

Fractals and Scaling in Finance" (M=Mandelbrot)

p. 62, 63

Concerning theorems of risk & probability of ruin
-M states that "much of statistics places an equal degree of confidence in Gaussian distribution. For example, many refined ~~theorems~~ theorems concerning risk and probabilities of ruin only hold in a universe in which the Gaussian holds with absolute exactitude".

p 65

"... the folklore that all financial charts look the same should be expected to fail for charts corresponding to long time periods"

Note: M is very concerned ~~that~~ that serial dependence is important & should not be overlooked.

NOTATION

Λ = L-STABLE MOTION

Σ = STUDENT'S DISTRIBUTION

p. 69

"Statistical fit need not be optimal for each individual feature of the problem, but must be acceptable for every quantity under consideration."

"do not focus exclusively on daily price changes over periods different from 1 day"

p. 69

• Hyperbolic distribution is "analytically" convenient.
Also, serial dependence can't be ignored.

p. 70

• M compares hydrology to finance

p 72

• A satisfactory statistical fit is of no use unless the fitting parameters are consistent in time and have intrinsic meaning.

ARMA has no intrinsic meaning.

ARCH is very good but there are concerns.

• M puts a lot of value on "scaling randomness".

P. 76: The "Lindy Effect."

p 79 "E3"

"New Methods in statistical economics."

• Pareto's Law

* p 80. M → Scaling distribution ~~but~~ literally cries for our attention. Especially, ~~the~~ (1) taking seriously the simplified models based on maximization or a linear aggregation (2) taking cautious view of the origin of the economic data or (3) believing that the physical distribution of various scarce mineral resources and of rainfall is important in economics.

* p 80

The most important feature of ^{the} scaling distribution is the length of its tail, not its extreme skewness.

p 81

Q The scholar observes in order to describe, but the entrepreneur observes in order to act.

p 81

Three ~~things~~ transformations are fundamental to varying extents.

1) Linear aggregation 2) Weighted mixtures.

P. 93

- * Kurtosis & Pearson's measure of skewness are meaningless.
- * A pattern is scientifically significant as a system of prediction when it is felt to have a good chance of repeating, meaning that in some sense, its likelihood of having occurred by chance is very small.

Unfortunately the tools of statistics have mostly been designed to deal with Gaussian alternatives.

P. 95

- 9 "The only criterion of trust worthiness is replicability in time"

P. 109

- ⊗ Bachelier - Invented Brownian motion & efficient market theory. "The mathematical expectations of the speculator is zero."
- * "Outliers" is mentioned here. I should find more information on this.

Questions & Facts

- What is autocovariance?
- What is the CW algorithm?
- " " Fixed Window Length Segmentation?
- Define ~~the~~
 - Local Stationarity
 - Non-"
- What is aggregation.

Mandelbrot's Path of Mentors

- ~~Cauchy~~ CAUCHY 1853 influenced Lévy (1886-1971).
- Lévy was Benoit's mentor.
- Lévy is the "L" in "L-Stable distributions"
- Macaulay's 1922 is respected by Benoit although he disagrees with its conclusion
- Zipf (1902-1950). His 1949 was influential. He ^(Zipf) invented "Power-law distribution".
(Mandelbrot's main area of physics is thermodynamics.)
- Walsh (Joseph L.) (1895-1973). Benoit was influenced by his 1949.
- Vilfredo Pareto (1848-1923). Sought to define economic equilibrium. Benoit was interested in his work on an empirical law, he wrote, for the distribution of personal income. (power-law distribution, or Pareto's Law.)
- Bachelier (1870-1946). Created "Brownian Motion" & "Efficient Market". EM lead to the general notion of "martingale".

Questions (and facts) <cont.>

• Bachelier <cont>: He states "The mathematical expectations of the buyer and the seller are zero".
OR, "The mathematical expectation of the speculator is zero".

Bachelier also went on to discover the Gaussian random-walk model and in noting its major weakness. What he saw was that the Brownian model diverges from the evidence in at least 2 ways: First, the sample variance of $L(t, T)$ varies in time. He observed that if the sample histograms are relative to mixtures of distinct populations, their tails could be expected to be fatter than in the ~~Gaussian~~ Gaussian case.

Second, he noted that no reasonable mixture of Gaussian distributions could account for the sizes of the very largest price changes, and treated them as "contaminators" or "outliers".
Hurst. The power-law relation in hydrology.
→ (1880-1978)

Fact: M1963 model of price variation owes to Lévy, Pareto, and Nippf.

Fact: "Fractal Brownian Motion strongly links my work in economics and the physical sciences" - Quote by Bercot.

Morris (William S.) See Morris 1962 "Operational Research for top Management". Morris was a

* People Who influenced Benoit, Questions, and
Facts cont.

- The Study of aggregation.

Benoit brought aggregation to economics.