



NOVA SCHOOL OF
BUSINESS & ECONOMICS

Hedge Funds

Investment Strategy – FX

Gonçalo Sommer Ribeiro

FX Arbitrage

FX Market

- **FX is probably the largest, most efficient asset class**
 - Biggest traded volume
 - Almost 24/7, very liquid (major crosses)
 - Several instruments - Spot, Forward, Futures, Options
 - Mostly OTC (Over The Counter)
 - very large operators / market makers
 - no brokerage fees, just bid-ask ex: 1.0951-52
- Quote = always pair of currencies
 - ex. EURUSD = 1.0951 = Usd per 1 Eur
 - Volatility smile but no skew - Why?

FX Arbitrage

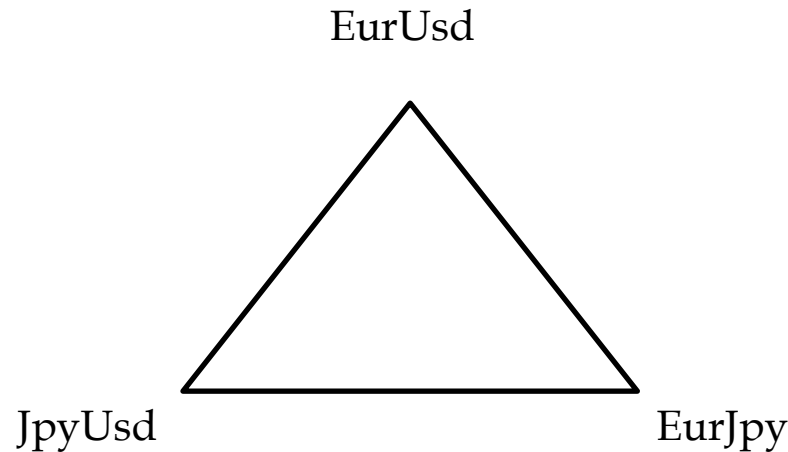
FX Fundamental Value

- **Very difficult to access fundamental value of currency**
 - Some variables that provide insight: Gold/fx reserves, GDP, interest rates (real and nominal), CPI, deficit, current account, liquidity, demand for countries assets (fiscal policy, trade, etc)
 - Benchmark to some historic “fair” value
- Some **market inefficiencies** - occasional ex: triangle arb
 - conjunctural ex: forward prices during crisis
 - structural ex: carry, BH

FX Arbitrage

Non-Arbitrage Relationship

Triangle Arbitrage



- These arbitrage opportunities exist but are quite rare (**need auto-monitor**), very fast (**need auto-trader**) and very difficult to implement in OTC market (**need justification**)

FX Arbitrage

Non-Arbitrage Relationship

Forward Arbitrage

EURUSD spot vs 1M Forward

Subprime
Crisis

EU Sov
Crisis

Trump
Election

FED
Hikes

Covid



FX Arbitrage

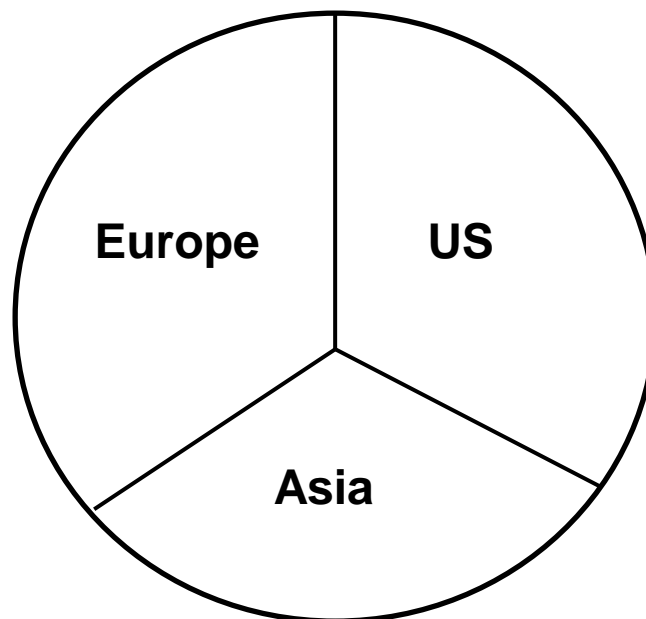
FX Carry

- **Carry is the most exploited arb opportunity in FX**
 - **No Arb Rule**
 - $\text{Fwd} = \text{spot} + \text{dif rates}$
ex: BrlUsd \rightarrow $\text{Fwd 1y} = 0.176819 = 0.1972 \times (1.0159 / 1.133)^1$
Borrow Usd @ 1,59%, buy BrlUsd @ 0.1972, depo Brl @ 13.3%
Then sell Fwd BrlUsd @ 0.176819
- Forwards **has nothing to do with expectations** (only through spot)
- And FWD is **not a good estimator of future spot rate**
 - Usually high (low) yield currencies do not devalue (appreciate) as much as implied in interest rate differentials
- So FX Carry persists. But trade too crowded \Rightarrow very volatile

FX Arbitrage

FX BH

- Currencies tend to devalue during their home market opening hours



Ranaldo (2007,2011)

- Might be due to **hedgers immunizing** FX risk of recently bought positions

FX Arbitrage

FX Hedging

- **How to hedge FX risk?**
 - How can EU investor buy US stock without USD risk?
 - May use **forward, future, options**
 - But **natural hedge** is easier – ex. borrow in USD
 - Asset in foreign currency
 - Funded with loan in that same currency
 - Naturally hedges the FX risk and partially the interest rate risk

Ex: Carry, FX BH, Mod FX