High frequency data
High frequency modeling and analysis

MASEF
Slides Part I
Markets - Financial products

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Different market types : OTC deals

Over The Counter (OTC) deals (direct deal)

- Data collected by Reuters, Bloomberg, Bridge, . . .
- Generally hard to use for statistical analysis
    - hard to get
    - often not liquid enough
    - often not homogeneous (depends on the agents involved)

Different market types : Organized markets

Organized markets (exchanges : generally private companies)

- Data collected by Reuters, Bloomberg, . . . AND by the exchanges
- Many are very liquid and homogenous
- Some exchanges
    - Nyse (New-York Stock Exchange)
    - Nyse-Liffe (London International Financial Futures Exchange)
    - Nyse-Euronext (French stocks)
    - Eurex (Frankfurt)
    - CME (Chicago)
    - CBOT (Chicago)

$\Longrightarrow$ Two different structures : pit or electronic

Different market types : Organized markets

- Pit markets
  - Less and less common
  - brokers and "locals"

- Electronic markets
  - More and more common
  - Orderbook-based system
  - Never opened 24h/24h ("overnight" effect)

$\implies$ Both can be active on the same assets

$\implies$ Influence of pit markets on electronic markets

Different types of agents

The different types of agents generally correspond to different behavior on the markets

- Investors
- Hedgers
- "Market makers"
    - Can be assigned by a market (still the case for Nyse)
    - Arbitrageurs
- Arbitrageurs (hedge funds) :
    - long/short,
    - cta (Commodity Trading Advisors)
    - . . .

Different types of assets

Main "classes"

- Forex (Foreign Exchange)
- STIR : Short Term Interest Rates
- LTIR : Long Term Interest Rates (Bonds)
- Stocks (+ indices)
- Commodities
- Energy
- . . .

$\implies$ Spots or Derivatives

Different types of assets : Spots

- Products are dealt at the same moment as the deal
- Short selling ?
- Can be not convenient for Arbitrageurs or Hedgers

Different types of assets : FX Spots

- It is ONLY OTC
- 24h/24h data
- Extremely liquid (50% of FX exchange is on the spot)
- Base of many early statistical analysis
- OTC $\implies$ High frequency flow trading !

Different types of assets : Stocks Spot

- Large number of stocks
  - Most of them are not very liquid
- Short selling ?
- When you use the data DON'T forget
  - Dividends
    - 4 times a year in the US
    - Price decreases ($\simeq 0.5\%$)
  - Splits

IR, Commodities, Energies . . . spots are not very liquid and generally much less liquid than the Futures

Different types of assets : Derivatives

- Options
    - Non homogenous data (in the money/out the money)
    - Hard to use for statistical analysis
    - Implicit volatility trading

- **Futures**/Forwards
    - Organized market $\Rightarrow$ Futures
    - OTC $\Rightarrow$ Forwards
    - Generally **very liquid**
    - Homogeneity ? Yes after **Rolling**
    - Collateral account system for counterpart default risk
        - initial margin
        - Account updated every night
        - SXE : 1/5 to 1/7
        - FX : 1/100

The tick size

- There is always a tick size !
- It is fixed by the market
- It has a large influence on the dynamics
    - "Small" (perceived) tick sizes (e.g., Futures on DAX, stock markets, . . .)
    - "Large" (perceived) tick sizes (e.g., Bund, Futures on EuroStoxx, . . .)
- Rules can be complex and can change through time !