More research on using correlation and volatility in trading signals

References

Evaluating correlation breakdowns during periods of market volatility – Mico Loretan

Using correlation in trading – Sofien Kaabar

The relative volatility index, deriving trading signals from fluctuations – Sofien Kaabar

The flashing indicator, combining correlation and volatility to generate trading signals

Abnormal sector option correlation premiums and predictable changes in implied volatility

Financial indicators signalling correlation changes in sovereign bond markets

Notes

One difficulty: correlation can differ in periods of heightened market volatility (compared to quiet markets) – during major market events, correlations change dramatically (bookstaber 1997)

Tempting to explain increased correlation of returns during hectic market periods as the result of a shift in the joint distrib of asset returns, owing to contagion of some markets by others / the particular nature of the shocks / changes in market structure and practices

But unless one has a model of when such periods are likely to arise (or at least how often) and what particular pattern of correlations will ensue -> this approach makes it very hard to properly hedge

Because the relationship is essentially unknown

*Could we use the correlation between our two assets and a third one as a trading signal ?*

*It would probably inform us on the stochasticity of the correlation between our own two assets*

*Could we use the maximum drawdown ?* – largest historical loss of an asset

Introduction to trading signals and how they are used (very briefly, it will be an opening)

explain the use in our context – additional info that is fed to the algorithm to consider for potential future moves in the volatility or the correlation of two (or more) assets

volatility: measures how a single asset prices fluctuate -> stochastic but assumed constant

correlation: measures how the combined asset prices of two assets can fluctuate -> stochastic but assumed constant

my own reasoning: can we implement a third underlying asset with high static correlation with the two we already consider -> compute the implied volatility of an ATM put option on that third asset, as well as the stochastic correlation between that third asset and our two considered

the idea being that we might observe patterns between how the volat/correl change, and how the prices of our two assets change as well -> might allow us to better predict sudden moves in those two assets, which could therefore increase the accuracy and efficiency of our hedging strategy

testing for autocorrelation to predict price moves -> seems like a very good idea

why would we need to consider autocorrelation in our delta hedging strategy

autocorrelation tells us how the stock’s returns relate to its returns in previous trading sessions

if the stock exhibits autocorrelation: past returns therefore do seem to influence future returns

so that past returns are a very good predictor of future returns for this particular stock

there is also serial correlation (similar concept)

it measures the relationship between a variable’s current value given its past values

when a variable and a lagged version of itself are correlated over periods of time

indicator used to determ how well the past price of a security predicts the future price

stocks with high degree of serial correlation / autocorrelation will exhibit patterns, and allow for traders to recognize and predict futures stock moves

serial correlation among these quants is determined using the Durbin-Watson test

the correlation can be either positive or negative (positive or negative patterns)

security that has a negative serial correlation has a negative influence on itself over time

ok donc il y a cette idée qu’on souhaite se hedge en forecastant des mouvements futurs de stocks

et on sait pas vraiment s’ils seront très différents des périodes précédentes ou pas

si jamais ils ont tendance à être vachement différent, notre stratégie aura une incentive à naturellement trop (ou pas assez) hedge en vu de ces potentiels mouvements, pour être en ligne avec le marché

l’autocorrélation des returns d’un actifs pourrait très bien être cet indicateur, et pourrait inciter l’algorithme à produire une stratégie soit très en ligne avec l’historique des returns (autocorrel assez forte), soit possiblement innovante (pas d’autocorrel : tendance à bouger sans signaux préalables)

<https://www.sciencedirect.com/science/article/abs/pii/S1057521920302428>

stock returns, quantile autocorrelation and volatility forecasting – Yixiu Zhao

they examine stock return autocorrelation at various quantiles of the returns distribution and use it to forecast stock return volatility

keywords: quantile autoregression / stock returns / volatility forecasting / volatility asymmetry