



NOVA SCHOOL OF
BUSINESS & ECONOMICS

Hedge Funds

Investment Strategy – Volatility

Gonçalo Sommer Ribeiro

Volatility Arbitrage Options

- **What is an option?**

Right, but not the obligation, to buy (Call) or to sell (Put) a certain asset at a pre-established price (Strike Price) at (or until) a certain future date (Maturity)

- **Which factors impact option value?**

Spot (s), strike (x), time to maturity (t), int. rate (r), div (d), vol (σ)

- **Which factor is the most important?**

Volatility Arbitrage

Options

Volatility

- **Why volatility is key?**

Option is a derivative

No Arbitrage Rule

All models based on payout replication via delta hedging

- **Why not price / expectations?**

Market efficient

Expectations already reflected in spot price

- **Need to estimate Volatility**

Volatility Arbitrage

Options

Volatility

- **Volatility estimation**

Vol easier to estimate than Price

Vol is Auto regressive

ARCH, GARCH, EGARCH, EWMA - all based on recent vol + L/T mean

- **Which factors can explain Vol?**

$\text{Vol} = f(\text{past vol, lt mean, events, liquidity, ...})$

- **How good is your model?**

Ex. t for kurtosis, hypergeometric for events

It's a pros market - who is being arbitrated?

Volatility Arbitrage

Types of Arbitrage

- **Option x Option** (ex. Put-Call parity) not very common

Market makers careful = bid/ask, smile, etc

- **Listed products**

easier to find mispricing's – warrants, rights, convertible bonds, structured products, etc

- **Futures on volatility**

sell vol (vix), intermarket spreads (ex vix-v2x)

Volatility Arbitrage

Investment Strategies


- How to extract value from an embedded option?

Convertible bond = Bond + Call Option on Stock

Structured Product = Bond + Call Option on Market Index

May buy package and hedge bond + **delta hedge** option separately

But careful with **exotic options** → Sometimes **delta hedge** no good

Easy to Δ Hedge  Difficult to Δ Hedge

Asian Option *Plain Vanilla* *Digital* *KI, KO, etc*