

TW Notes on
Emanuel Derman (2011) Models. Behaving.
Badly Free Press

There are three distinct ways of
knowing the world: theories, models,
and intuition p. 5

Theories ~~Models~~ are attempts to discover
principles that drive the world

Models are metaphors that simplify

"Theories tell you what something is;
models tell you what something is like" p. 6

-TW] By this definition most economic
"theories" are really models.

"Intuition is more comprehensive" It's

like the archer with the bow

Making equations work correctly
~~regularly~~ requires their interpretation as

a metaphor p. 41

"Taking an analogy based on
matching ~~regularities~~ regularities and
then extending it into distant regions
is a time-honored trick of mathematics.

It's called analytic continuation" p. 41

"When you model 'the economy'
and 'the market' you are modeling

high level abstractions" p. 47

Hyeck argues in the physical world we
know the macro level through

and know the micro level by abstraction. With economics in the other way round" p 48

"Risk versus return is the overwhelming issue in finance" p 49

"Risk connotes the possibility of harm"
"The Standard Model [of physics]" p 47

is not really a model at all; it is a description and hence a theory" p 51

"A model is the construction of an analogy" p 51

"A model is a metaphor of limited applicability" ... [they] take the properties of something real and project them onto something strange" p 54

"A model is a caricature that over-emphasizes some features at the expense of others. It focuses on parts rather than the whole" p 54

"Thinking for yourself is hard work and models save mental labor" p 55

"A model is a little language" p 57

"Models reduce the number of dimensions" p 55

"Theories ... are the real thing. They need confirmation rather than explanation" p 59

"When models produce paradoxes or conflicts, it becomes necessary to expose the taken-for-granted assumptions" p 67

According to Spinoza "pleasure and pain are associated with transitions between states, not the states themselves" p 81

[W] This may help explain our tendency to always want more]

"Spinoza's entire theory resembles the structure of contingent claims in modern finance" p 82

The best theory in the world is quantum electrodynamics

"The development of the Efficient Markets Model... [was] driven as much by ideology as by facts" p 109

Einstein called intuition a "sympathetic understanding of experience" p 115

"The imposition of an apparently missing symmetry has become the classic modus operandi of theoretical physics" 122

"Calibration in finance works much less well than renormalization in physics" p 134

The lesson from Feynman et al in renormalization - the idea that the difference between two infinities can be finite is to "use your theories to calculate only what you can really measure and carefully avert your eyes from everything else" p133

In crisis the normal models of finance fail.

"The Black-Scholes option-pricing model ... regards markets as equilibrium-seeking systems and models them by analogy with the physics of heat diffusion" p140

Early on Derman thought it might be possible to use the ~~tools~~ tools of physics to build "a grand unified theory of securities" p140
After 20 years on Wall Street he no longer believes that

"In physics you're playing against God ... In finance you're playing against God's creature" p140

That doesn't mean modeling in finance is a waste of time, but you need to understand what they're best used for and not abandon your common sense

"Financial modeling is not the physics of markets" p 140

"Finance is not mathematics" p 141

Theorem are if-then statements

Physics has laws - which aren't contingent

He criticizes the idea that there is a fundamental theory of finance - there can't one of physics

Many economists mistake their models for laws

He argues that many articles in top academic finance journals "Replete with axioms, theorems, and lemmas, ... have a degree of rigor that is inversely proportional to their minimal usefulness" p 144

It isn't economists' fault that they don't have successful theories like physics because they're trying to explain the actions of people

"But it is the economists' fault that they take their simple models so seriously" p 144

He criticizes financial economists' "~~at~~ dark secret love of mathematical elegance regardless of its efficiency and its belief that ~~top~~ rigor can replace fact and intuition" p 144

You can't travel much further along
in physics than in finance before
you have to deal with uncertainty
"In finance the thread of uncertainty
emerges from the start" p 149

~~Fish~~ Fischer Black stressed
the noise in price. He argued
that if you take efficiency to mean
a price that's within $2 + \frac{1}{2} \times$

true value most markets are efficient
most of the time (most being $\approx 90\%$)

Derman thinks weather may be optimistic
He calls ~~K~~ Knight's risk p 153
"quantifiable uncertainty"

The EMM assumes new information
arrives uniformly

"The radically naive assumption of the
EMM" is that the only risk is one of
diffusion that grows only with \sqrt{t}

"The desire for risk is a biological
premise" 173

"I doubt there will ever be a consensus
value for the risk premium" 174

"He calls Black-Scholes "the best
model in all of economic..." 175 It works
much better than EMM - because it's
based on an ~~anti~~ arbitrage relationship

CAPM can't nearly as robust

He interprets CAPM as adding a "herding tendency", i.e. stocks tending to move up and down together, to the ~~CAPM~~ EMM p 174

"Despite its lack of great success, CAPM has infiltrated the ^{language} ~~language~~ of finance, even nonacademic finance" 182

"It is naive to imagine that the risk of every stock in the market can be condensed into just one quantity, its volatility σ .

Risk has too many aspects..." p 185

"CAPM is a useful way to think about a model world that is, quite often, far away from the world we live in" 185

A "news ... doesn't always arrive in small, steady increments" p 185

"~~But~~ People expect too much or too little from financial models.

"After more than 20 years of hubris, models collapsed [in the global financial crisis]" p 191

"Financial models aren't going to disappear. Data alone have no voice. Theorizing and modeling are what people do..." p 193

Financial models do have a number of uses. Among these are facilitating interpolation and quantifying intuition.

"Every financial axiom is pretty much wrong; the most relevant questions in creating a model are how wrong and in what way?" p 175

"Good models are vulgar in a sophisticated way" p 195

In models you need to "sweep dirt under the rug, but let users know about it" p 176

The dangerous part of Black-Scholes is that therein only diffusion risk

"Smart traders know that you have to combine models with heuristics" p 197

"despite the fancy mathematics, a model is a toy. No wonder it often breaks down and causes havoc" p 197

"A successful financial model must have limited scope and must work with simple analogies" p 198

Derman and Paul Wilmott in 2001 published an ethical declaration

The Financial Modelers' ~~Manifesto~~
Manifesto

It includes

"I will not ~~to~~ be overly impressed by mathematics. I will never sacrifice reality for elegance without explaining to my end user why I have done so"
pp 198-199
and

"I will not give the people who use my models false comfort about their accuracy" p 197

He ends ~~so~~ with a discussion of his disillusionment with the response to the financial crisis - crony capitalism ~~and~~ ~~the~~ ~~war~~ has broken the essential principle of capitalism that ~~there~~ risk and reward.