

BRIGHTONROCK

Value at Risk

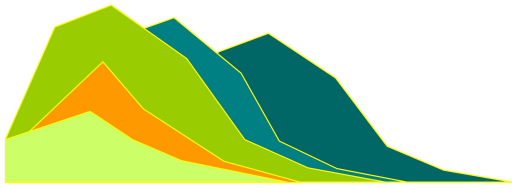
Beware!

“We'll take the house. ... Honey, the chances of another plane hitting this house are astronomical. It's been pre-disastered. We're going to be safe here.”

T.S Garp

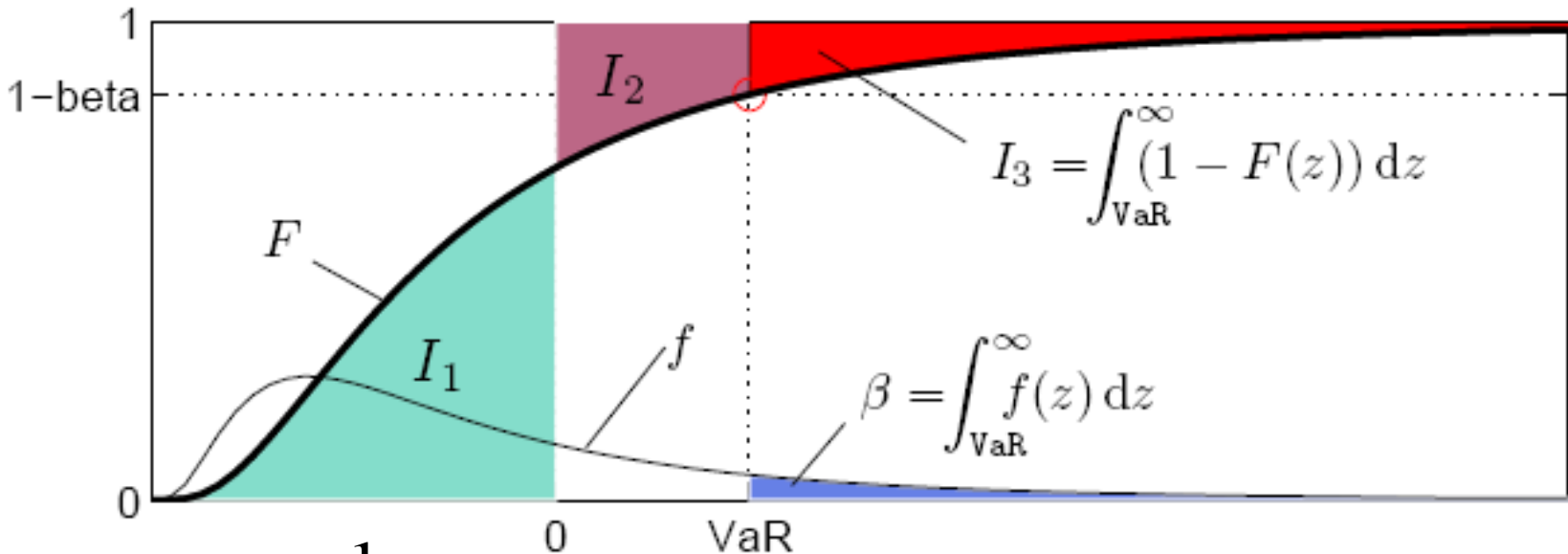
GARP
Luxembourg October 2008

Con Keating



BRIGHTONROCK

VaR and Shortfall The conventional

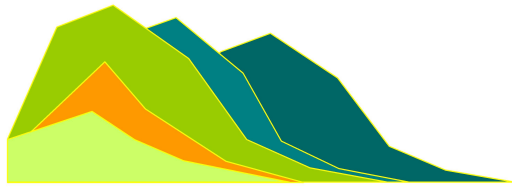


$$\text{ES} = \text{VaR} + \frac{1}{\beta} I_3$$

$$\text{VaR}_{1-\beta} = F^{-1}(1 - \beta)$$

But beware the discrete, and do remember that a sample arises from within the true distribution

Beware also of mixing expectations – credit risk [$E(X)$] but most risk measures are second moment based [$\text{SQRT}(E(X)^2)$]



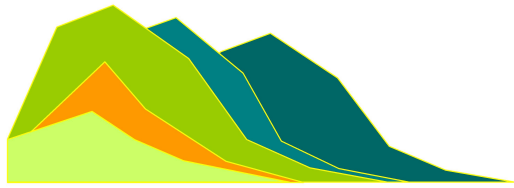
BRIGHTONROCK

VaR & Ruin Probabilities

$$P_{\text{ruin}} \leq \frac{1}{\beta^2}, \quad \text{where } \beta = \frac{C + \lambda N}{\sigma \sqrt{N}}.$$

- Value at Risk is simply an application of insurance ruin theory
- It dates from 1963 and William Baumol rather than the 1990s
- If we wish to regulate the probability of ruin, there are variables other than capital (C) we may utilise.
- The loading factor (λ) but this is product regulation
- The number of risks (N) but this has competition implications
- The variability of individual risks (σ), again product regulation
- The regulator favours institutional over product regulation.
- The regulator also favours principles over prescriptive rules

- But none of this is the central source of my criticism of VaR or Financial Modelling more generally

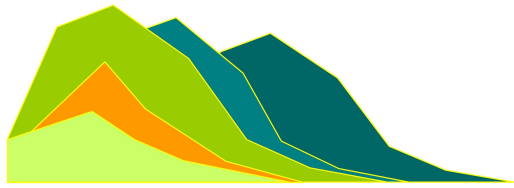


BRIGHTONROCK

A quotation

I could prove God statistically.

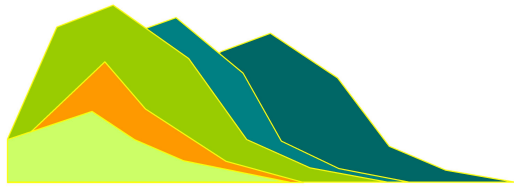
George Gallup (1901 - 1984)



BRIGHTONROCK

Crisis

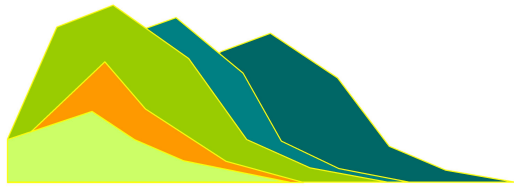
- These financial models are stationary
- This is the mathematics of gambling
- All outcomes can be specified and probabilities assigned
- Arrow Debreu – is just a fixed point theorem
- With initial boundary conditions, beautiful results follow
- Rational Expectations – just another fixed point theorem
- General Equilibrium follows
- Remember Feynman – equilibrium is when all of the fast things have happened but not the slow....
- Where's Frank Knight's Uncertainty?
- Real world finance is far harder than these models would have us believe
- But the regulators want us to use these models in managing our businesses



BRIGHTONROCK

Models

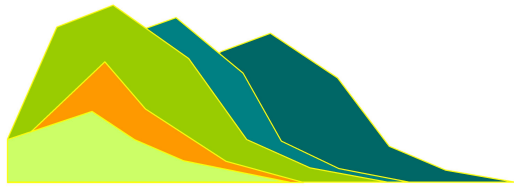
- There are questions with all financial theories as to whether they function as cameras, recording empirical regularities or as engines influencing performance.
- Most important for these latter theories are the prescriptive actions they generate to reinforce themselves. Or as the German sociologist Max Weber expressed it: “*To seal the ideological bondage*”
- Better is to use models to parse data into information and noise
- No assumption of a true model is needed
- The objective becomes to extract the useful and learnable information with a model class suggested
- By defining learnable information, we can also compare any two models



BRIGHTONROCK

Information Parsing

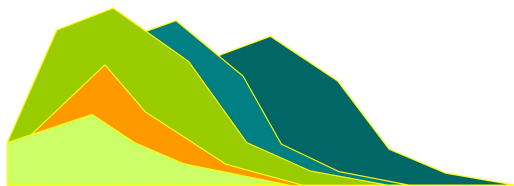
- Consider the following data
- An alternating binary string 010101...
- If our model is Bernoulli with the probability of each symbol (0,1) one half
- Then this string is all noise, and the information is zero
- But if our model is first-order Markov, with the conditional probability of symbol (1) unity in State 0, and of symbol (0) unity in State 1,
- Then the entire string is information and there is zero noise
- So from the same data different model classes can extract entirely different properties from the same data, while imposing different constraints
- And this is the very purpose of modelling.



BRIGHTONROCK

Information Theoretic Modelling

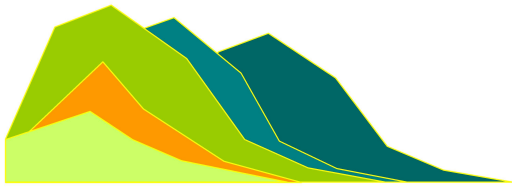
- Can be directly related to probability and offer some useful further insights
- The extreme events which are so problematic in practical risk management are precisely the events which are information rich
- Further, in general terms, maximisation of the probability of the data with respect to the class of model involves a process which penalises the number of parameters
- In the spirit of Ockham
- And leads to optimally “distinguishable” models
- Which have application in hypothesis testing and confidence estimation
- In particular the Bayes Information Criterion (BIC) emerges naturally but rather more fully than the only asymptotically effective version we are familiar with.



BRIGHTONROCK

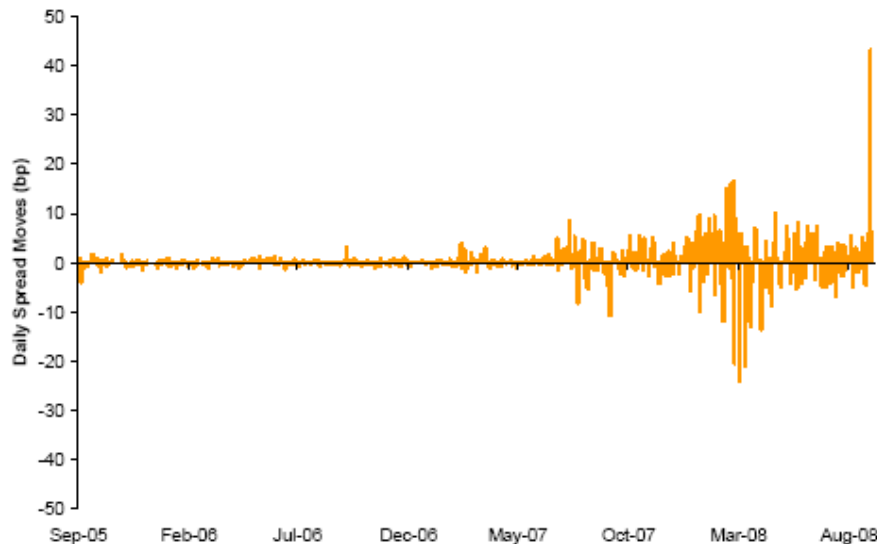
Information

- With perfect information institutions don't matter, nor does history or the distribution of wealth.
- Imperfect knowledge of price, quality and effort has no effect
- Given the production technology, initial endowment and preferences all future is determined.
- The Arrow-Debreu world is one of perfect information – beliefs cannot be endogenous and cannot change
- And that precludes investing in information discovery
- Imperfect information has major consequences, even if small.
- It limits markedly the domain of the law of supply and demand, the law of diminishing returns, the law of the single price and the efficient markets hypothesis.
- In general though it never pays to invest in just a little information discovery.

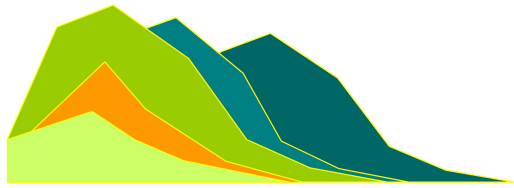


BRIGHTONROCK

- Is characterised not by equilibrium, but by innovation and diversity
- In diversity there is economic resilience
- Successful innovation is exaptive, rather than adaptive,
- and usually co-constructive
- Accompanied by Schumpeter's "waves of creative destruction"
- We live on the edge of chaotic behaviour, including extinction outcomes



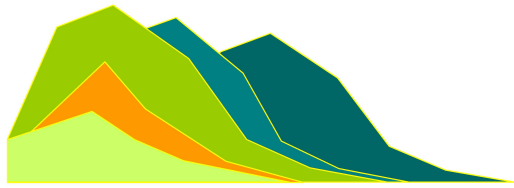
- Beware of path dependency
- With the endogeneity of market risk
- We can pass a phase transition into statistical wildness.



Financial Risk Management – The future

BRIGHTONROCK

- Will consider the mixed game nature of markets: Exogenous and endogenous risk – hysteresis and super-additivity of risk
- Liquidity will be prominent in models
- Historic measures are trivial, but predictive is an open problem
- ALM - the technical problems will be recognised
- Mark-to-market accounting and value relevance in context
- Innovation and its negative consequences
- Risk mitigation by legal framework specification: e.g. Caveat Emptor versus Uberimae Fidei
- More than management devices for asymmetry of information – co-construction
- But overall will recognise the inherent uncertainty of risk estimates
- Market-centric finance has passed its prime
- Institutions should rise to prominence again
- With conservatism and security a central theme

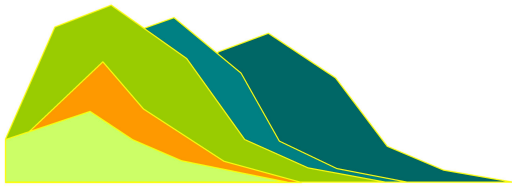


BRIGHTONROCK

An ending quotation

Because things are the way they are, things will not stay the way they are.

Bertolt Brecht (1898 - 1956)



BRIGHTONROCK

Con.Keating@BrightonRockGroup.co.uk

- Website:
- www.brightonrockgroup.co.uk

Contact Details



"We've done what we can. Now it's all in the hands of the accountants."