

Donald MacKenzie (2006) *An Engine, Not a Camera: How Financial Models Shape Markets* Cambridge MA MIT Press

"Financial economics ... did more than analyze markets, it altered them" p 12  
social studies of finance  
set of > 60 oral history interviews  
investigating whether finance theory was 'performative'  
Barnesian

The B-S-M model fit better over time up to the '87 crash then a volatility smile appeared "reveals the historicity of economics" 33

Miller's defn of equil - no scope for arbitrage profits  
with 1000 securities about 500,000 correlations  
Sharpe developed Markowitz's idea of correlation with an underlying factor founding the CAPM  
kind linear relationship between beta + return  
idiosyncratic risk would be diversified and not priced all investors would have the same optimal risky portfolio - the market portfolio  
random walk French broker Jules Regnaud 1863  
Louis Bachelier 1900  
Maurice Kendall 1952  $V^k$  stock prices 'Demon of Chance'  
Samuelson genuine Brownian motion log normal  
60s-70s two schools of modern finance dominated  
Chicago + MIT

Some review anomalies, opportunities for statistical arbitrage, or inefficiencies, others are primer for poorly understood risk factors

persistent anomalies include closed end funds and momentum inclusion in indices eroded lately

Mandelbrot: Mandelbrot Lévy distributions fat tails and self similarity invariant under scaling

Fama worked with Mandelbrot fat tails distributions became more normal as time periods lengthened

Work by R. Officer 1972 showed that simple scaling did not work

Lévy distribution can have infinite variance Normal if  $\alpha = 2$  'wild' randomness

Ch 5 Options sold on Dutch East India Co in late 1600s banned in Britain 1734 & 1834 in France 1806

Spensible attitude toward risk from price for leverage leverage - Samuelson

Classical Theory - to B-S except for constant mean-variance analysis seemed to assume

utility functions were good quadratic Merton continuous time model - user Continuous

tending to hedge the portfolio replication method

Black eff if within a factor of 2 of fundamental value CAPM dropped out option price determined by arbitrage expected return and risk aversion dropped out

Samuelson 'There is no such thing as a perfect hedge' 1978

B-S helped break the cultural aversion between gambling and option

Initially the correspondence between B-T prices and B-S-M ~~was~~ were poor but soon began to improve

Ch The Fall

B-S-M also used for portfolio insurance synthetic put - dynamic amt allocation

jump protection LOR worried of limitations concerned about positive feedback

Sept 11, '86 Dow ↓ 4.67. Jan 23, '87 ↓  
Autumn '87 doubt about whether success of

Programme was sustainable

Wed Oct 14 large fall Friday 16 4.6 ↓

Oct 19 London ↓ 11% largest largest one day ev.

Trading disruption due to high volume broke  
The index arbitrage link Dow ↓ 22.67

Take "strange chemistry between participants"

Greatest danger Monday night

The PI programme did tend to reduce initial losses but also to ruin the rebound

With log normal dist Oct 19 270 event  
Prob 10<sup>-160</sup> Jachowitz and Rubenstein 1996

PI ~ sold ~ 10% of sales on NYSE  
and 40% of futures on Merc

Oct 13 '87 PI sales total ~ 0.27% of capitalization

↓ 7% about 1% changed hands

Brief rebound Tues morning overwhelmed by more selling  
rebounded again in afternoon & next day  
about 1/2 reversed by close Wed.

heavy use of simple stop loss orders

failure of the DOT came from lots of small sellers

What caused the rebound has been little studied

### Volatility Skew

Antiquate adds a skew each day to their  
Cov - Ron - Rubenstein paper

Not agreement on why it exists it seems  
to be greater than just fat tails

M suspects the "collective trauma of '87"  
sustains the skew 206

The skew is less in UK + Japan

But 2003 becoming similar to

catastrophic risk market limited supply

In 1991 the Options Clearing Corporation  
shifted to heavy distributions for selling margin  
are alpha 1.65 range 1.3 to 2.00 for  
individual stocks - They don't change much  
in the SV with extreme events

### US Arbitrage LTCM

Convergence and relative value arbitrage

Two-legged trader

If held to maturity a convergence trade has  
to be profitable - LTCM used VAR and appeared  
to be highly diversified. They used conservative  
estimates of future values and stress tested  
for example correlation from 0.1 to 0.3 - considered risk  
of a sudden T in hair cuts

assets of "similar risks" subject to disagreement

M disagrees with Lowenstein that LTCM  
had blind faith in its model

M focuses on how imitation led to a  
super portfolio He calls it a sociological  
process

### Consensus Traders

Travler 97  
Thom Cibi

July 7, 98 Salomon closed its US arb desk and quickly liquidated its portfolio  
Soulfully the Russian default wasn't seen as a big event by US bankers

3 month moratorium of R bank for obligations wiped out ~~lots~~ lots of covs against the devaluation

LTCM had limited direct exposure, but institutions that did started liquidating  
The widening of spreads became 'self-feeding' rather than self-limiting 233

Most hedge funds didn't have LTCM's long lock up VAR technology may have contributed

correlations on LTCM's portfolio components went up from  $\approx 0.1$  to  $\approx 0.7$  233

A type of bank run started - Public concerns led to declines in asset prices and increased margin requirements of collateral

### Ch 9 Models and Markets

the achievement of efficiency as a process

The financialization of the corporation

"Human beings need to be viewed both as limited in cognitive ~~power~~ capacity ... and also as mutually susceptible ..." 266 concern with how our actions appear to others

Prospect theory will be gambler to avoid a low risk arrow in domain of gain and risk seeking in low domain

" Sometimes, behavioral finance seems... to be too narrowly psychological and <sup>individualistic</sup> ~~individualistic~~..."

Prosper theory countered by cultural 268 and organizational factors - counter to trader's maximum of run your profits and cut your losses - trader's manager to stop gambling for redemption

markets are mechanisms for collective calculation  
269-70 limits to arbitrage - derived by LTCM interview  
competitive construction of 'sufficient rationality'

'art of accumulation' at the heart of arbitrage  
Samuelson markets may be efficient in the narrow sense of relative value but not in the narrow sense of ascending bubbles - ride the dot com bubble

imitation<sup>can</sup> limits arbitrage diversity in crowding  
imitation-induced correlation

revised JWM Putnam risk model - worst case  
all cost = 1.0