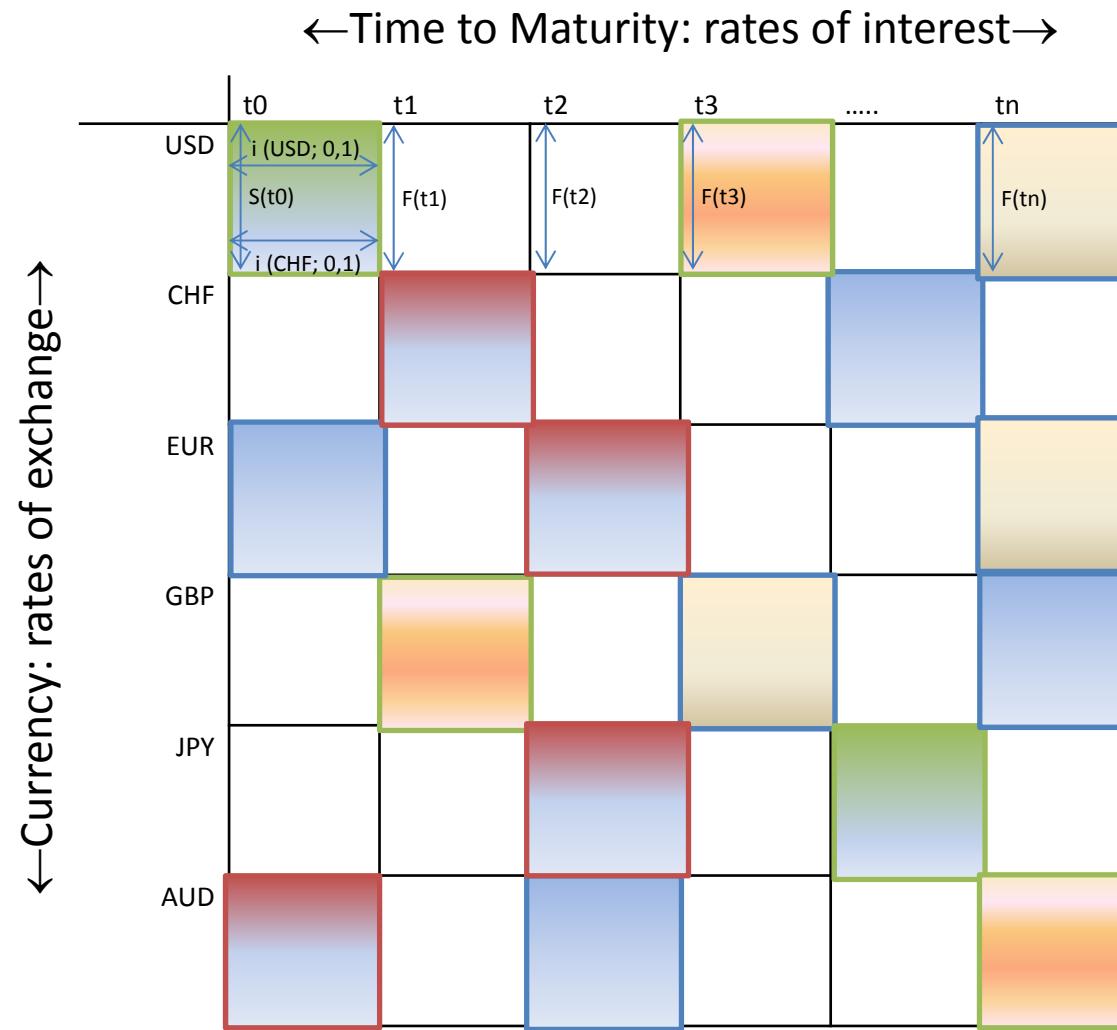
# CIP after the Global Financial Crisis



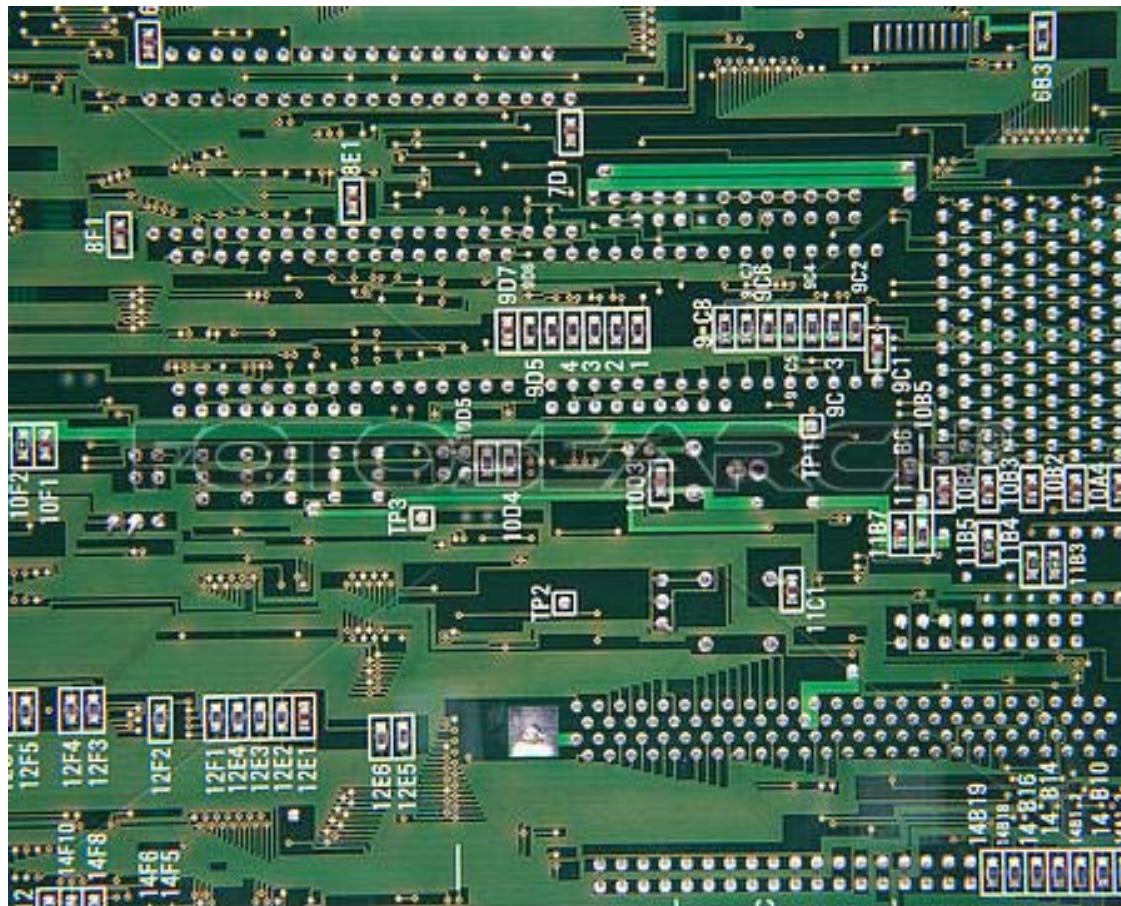
## Where do Matters Stand? Life in the Neutral Zone

- Interest rate parity - a bedrock assumption in Intl Fin
  - » For the term structure of forward exchange rates
  - » For relating covered costs or returns in different numeraires
  - » For open economy macro models
  - » CIP as a barometer of perfect capital mobility
  
- What's different about a wider zone? (0.05% vs. 0.50%)
  - » More opportunities for one-way arbitragers
    - ◆ But only those with the right  $i_j$ ,  $i_j^*$ ,  $\rho_j$ ,  $\rho_j^*$
  - » CIP may “hold” in a technical sense, but increased market frictions, more stringent banking and MMF regulations and uncertainty may impact capital mobility



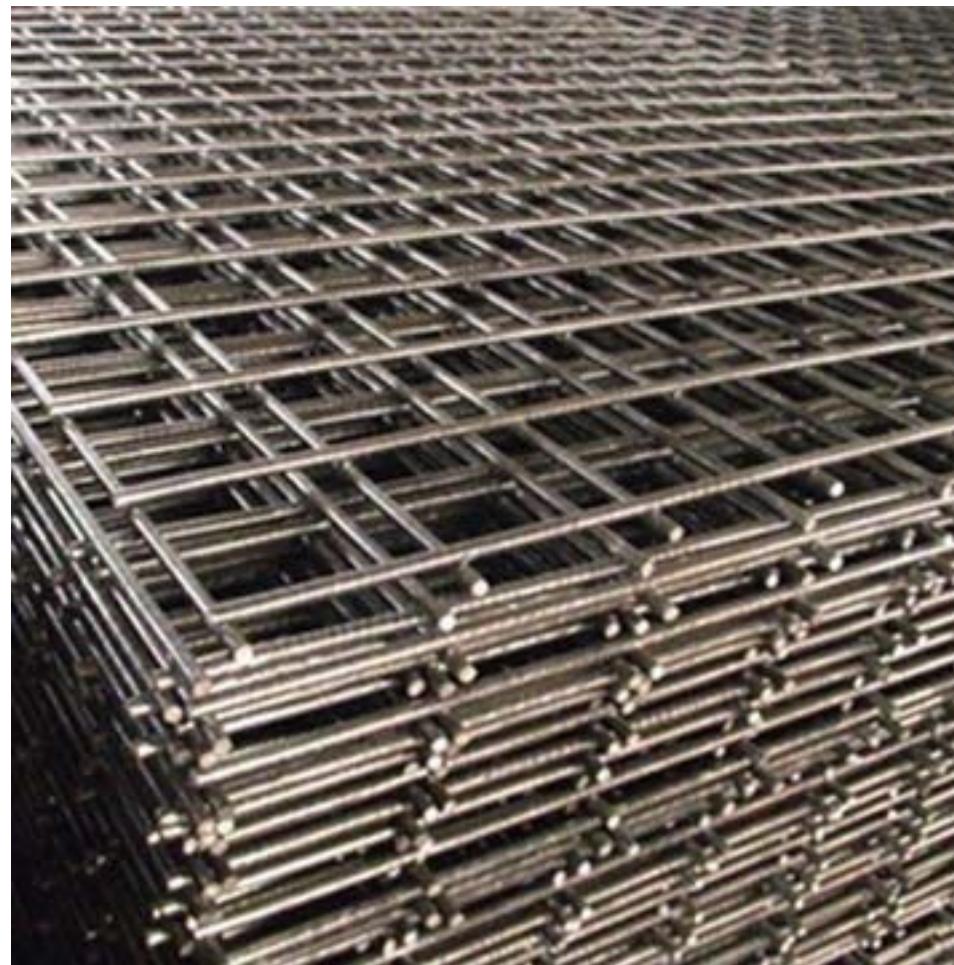


# Integrated Circuit Board



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# Re-Bar Steel Reinforcing



# Broadway Boogie Woogie

Piet Mondrian, 1942

